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# Getting Started with SOQL

Revolutionize the use of simple query strings to make them more efficient using SOQL

**Magulan D**

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to make them more efficient using SOQL

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I would like to thank Satheesh Kumar for his continuous effort in reviewing the book in spite of his busy schedule. He supported and encouraged me throughout my writing.

I would like to thank my wife Gowripriya for her support and motivation. She helped me a lot in my writing. She motivated me to write this book. Her reviews and comments helped me complete my writing. It was a long and difficult journey for her. I dedicate this book to her.

I would like to express my gratitude to all the people in Packt Publishing who supported me in publishing this book.

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Special thanks to my wife Dalila.

---

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- *How to login to DocuSign™ via REST in 10 minutes: A developer lab from Grigsby Consulting LLC's Integration Cookbook Volume 2* [Kindle Edition]
- *How to login to Salesforce™ via SOAP in 10 minutes: A developer lab from Grigsby Consulting LLC's Integration Cookbook Volume 2* [Kindle Edition]
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Reviewing this book was a great experience. I would like to thank the author and the publisher for presenting this opportunity to me. This book is a gift to developers who have just started learning Salesforce, as it provides a solid foundation with concepts explained in a simple language.

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# Preface

SOQL plays a vital role in the development of Salesforce.com and administration tasks. As a developer or as an administrator in Salesforce.com, we write many SOQL statements to fetch and validate the data present in the objects. If we know all the features in SOQL, we can easily write optimized SOQL statements to filter the data and fetch the required data from the object.

The sample queries used in this book will help you to understand the SOQL features easily. In the first few chapters, the sample queries are intended for beginners and for developers or administrators who are new to Salesforce.com. In the rest of the chapters, the sample queries are intended for Salesforce.com experts. So, in the first part, simple queries are used, and in the next part, complex queries are used for an easier understanding of the SOQL features. Real-time examples are used as sample queries. These examples include querying data from a single object as well as querying data from multiple objects in a single query.

This book also addresses the standards and guidelines to be followed when writing SOQL statements. The standards and guidelines discussed in this book will help you to write SOQL statements without hitting any limitation set by Salesforce.com and to avoid unwanted data fetched through the queries.

The last chapter provides the installation procedures to be followed to install the software needed to execute SOQL statements. These software help us to get the real-time data from the objects for viewing. They also help you to execute the sample queries used in this book in each and every chapter simultaneously.

The most interesting part is the knowledge check at the end of each chapter. The knowledge check is a kind of assessment that grabs our attention and concentration and helps us to recollect the topics learnt in that chapter. It is also helpful for Salesforce.com certification preparation.

## What this book covers

*Chapter 1, Introduction to SOQL*, shows what SOQL is and its purpose. While discussing its purpose, we will see where exactly we should use SOQL statements in Salesforce.com development and administration.

*Chapter 2, Basic SOQL Statements*, shows how to write basic SOQL statements in Salesforce.com. We will start with simple alias notation. We will try out many examples to differentiate objects using alias notation.

*Chapter 3, Advanced SOQL Statements*, shows how to query records from more than one object using relationship queries. The steps to get the relationship name among objects will also be provided.

*Chapter 4, Functions in SOQL*, shows all the functions that are available in SOQL. It discusses about the methods for translating the field values using `toLabel()`, which will be very useful when we want to translate the values and show them in a report.

*Chapter 5, Limitations and Best Practices*, shows the standards to be followed when writing SOQL statements. The best practice explained here allows us to retrieve the required records by filtering well. As a developer or as an administrator, we should follow these standards and best practices.

*Chapter 6, Tools with Installation Guidelines*, shows a few tools that are available to execute SOQL statements. The installation guidelines will also be discussed with step-by-step instructions.

## What you need for this book

A basic knowledge in Salesforce.com CRM is a prerequisite to follow the examples in this book. A basic knowledge of SQL is an added advantage.

## Who this book is for

This book is intended for Salesforce.com developers and administrators. Developers and administrators with a basic knowledge of Salesforce.com will find the material in this book accessible without additional preparation. Salesforce.com developers and administrators will find all the features that are available for writing SOQL statements.

---

## Conventions

In this book, you will find a number of styles of text that distinguish between different kinds of information. Here are some examples of these styles, and an explanation of their meaning.


Code words in text, database table names, folder names, filenames, file extensions, pathnames, dummy URLs, user input, and Twitter handles are shown as follows:


"Filtering a multiselect picklist field using the `INCLUDES` and `EXCLUDES` operators will be discussed in detail."

Any command-line input or output is written as follows:

```
SELECT Id, Name FROM Account
```

**New terms** and **important words** are shown in bold. Words that you see on the screen, in menus or dialog boxes for example, appear in the text like this: "The **Objects** link displays all the custom objects available in our organization."

 Warnings or important notes appear in a box like this.

 Tips and tricks appear like this.

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# 1

## Introduction to SOQL

You will be introduced to SOQL in this chapter. This chapter will also discuss the API names of standard objects, custom objects, standard fields, and custom fields. These API names are used while querying using SOQL statements. This chapter explains when and where we use SOQL statements in Salesforce.

SOQL syntax will give us more information, such as reserved keywords in SOQL, how to write SOQL statements, and so on. We will get started by writing our first SOQL statement in this chapter.

### What is SOQL?

**Salesforce Object Query Language (SOQL)** is used to build queries for fetching data in the Force.com platform. Just as we write a query in **Structured Query Language (SQL)** with some columns and a table, here, in SOQL, we write a query with some fields and an object. However, SOQL does not support all the features of SQL. For example, the \* character in the `SELECT` statement denotes all columns in a table in SQL, but it cannot be used in the `SELECT` statement in SOQL. So, to retrieve all fields in SOQL, we have to mention all the fields separated by commas.

SOQL is case insensitive. For ease of use, we suggest you to maintain SOQL keywords in uppercase and fields in initial case (first letter in uppercase and the rest in lowercase). Throughout this book, all SOQL keywords will be written in uppercase and object names, field lists, conditions, and so on will be written in lowercase.

SOQL is very easy to understand if you have prior knowledge in SQL. As mentioned earlier, however, it does not support all the features available in SQL. If we think of tables as objects and columns as fields in Salesforce, writing SOQL becomes easier. Salesforce has standard objects (objects defined by Salesforce) and custom objects (objects defined by the user). The custom object ends with `__c` for identification purposes.

Good knowledge of SOQL helps us to optimize our code. If we are looking for data from different objects, SOQL helps us a lot in accomplishing that. Instead of writing complex code to achieve this, an administrator or developer with vast knowledge of SOQL may easily accomplish these kinds of tasks. The functions available in SOQL reduce our workload and save time.

The sample queries used in this book are real-time examples with step-by-step explanations. Beginners will gain confidence as we go ahead. Administrators and developers can also get ideas on how to optimize their code for faster execution of queries. An administrator can easily build any kind of complex report in an Excel file by extracting data from the objects using SOQL and delivering it to the clients in a timely manner if he or she has good knowledge of SOQL. SOQL eases the tasks of administrators, who are always looking for data.



A developer also faces many situations where they may have to write SOQL queries in Apex programming. If the developer has wide knowledge of SOQL, they can easily accomplish their task without reiterating again and again to form data for manipulation.

Make use of the tools available at [Salesforce.com](https://www.salesforce.com) to execute the query instantly to clarify any doubts that arise. Salesforce provides tools, and third-party tools are also available. Steps with installation procedures and guidelines are available in *Chapter 6, Tools with Installation Guidelines*. The Developer Console can also be used for the easier and instant execution of queries.

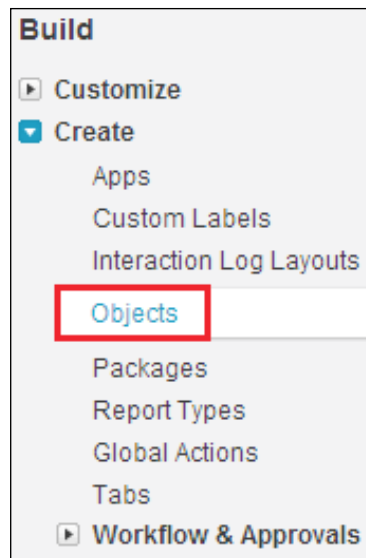
To use SOQL, we need to know the API name of the objects. To know the API names of the standard objects in Salesforce, visit the following reference link provided by Salesforce:

[http://www.salesforce.com/us/developer/docs/api/Content/sforce\\_api\\_objects\\_list.htm](http://www.salesforce.com/us/developer/docs/api/Content/sforce_api_objects_list.htm)

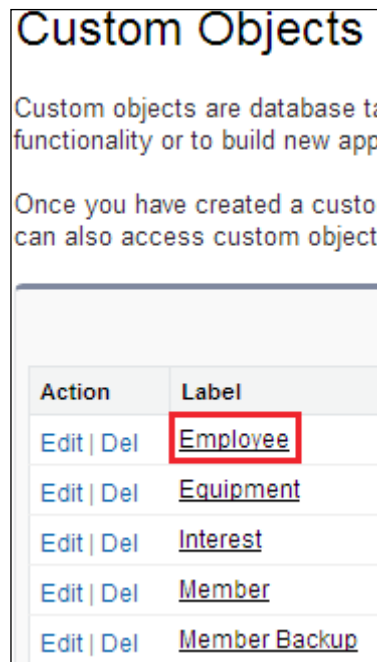
Since custom objects are user-defined objects, information about these objects will not be available under **Customize** in the Force.com setup.

 The API names of custom objects always end with \_\_c. 

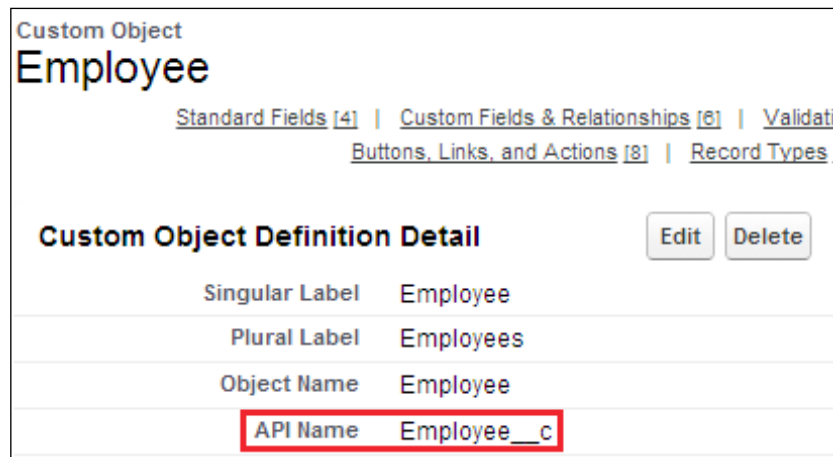
The steps to get the API name of the custom objects change from environment to environment. In my organization, it is **Setup | Build | Create | Objects**, as shown in the following screenshot. We can view an object's API name on selecting it.



The **Objects** link displays all the custom objects available in our organization, as shown in the following screenshot:



The **Employee** link redirects us to the `Employee` object custom definition, as shown in the following screenshot:



The `SELECT` statement is used to retrieve data from objects. Relationships must exist among objects in case we want to retrieve data from two or more objects.



It is not possible to write a single SOQL query to fetch records from two objects without any relationship among the two objects in Salesforce.

Relationship queries (queries for fetching records from more than one object) will be discussed in *Chapter 2, Basic SOQL Queries*.

## Purpose of SOQL

The main purpose of SOQL is to fetch data from Salesforce objects. SOQL can be used in the following places:

- The `queryString` parameter in the `query()` call
- Apex statements
- Visualforce controllers and the getter methods
- The schema explorer of the Force.com IDE

---

## SOQL syntax

Similar to SQL, SOQL also makes use of the `SELECT` statement to fetch data. Let us explore the following SOQL syntax:

```
SELECT fields
FROM Object
WHERE Condition
Ordering LIMIT
FOR VIEW Or FOR REFERENCE
OFFSET
UPDATE VIEWSTAT
```

The preceding query is explained as follows:

- `fields`: This denotes the API names of the fields of an object
- `Object`: This denotes the custom or standard object
- `Condition`: This is used for filtering records (optional)
- `Ordering`: This is used for ordering the result (optional)
- `Limit`: This is used for limiting the number of fetched records (optional)
- `FOR VIEW`: This updates `LastViewedDate` for fetched records (optional)
- `FOR REFERENCE`: This updates `LastReferencedDate` for fetched records (optional)
- `OFFSET`: This denotes the starting row for fetching (optional)
- `UPDATE VIEWSTAT`: This updates the articles' view statistics for fetched records (optional)

`SELECT`, `fieldList`, `FROM`, and `Object` are required. The others are optional in SOQL.

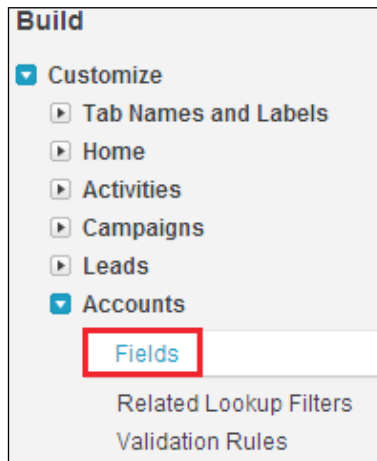
We should use the API names of the fields in the `SELECT` statement. We should not use the labels of the fields. The API names are available in the object definition. For **Standard Fields**, the **Field Name** column refers to the API name, and for **Custom Fields**, the **API Name** column refers to the API name.

To get the API names of standard objects in Salesforce, navigate to **Setup | Build | Customize | Object | Fields**.



In the Force.com setup, we can get all the information related to standard objects in Salesforce by navigating to **Build | Customize**.

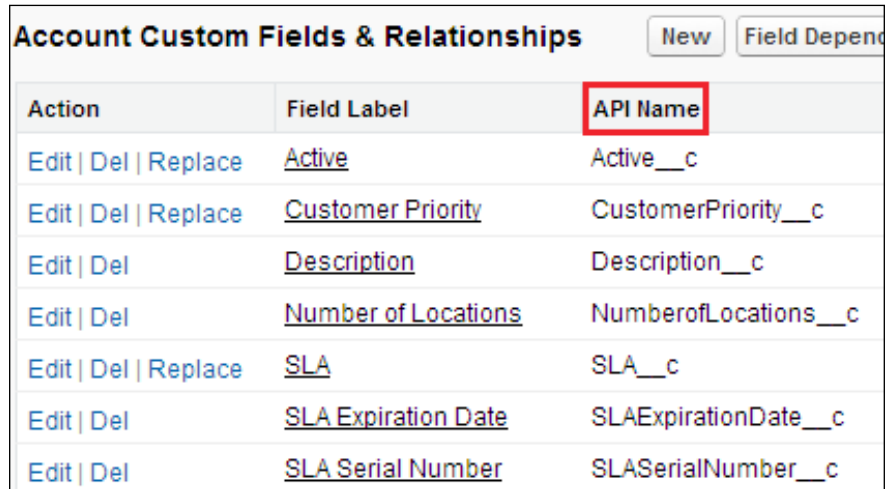
Let us see how to get the API names of the `Account` object fields. To get the API names of the `Account` object fields, navigate to **Setup | Build | Customize | Accounts | Fields** as shown in the following screenshot. The `Standard` object fields are present under **Customize** and custom objects are present under **Create | Objects** in Salesforce.



In the **Account Standard Fields** section, the **Field Name** column refers to the API name of the standard fields, as shown in the following screenshot:

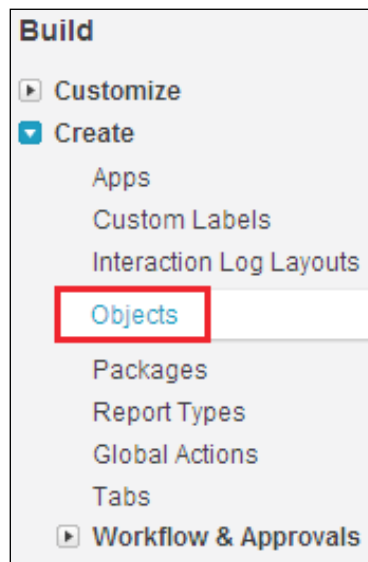
Action	Field Label	Field Name
	<a href="#">Account Name</a>	Name
<a href="#">Edit</a>	<a href="#">Account Number</a>	AccountNumber
<a href="#">Edit</a>	<a href="#">Account Owner</a>	Owner
<a href="#">Edit</a>	<a href="#">Account Site</a>	Site
<a href="#">Replace</a>   <a href="#">Edit</a>	<a href="#">Account Source</a>	AccountSource
<a href="#">Edit</a>	<a href="#">Annual Revenue</a>	AnnualRevenue
	<a href="#">Billing Address</a>	BillingAddress
	<a href="#">Created By</a>	CreatedBy
<a href="#">Edit</a>	<a href="#">Customer Portal Account</a>	IsCustomerPortal

In the **Account Custom Fields & Relationships** section, the **API Name** column denotes the API name of the fields, as shown in the following screenshot:



Action	Field Label	API Name
Edit   Del   Replace	<u>Active</u>	Active__c
Edit   Del   Replace	<u>Customer Priority</u>	CustomerPriority__c
Edit   Del	<u>Description</u>	Description__c
Edit   Del	<u>Number of Locations</u>	NumberofLocations__c
Edit   Del   Replace	<u>SLA</u>	SLA__c
Edit   Del	<u>SLA Expiration Date</u>	SLAExpirationDate__c
Edit   Del	<u>SLA Serial Number</u>	SLASerialNumber__c

To get the API names of custom objects in Salesforce, navigate to **Setup | Build | Create | Objects**, as shown in the following screenshot, and select the object:





This **Objects** link displays all the custom objects available in our organization, as shown in the following screenshot:

Action	Label
<a href="#">Edit</a>   <a href="#">Del</a>	<b>Employee</b>
<a href="#">Edit</a>   <a href="#">Del</a>	<a href="#">Equipment</a>
<a href="#">Edit</a>   <a href="#">Del</a>	<a href="#">Interest</a>
<a href="#">Edit</a>   <a href="#">Del</a>	<a href="#">Member</a>
<a href="#">Edit</a>   <a href="#">Del</a>	<a href="#">Member Backup</a>

The **Field Name** column in the **Standard Fields** section denotes the API names of the fields, as shown in the following screenshot:

Action	Field Label	Field Name
	<a href="#">Created By</a>	CreatedBy
<a href="#">Edit</a>	<b><a href="#">Employee Number</a></b>	Name
	<a href="#">Last Modified By</a>	LastModifiedBy
<a href="#">Edit</a>	<a href="#">Owner</a>	Owner

The **API Name** column in the **Custom Fields & Relationships** section denotes the API names of the fields, as shown in the following screenshot:

Action	Field Label	API Name
Edit   Del	<u>Age</u>	Age__c
Edit   Del   Replace	<u>City</u>	City__c
Edit   Del	<u>Date of birth</u>	Date_of_birth__c
Edit   Del	<u>Email</u>	Email__c
Edit   Del	<u>Employee Name</u>	Employee_Name__c
Edit   Del   Replace	<u>State</u>	State__c

## Writing your first SOQL statement

Before getting started with writing our first SOQL statement, we have to install a software to execute our queries. Salesforce offers a couple of tools to write and execute SOQL queries instantly. Salesforce also supports other third-party tools to write and execute queries. Let us write a simple SOQL query to fetch the IDs and names of accounts from the `Account` object.

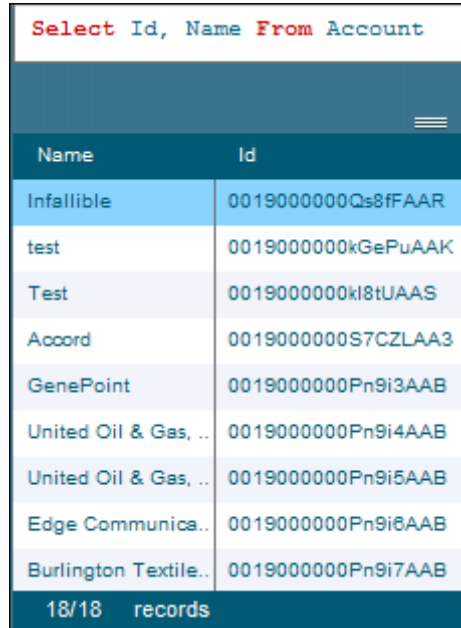


`Account` is a standard object in Salesforce. We use the `Account` object to store information about our customers and partners with whom we do business.

A sample query is given as follows:


```
SELECT Id, Name FROM Account
```

Refer to the following screenshot:



Select Id, Name From Account	
Name	Id
Infallible	0019000000Qs8fFAAR
test	0019000000kGePuAAK
Test	0019000000ki8tUAAS
Accord	0019000000S7CZLAA3
GenePoint	0019000000Pn9i3AAB
United Oil & Gas, ..	0019000000Pn9i4AAB
United Oil & Gas, ..	0019000000Pn9i5AAB
Edge Communica..	0019000000Pn9i6AAB
Burlington Textile..	0019000000Pn9i7AAB
18/18 records	

Here, `Id` and `Name` are standard fields of the `Account` object.

[  Custom objects and custom fields always end with `__c` in Salesforce. ]

Let us see another example of how to fetch custom fields in standard objects. Refer to the following screenshot:

SELECT Id, Name, Active\_\_c, CustomerPriority\_\_c FROM Account

Elapsed Time: 00 : 00 : 02 : 7260

Name	Active__c	Id	CustomerPriority__
GenePoint	Yes	0019000000Pn9i...	Low
United Oil & Gas, ..	Yes	0019000000Pn9i...	High
United Oil & Gas, ..	Yes	0019000000Pn9i...	High
Edge Communica..	Yes	0019000000Pn9i...	Medium
Burlington Textile..		0019000000Pn9i...	
Pyramid Construct..	Yes	0019000000Pn9i...	
Dickenson plc	Yes	0019000000Pn9i...	Low
Grand Hotels & R...	Yes	0019000000Pn9i...	High
Express Logistics ...	Yes	0019000000Pn9i...	Medium

18/18 records

Here, Id and Name are standard fields and Active\_\_c and CustomerPriority\_\_c are custom fields.

A sample query is given as follows:

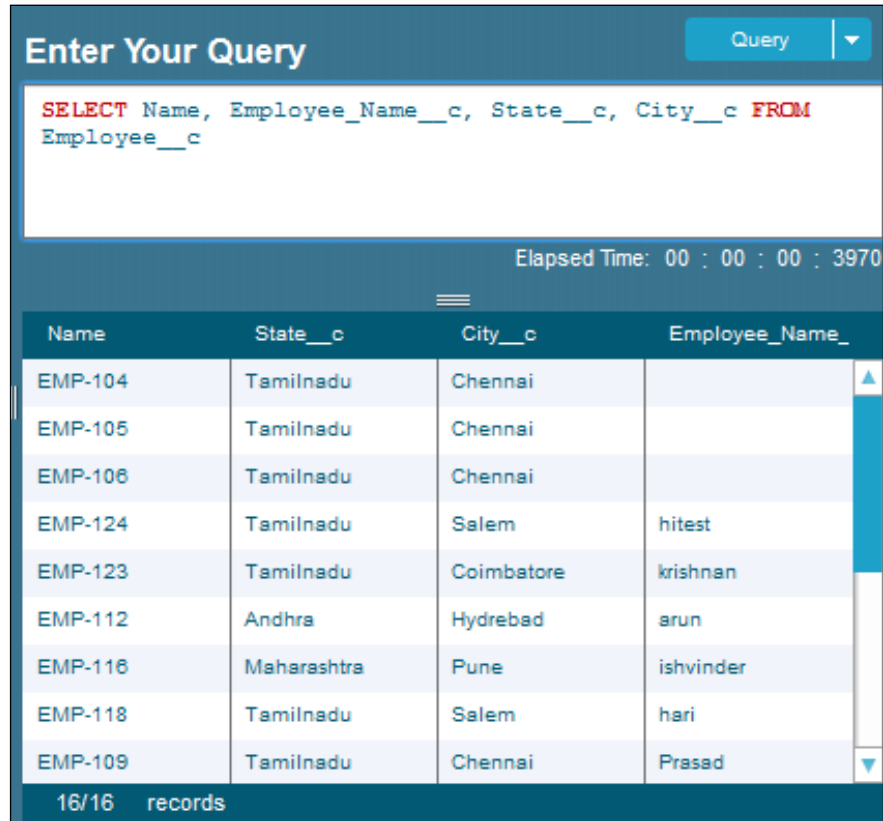
```
SELECT Id, Name, Active__c, CustomerPriority__c FROM Account
```

In the preceding example, we saw how to retrieve records from Account (standard object). Let us write a simple SOQL query to fetch records from a custom object. In this example, let us make use of a custom object, Employee\_\_c, which has custom fields such as Employee\_Name\_\_c, State\_\_c, City\_\_c, and so on.

A sample query is given as follows:

```
SELECT Name, Employee_Name__c, State__c, City__c FROM Employee__c
```

Refer to the following screenshot:



The screenshot shows a Salesforce query interface. At the top, there is a header "Enter Your Query" with a "Query" button. Below the header, the SQL query is displayed: `SELECT Name, Employee_Name__c, State__c, City__c FROM Employee__c`. Below the query, the elapsed time is shown as "Elapsed Time: 00 : 00 : 00 : 3970". The main part of the screenshot is a table with the following columns: Name, State\_\_c, City\_\_c, and Employee\_Name\_\_. The table contains 16 records, with the first 9 records visible. The bottom of the table shows "16/16 records".

Name	State__c	City__c	Employee_Name__
EMP-104	Tamilnadu	Chennai	
EMP-105	Tamilnadu	Chennai	
EMP-106	Tamilnadu	Chennai	
EMP-124	Tamilnadu	Salem	hitest
EMP-123	Tamilnadu	Coimbatore	krishnan
EMP-112	Andhra	Hydrebad	arun
EMP-116	Maharashtra	Pune	ishvinder
EMP-118	Tamilnadu	Salem	hari
EMP-109	Tamilnadu	Chennai	Prasad

Here, `Employee__c` is a custom object; `Name` is a standard field; and `Employee_Name__c`, `State__c`, and `City__c` are custom fields.

Each and every object in Salesforce has system fields. System fields are read-only fields. The following is a list of system fields:

- Id
- IsDeleted
- CreatedById
- CreatedDate

- LastModifiedById
- LastModifiedDate
- SystemModstamp



All system fields are not editable. Only a few system fields are editable. To get edit access to system fields, we have to contact Salesforce support.

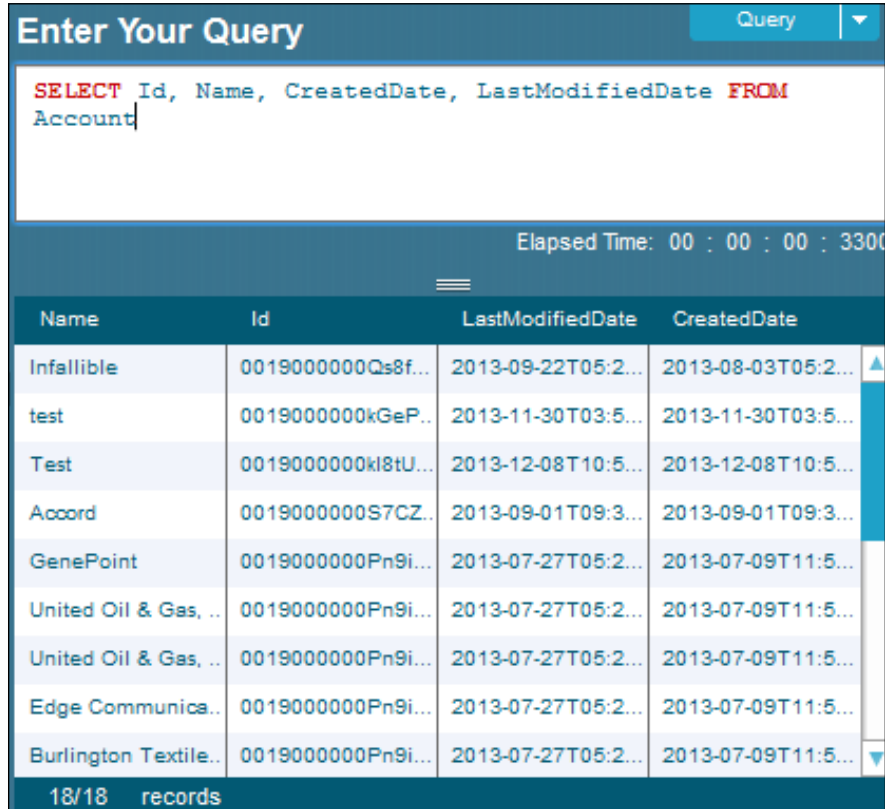
The following table describes field names:

Field Name	Description
Id	It is a unique identifier of the record.
IsDeleted	It is used to check if the record is in the <b>Recycle Bin</b> . If IsDeleted is true, the record is in the <b>Recycle Bin</b> , otherwise the record is not soft deleted.
CreatedById	It is the ID of the user who created the record.
CreatedDate	It is the date and time this record was created.
LastModifiedById	It is the ID of the user who last modified it.
LastModifiedDate	It is the date and time this record was last modified by a user.
SystemModstamp	It is the date and time when this record was last modified by a user or by an automated process (such as a trigger).

Let us see a sample SOQL query to fetch the system fields:

```
SELECT Id, Name, CreatedDate, LastModifiedDate FROM Account
```

Refer to the following screenshot:



The screenshot shows a query interface with a text area containing the following SQL query:

```
SELECT Id, Name, CreatedDate, LastModifiedDate FROM Account
```


Below the query, the elapsed time is shown as 00 : 00 : 00 : 3300. The results are displayed in a table with the following columns: Name, Id, LastModifiedDate, and CreatedDate.

Name	Id	LastModifiedDate	CreatedDate
Infallible	0019000000Qs8f...	2013-09-22T05:2...	2013-08-03T05:2...
test	0019000000kGeP...	2013-11-30T03:5...	2013-11-30T03:5...
Test	0019000000kl8tU...	2013-12-08T10:5...	2013-12-08T10:5...
Accord	0019000000S7CZ...	2013-09-01T09:3...	2013-09-01T09:3...
GenePoint	0019000000Pn9i...	2013-07-27T05:2...	2013-07-09T11:5...
United Oil & Gas, ..	0019000000Pn9i...	2013-07-27T05:2...	2013-07-09T11:5...
United Oil & Gas, ..	0019000000Pn9i...	2013-07-27T05:2...	2013-07-09T11:5...
Edge Communica..	0019000000Pn9i...	2013-07-27T05:2...	2013-07-09T11:5...
Burlington Textile..	0019000000Pn9i...	2013-07-27T05:2...	2013-07-09T11:5...

At the bottom of the table, it indicates 18/18 records.

Here, CreatedDate and LastModifiedDate are system fields.

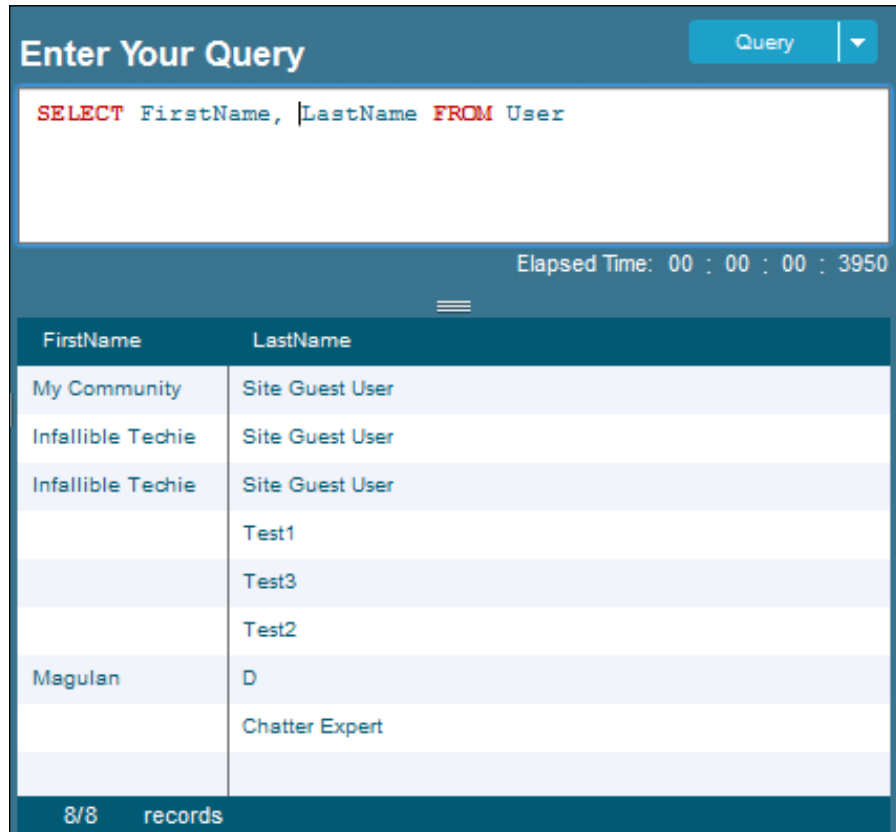
Let us see another example to fetch FirstName and LastName from the User object.

 The User object is also another standard object in Salesforce. The User object stores all the information about the users in the organization. The IsActive field is used to check whether the user is active or inactive.

A sample query is given as follows:

```
SELECT FirstName, LastName FROM User
```

Refer to the following screenshot:




The screenshot shows a query interface titled "Enter Your Query" with a "Query" button. The query entered is `SELECT FirstName, LastName FROM User`. Below the query, it shows "Elapsed Time: 00 : 00 : 00 : 3950". The results are displayed in a table with two columns: "FirstName" and "LastName".

FirstName	LastName
My Community	Site Guest User
Infallible Techie	Site Guest User
Infallible Techie	Site Guest User
	Test1
	Test3
	Test2
Magulan	D
	Chatter Expert

At the bottom of the table, it indicates "8/8 records".

Let us see another example to fetch Name and StageName from the Opportunity object.


 Opportunity is an important standard object in the Sales application in Salesforce. Opportunity is a potential revenue-generating event.

A sample query is given as follows:

```
SELECT Name, StageName FROM Opportunity
```




Refer to the following screenshot:

The screenshot shows a Salesforce query interface. At the top, there is a header "Enter Your Query" with a "Query" button and a dropdown arrow. Below the header, the query text is displayed: `SELECT Name, StageName FROM Opportunity`. Below the query, the elapsed time is shown as "Elapsed Time: 00 : 00 : 01 : 2540". Below the elapsed time, there is a table with two columns: "Name" and "StageName". The table contains 10 rows of data. At the bottom of the table, it says "33/33 records".

Name	StageName
Test	Value Proposition
Edge SLA	Closed Won
Grand Hotels Kitc...	Id. Decision Makers
Grand Hotels SLA	Closed Won
Express Logistics ...	Value Proposition
Express Logistics ...	Perception Analysis
Express Logistics ...	Closed Won
University of AZ In..	Proposal/Price Quote
University of AZ P...	Closed Won

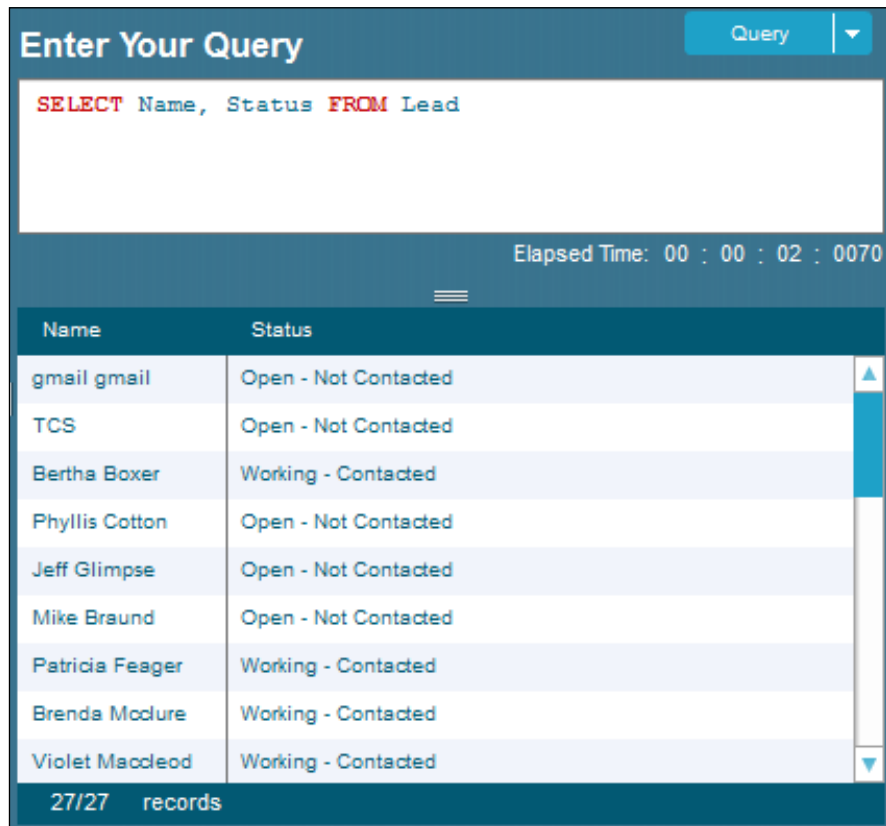
Let us see another example to fetch Name and Status from the Lead object.

[  Lead is also a standard object in Salesforce. Lead is used to store information about an organization or individual persons who are interested in our product. A Lead can be converted into a single Account, multiple Contacts, and multiple Opportunities objects. ]

A sample query is given as follows:

```
SELECT Name, Status FROM Lead
```


Refer to the following screenshot:



The screenshot shows a web interface titled "Enter Your Query" with a "Query" button. Below the title bar, a text input field contains the SQL query: `SELECT Name, Status FROM Lead`. Below the input field, the elapsed time is displayed as "Elapsed Time: 00 : 00 : 02 : 0070". A table with two columns, "Name" and "Status", displays the results of the query. The table contains 10 rows of data. At the bottom of the table, it indicates "27/27 records".

Name	Status
gmail gmail	Open - Not Contacted
TCS	Open - Not Contacted
Bertha Boxer	Working - Contacted
Phyllis Cotton	Open - Not Contacted
Jeff Glimpse	Open - Not Contacted
Mike Braund	Open - Not Contacted
Patricia Feager	Working - Contacted
Brenda Moclure	Working - Contacted
Violet Maccleod	Working - Contacted

Let us see another example to fetch `Id` and `Name` from the `Product` object. The API name of the `Product` object is `Product2`.

 The `Product2` object stores all the information about the products available in our organization.

A sample query is given as follows:

```
SELECT Id, Name FROM Product2
```

Refer to the following screenshot:

The screenshot shows a query execution interface with a dark blue header. The header contains the text "Enter Your Query" and a "Query" button with a dropdown arrow. Below the header is a text area containing the SQL query: `SELECT Id, Name FROM Product2`. Below the query area, the elapsed time is displayed as "Elapsed Time: 00 : 00 : 01 : 4530". Below the elapsed time is a table with two columns: "Name" and "Id". The table contains 18 rows of data. The first row is "Laptop" with Id "01t900000020111AAC". The second row is "GenWatt Diesel 1..." with Id "01t9000000256nPAAQ". The third row is "SLA: Bronze" with Id "01t9000000256nQAAQ". The fourth row is "GenWatt Gasoline.." with Id "01t9000000256nRAAQ". The fifth row is "Installation: Porta..." with Id "01t9000000256nSAAQ". The sixth row is "SLA: Gold" with Id "01t9000000256nTAAQ". The seventh row is "GenWatt Gasoline.." with Id "01t9000000256nUAAQ". The eighth row is "Installation: Indust.." with Id "01t9000000256nVAAQ". The ninth row is "GenWatt Gasoline.." with Id "01t9000000256nWAAQ". At the bottom of the table, it says "18/18 records".

Name	Id
Laptop	01t900000020111AAC
GenWatt Diesel 1...	01t9000000256nPAAQ
SLA: Bronze	01t9000000256nQAAQ
GenWatt Gasoline..	01t9000000256nRAAQ
Installation: Porta...	01t9000000256nSAAQ
SLA: Gold	01t9000000256nTAAQ
GenWatt Gasoline..	01t9000000256nUAAQ
Installation: Indust..	01t9000000256nVAAQ
GenWatt Gasoline..	01t9000000256nWAAQ

Let us see another example to fetch Id and Name from the Price Book object. The API name of the Price Book object is Pricebook2.

 Pricebook2 is another standard object in Salesforce. In the Pricebook2 object, we use stored information on the different prices of products.

A sample query is given as follows:

```
SELECT Id, Name FROM Pricebook2
```

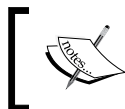
Refer to the following screenshot:

The screenshot shows a query interface with the following components:

- Header:** "Enter Your Query" with a "Query" button and a dropdown arrow.
- Query Text:** `SELECT Id, Name FROM Pricebook2`
- Elapsed Time:** 00 : 00 : 00 : 3610
- Table:** A table with two columns: "Name" and "Id".
 

Name	Id
Standard	01s900000000X2zaAAC
Standard Price Book	01s900000000X2zbAAC
- Footer:** 2/2 records

Let us see another example to fetch `ProductCode`, `Product2Id`, `Name`, and `UseStandardPrice` from the `Price Book Entry` object. The API name of the `Price Book Entry` object in Salesforce is `PricebookEntry`.



PricebookEntry is another Salesforce standard object. We store the list price of the product under the Pricebook2 object in the Pricebookentry object.

A sample query is given as follows:

```
SELECT ProductCode, Product2Id, Name, UseStandardPrice FROM
PricebookEntry
```

Refer to the following screenshot:

The screenshot shows a Salesforce query interface titled "Enter Your Query". The query entered is:

```
SELECT ProductCode, Product2Id, Name, UseStandardPrice
FROM PricebookEntry
```

The interface shows an elapsed time of 00 : 00 : 00 : 3990. Below the query, a table displays the results of the query. The table has four columns: Name, Product2Id, UseStandardPrice, and ProductCode. The results are as follows:

Name	Product2Id	UseStandardPrice	ProductCode
GenWatt Diesel 2...	01t9000000256n...	false	GC1040
GenWatt Diesel 1...	01t9000000256n...	false	GC1020
Installation: Indust..	01t9000000256nJ..	false	IN7080
SLA: Silver	01t9000000256n...	false	SL9040
GenWatt Propane..	01t9000000256n...	false	GC3040
SLA: Platinum	01t9000000256n...	false	SL9080
GenWatt Propane..	01t9000000256n...	false	GC3020
GenWatt Propane..	01t9000000256n...	false	GC3060
GenWatt Diesel 1...	01t9000000256n...	false	GC1060

At the bottom of the table, it indicates "36/36 records".

## Summary

In this chapter, we learned what SOQL is and got to know its purpose. While discussing the purpose, we saw where exactly we use SOQL statements in Salesforce development and administration.

We discussed the fetching of the API name of the custom object with detailed descriptions and steps. Moreover, we saw the steps for fetching API names of the standard and the custom fields. The usage of system fields and querying system fields, with a description of each system field, was provided in a table.

Basic syntax of SOQL statements with all reserved keywords was discussed. We also saw some examples for fetching records using the SOQL queries from standard objects and custom objects. Finally, methods to find the difference between custom objects and standard objects and custom fields and standard fields were introduced.

# 2

## Basic SOQL Statements

This chapter will teach us the usage of the alias notation, logical operators, comparison operators, the `IN` operator, the `NOT IN` operator, the `INCLUDES` operator, and the `EXCLUDES` operator while building SOQL queries. The different types of operators available are mainly used for filtering the records retrieved via the SOQL query.

The `WHERE` clause usage for filtering the records will also be explained. We will also learn how to sort the retrieved records while querying using the `ORDER BY` clause. By using the `ORDER BY` clause, we will be sorting our fetched records in both ascending and descending order.

### The alias notation

SOQL supports the alias notation. The alias notation in SOQL is usually used to distinguish different objects used in a single SOQL.

The name used for the alias notation is very important. The SOQL reserved keywords that cannot be used as alias names are `AND`, `ASC`, `DESC`, `EXCLUDES`, `FIRST`, `FROM`, `GROUP`, `HAVING`, `IN`, `INCLUDES`, `LAST`, `LIKE`, `LIMIT`, `NOT`, `NULL`, `NULLS`, `OR`, `SELECT`, `WHERE`, and `WITH`. Naming should be done in a way that denotes the object, which will help us when we write some complex SOQL statements.

Let us see a simple example to understand the usage of the alias notation in SOQL.

A sample query is given as follows:

```
SELECT Acct.Id, Acct.Name FROM Account Acct
```

In the preceding example, `Acct` is the alias notation for the `Account` object. We can directly fetch `Id` and `Name` of the `Account` object without using the alias notation as well. This query is just for understanding the usage of the alias notation. Further examples will be concerned more with objects in querying. We will get a clear picture about the usage of the alias notation in this chapter. The following screenshot shows the output of the SOQL execution:



The screenshot shows a query execution interface with a header "Enter Your Query" and a text area containing the query: `Select Acct.Id, Acct.Name From Account Acct`. Below the query is a table with two columns: "Name" and "Id". The table contains 18 rows of data, including entries like "Infallible", "test", "Test", "Accord", "GenePoint", "United Oil & Gas, ..", "Edge Communica..", "Burlington Textile..", "Pyramid Construct..", "Dickenson plc", "Grand Hotels & R...", "Express Logistics ...", "University of Arizo..", "United Oil & Gas ...", "sForce", and "System admin". At the bottom of the table, it indicates "18/18 records".

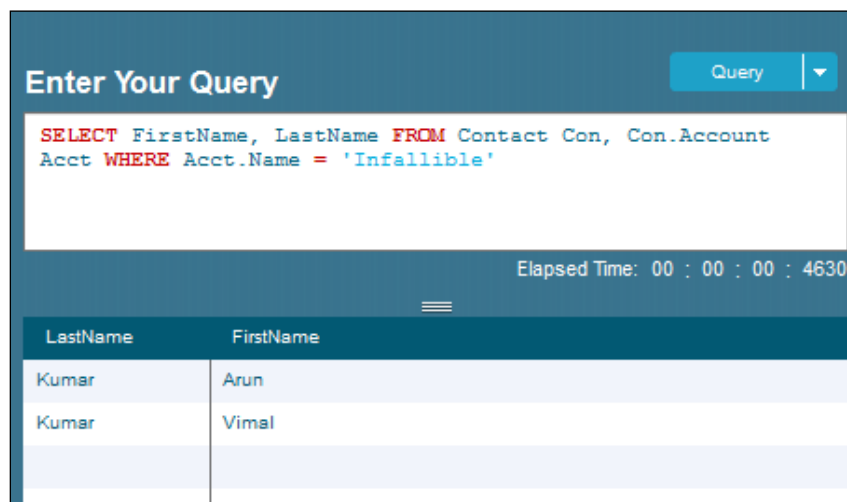
Name	Id
Infallible	0019000000Qs8fFAAR
test	0019000000kGePuAAK
Test	0019000000kI8tUAAS
Accord	0019000000S7CZLAA3
GenePoint	0019000000Pn9i3AAB
United Oil & Gas, ..	0019000000Pn9i4AAB
United Oil & Gas, ..	0019000000Pn9i5AAB
Edge Communica..	0019000000Pn9i6AAB
Burlington Textile..	0019000000Pn9i7AAB
Pyramid Construct..	0019000000Pn9i8AAB
Dickenson plc	0019000000Pn9i9AAB
Grand Hotels & R...	0019000000Pn9iAAAR
Express Logistics ...	0019000000Pn9iBAAR
University of Arizo..	0019000000Pn9iCAAR
United Oil & Gas ...	0019000000Pn9iDAAR
sForce	0019000000Pn9iEAAR
System admin	0019000000QKfy3AAD

So far, we are aware of using the alias notation in SOQL statements in Salesforce.com. With the help of the preceding example, we have queried records using the SOQL query from only one object. Let's see some complex examples to understand how the alias notation in SOQL statements work to distinguish different objects used in SOQL statements.

A sample query is given as follows:

```
SELECT FirstName, LastName FROM Contact Con, Con.Account Acct WHERE Acct.
Name = 'Infallible'
```

In the preceding example, *Acct* is the alias notation for the *Account* object and *Con* is the alias notation for the *Contact* object. The alias notation will be very helpful to us while writing the SOQL queries for querying the records from multiple objects. Since many fields are common in all the objects, this alias notation helps us to distinguish among the objects used in the query. The following screenshot is the output of the SOQL execution:



The screenshot shows the 'Enter Your Query' interface in Salesforce. The query entered is: `SELECT FirstName, LastName FROM Contact Con, Con.Account Acct WHERE Acct.Name = 'Infallible'`. The elapsed time is 00 : 00 : 00 : 4630. The results are displayed in a table with two columns: LastName and FirstName.

LastName	FirstName
Kumar	Arun
Kumar	Vimal

## The WHERE clause

The *WHERE* clause in SOQL is mainly used to filter retrieved data. The *WHERE* clause in SOQL is also called the condition expression. Whenever we want to filter our records from the objects using SOQL, we have to make use of the *WHERE* clause. The *WHERE* clause will retrieve the records that match the criterion or criteria. Followed by the *WHERE* clause, we can use the comparison operators, logical operators, *IN* operator, *NOT IN* operator, *INCLUDES* operator, *EXCLUDES* operator, and so on. We have the privilege of using a combination of these operators to filter correctly in a SOQL statement.



Let us see an example showing the usage of the WHERE clause. A sample query is given as follows:

```
SELECT FirstName, LastName FROM Contact WHERE FirstName != null
```

In the preceding example, the SOQL query will return all the Contact records where FirstName of the contacts is not null. The following screenshot is the output of the SOQL execution:

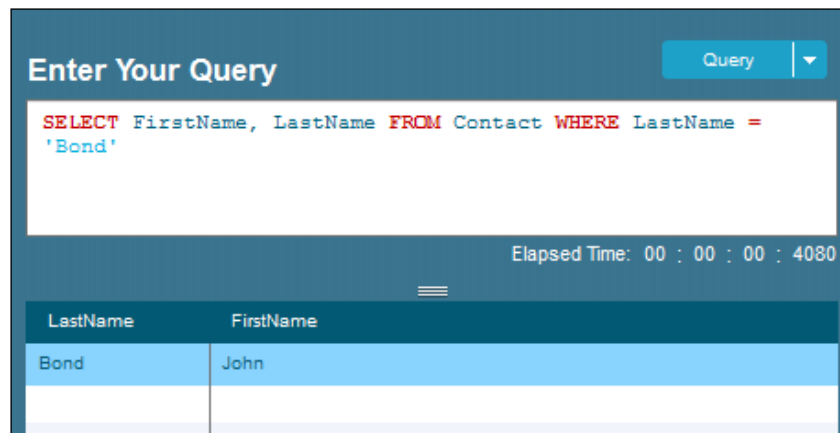
The screenshot shows a web interface for entering and executing a SOQL query. At the top, there is a text input field containing the query: `SELECT FirstName, LastName FROM Contact WHERE FirstName != null`. To the right of the input is a 'Query' button with a dropdown arrow. Below the input field, the execution time is displayed as 'Elapsed Time: 00 : 00 : 02 : 0970'. The main part of the interface is a table with two columns: 'LastName' and 'FirstName'. The table contains 23 rows of data, with the row for 'D'Cruz' highlighted in blue. At the bottom of the table, it says '23/23 records'.

LastName	FirstName
Gonzalez	Rose
Forbes	Sean
Rogers	Jack
Stumuller	Pat
Young	Andy
Barr	Tim
Bond	John
Pavlova	Stella
Boyle	Lauren
Levy	Babara
Davis	Josh
Grey	Jane
Song	Arthur
James	Ashley
Ripley	Tom
D'Cruz	Liz
Frank	Edna
Green	Avi

In the preceding example, we saw how to filter the `null` value records using the `WHERE` clause. In the same example, if we used the equals operator instead of the not equals operator, we would have retrieved records where the `FirstName` object of the contacts is null. With a small change, the query results differently. So, make sure to write your queries accurately. Let us see another example. A sample query is given as follows:

```
SELECT FirstName, LastName FROM Contact WHERE LastName = 'Bond'
```

In the preceding example, the SOQL query will return all the contacts where `LastName` is `Bond`. The preceding example with the condition `LastName = 'BOND'` will also produce the same result set since the SOQL string comparison is case insensitive. The following screenshot is the output of the SOQL execution:



## The comparison operators

Comparison operators are used in SOQL to compare a value with another value to return `true` or `false`. While using comparison operators, we should be very careful with data types. We should not compare number values with strings. We have to make sure we are comparing the values with proper data to avoid warnings and errors in SOQL.

Let us see the comparison operators that can be used in SOQL:

Operator	Description
=	Equals
!=	Not equals
<	Less than

Operator	Description
<=	Less than or equal to
>	Greater than
>=	Greater than or equal to
LIKE	Like

Let's see some examples of these comparison operators in SOQL.

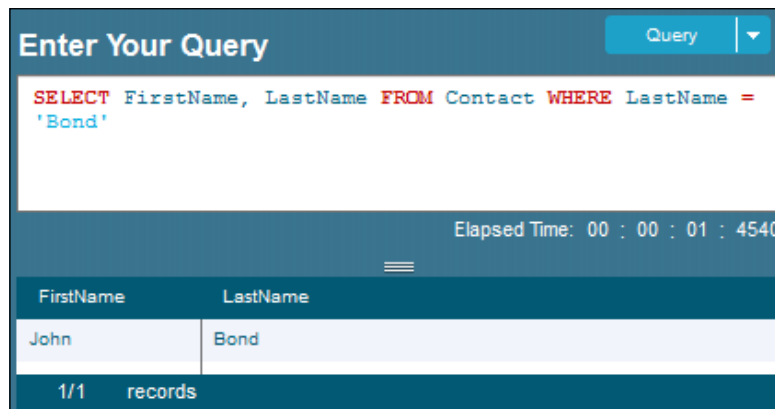
## The equals operator

Using the equals operator, we can retrieve records that match the given criteria. The equals operator checks whether the values of two operands are equal. If the value is equal, the condition becomes `true`. We can make use of the equals operator if we know which value we have to compare with.

A sample query is given as follows:

```
SELECT FirstName, LastName FROM Contact WHERE LastName = 'Bond'
```

The preceding query will retrieve all the contacts where the last name of the contact is Bond. The following screenshot is the output of the SOQL execution:



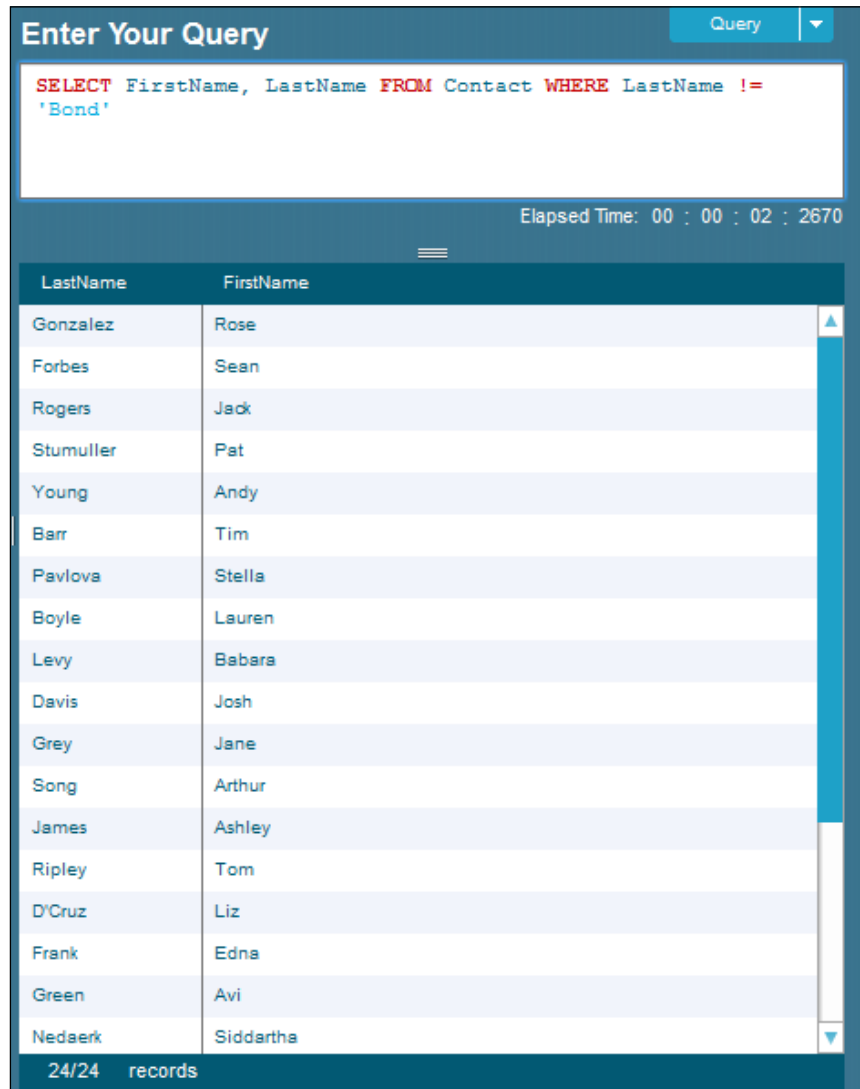
## The not equals operator

Using the not equals operator, we can retrieve records that do not match the given criteria. The not equals operator checks whether the values of two operands are equal. If the value is not equal, the condition becomes `true`. We can make use of the not equals operator to retrieve accurate data if we know the exact value that should not be included.

A sample query is given as follows:

```
SELECT FirstName, LastName FROM Contact WHERE LastName != 'Bond'
```

The preceding query will retrieve all the contacts where the last name of the contacts is not Bond. The following screenshot is the output of the SOQL execution:



The screenshot shows a web interface for executing a SOQL query. At the top, there is a header "Enter Your Query" with a "Query" button. Below the header, the query is displayed in a text area: `SELECT FirstName, LastName FROM Contact WHERE LastName != 'Bond'`. Below the query, the elapsed time is shown as "Elapsed Time: 00 : 00 : 02 : 2670". The results are displayed in a table with two columns: "LastName" and "FirstName". The table contains 24 records, with the first 23 visible in the screenshot. The records are as follows:

LastName	FirstName
Gonzalez	Rose
Forbes	Sean
Rogers	Jack
Stumuller	Pat
Young	Andy
Barr	Tim
Pavlova	Stella
Boyle	Lauren
Levy	Babara
Davis	Josh
Grey	Jane
Song	Arthur
James	Ashley
Ripley	Tom
D'Cruz	Liz
Frank	Edna
Green	Avi
Nedaerk	Siddartha

At the bottom of the table, it says "24/24 records".

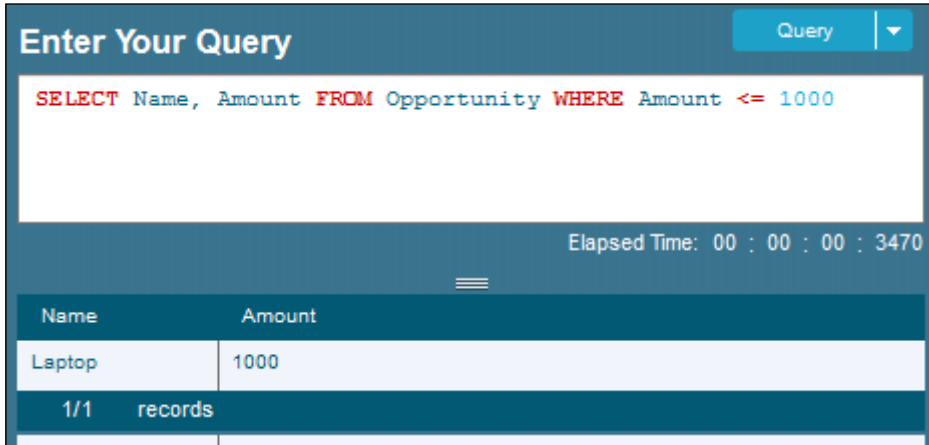
## The less than or equal to operator

Using the less than or equal to operator, we can retrieve records that are less than or equal to the given limit. The less than or equal to operator is used to check whether the value of the left operand is less than or equal to the value of the right operand. If yes, the condition becomes `true`. The record that matches the given limit will also be included in the result.

A sample query is given as follows:

```
SELECT Name, Amount FROM Opportunity WHERE Amount <= 1000
```

The preceding query will retrieve all Opportunity instances where Amount is less than or equal to 1000. If the Amount object is exactly equal to 1000, those Opportunity instances are also included in the result. The following screenshot is the output of the SOQL execution:



The screenshot shows a query execution interface with a dark blue header. The header contains the text "Enter Your Query" on the left and a "Query" button with a dropdown arrow on the right. Below the header is a white text area containing the SQL query: `SELECT Name, Amount FROM Opportunity WHERE Amount <= 1000`. Below the text area is a dark blue bar with the text "Elapsed Time: 00 : 00 : 00 : 3470". Below this bar is a table with two columns: "Name" and "Amount". The table has one row with the values "Laptop" and "1000". Below the table is a dark blue bar with the text "1/1 records".

Name	Amount
Laptop	1000

1/1 records

If we want to avoid this, we have to use the less than operator instead of the less than or equal to operator. We should be very careful when choosing the operator. If we select the wrong operator, we will get incorrect results.

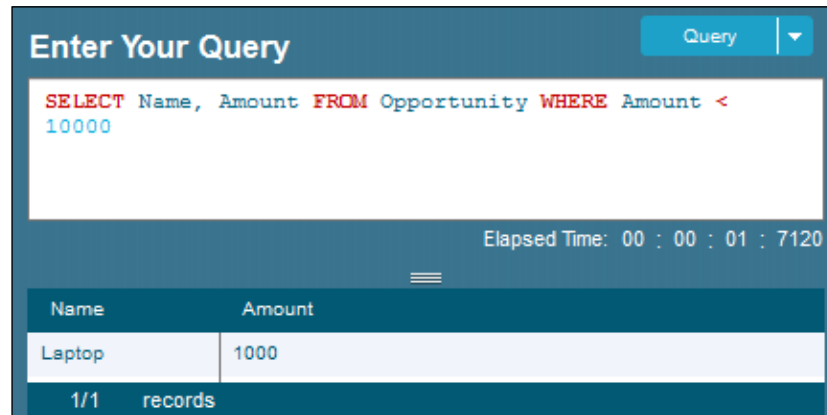
## The less than operator

Using the less than operator, we can retrieve records that are less than the given limit. The less than operator is used to check whether the value of the left operand is less than the value of the right operand. If yes, the condition becomes `true`. The less than operator does not include records that match the given limit, unlike the less than or equal to operator. In the less than operator, the limit is not included in the result. But in the case of the less than or equal to operator, the limit is included in the result.

A sample query is given as follows:

```
SELECT Name, Amount FROM Opportunity WHERE Amount < 10000
```

The preceding query will retrieve all `Opportunity` instances where `Amount` is less than 10000. The following screenshot is the output of the SOQL execution:



The screenshot shows a query execution interface with a dark blue header and a white text area for the query. The query is: `SELECT Name, Amount FROM Opportunity WHERE Amount < 10000`. Below the query, the elapsed time is shown as 00 : 00 : 01 : 7120. The results are displayed in a table with two columns: `Name` and `Amount`. The table contains one record: `Laptop` with an `Amount` of 1000. At the bottom of the table, it indicates 1/1 records.

Name	Amount
Laptop	1000

1/1 records

The `Opportunity` instances where `Amount` is exactly equal to 10000 are not included in the result. If we want to include this, we have to make use of the less than or equal to operator instead of the less than operator.

We need to ensure our symbol for the operator is correct, or else we will get incorrect results. If we are not careful, we may get the wrong set of data in our results. We have to check whether the symbol used is correct. A table with the list of operators and descriptions will help us a lot to avoid incorrect data while retrieving.


## The greater than or equal to operator

Using the greater than or equal to operator, we can retrieve the records that are greater than or equal to the given limit. The greater than or equal to operator is used to check whether the value of the left operand is greater than or equal to the value of the right operand. If yes, the condition becomes `true`. The limit is also included in the result.

A sample query is given as follows:

```
SELECT Name, Amount FROM Opportunity WHERE Amount >= 1000
```

The preceding query will retrieve all the Opportunity instances where Amount is greater than or equal to 1000. The Opportunity instances where the Amount object is exactly equal to 1000 are also included in the result. If we don't want to include those, we have to use the greater than operator instead. The choice of operator makes a big difference in the retrieved records count. The following screenshot is the output of the SOQL execution:



The screenshot shows a query execution interface with a text area containing the following SOQL query: `SELECT Name, Amount FROM Opportunity WHERE Amount >= 1000`. Below the query, the elapsed time is 00 : 00 : 01 : 748. The results are displayed in a table with two columns: Name and Amount. The table contains 33 records, with the first 18 records visible in the screenshot. The records are as follows:

Name	Amount
Laptop	1000
Edge SLA	60000
Grand Hotels Kite...	15000
Grand Hotels SLA	90000
Express Logistics ...	80000
Express Logistics ...	120000
Express Logistics ...	220000
University of AZ In..	100000
University of AZ P...	50000
University of AZ S...	90000
United Oil Emerg...	440000
United Oil Installa..	270000
United Oil Installa..	270000
United Oil Office ...	125000
GenePoint Stand...	85000
Burlington Textile..	235000
United Oil Installa..	235000
United Oil Plant S...	675000

At the bottom of the table, it indicates 33/33 records.

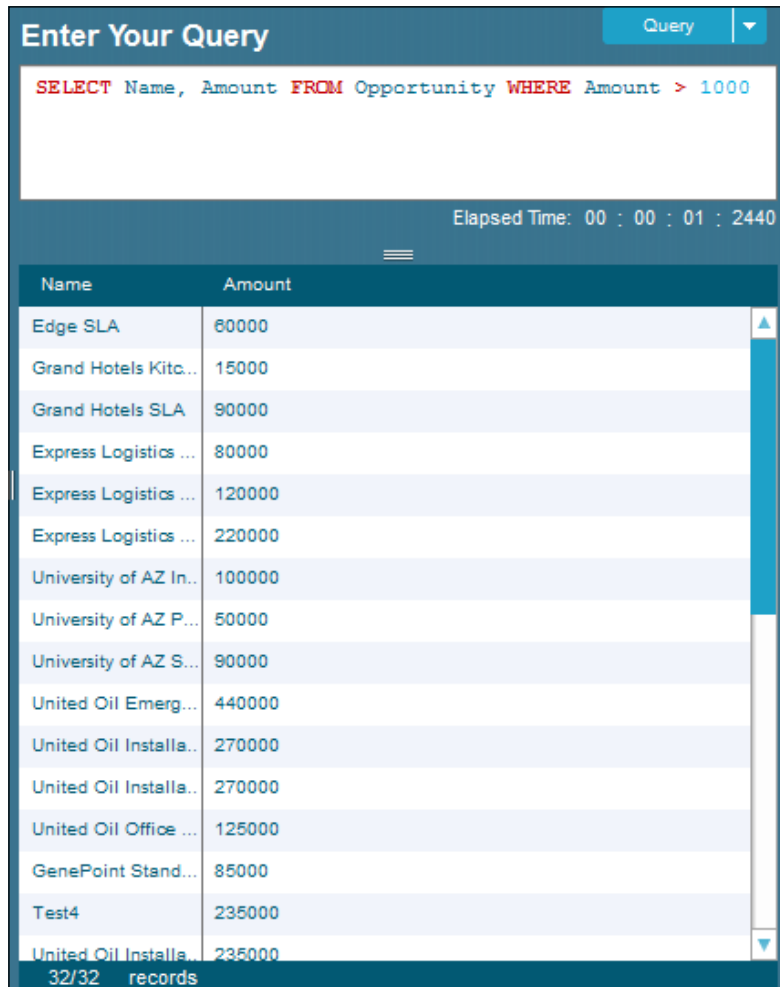
## The greater than operator

Using the greater than operator, we can retrieve records that are greater than the given limit. The greater than operator is used to check whether the value of the left operand is greater than the value of the right operand. If yes, the condition becomes true.

A sample query is given as follows:

```
SELECT Name, Amount FROM Opportunity WHERE Amount > 1000
```

The preceding query will retrieve all the `Opportunity` instances where `Amount` is greater than 1000. The following screenshot is the output of the SOQL execution:



The screenshot shows a web interface for entering and executing a SOQL query. The query entered is `SELECT Name, Amount FROM Opportunity WHERE Amount > 1000`. The execution time is 00 : 00 : 01 : 2440. The results are displayed in a table with two columns: `Name` and `Amount`. The table contains 32 records, with the first 15 visible in the screenshot. The records are sorted by `Amount` in descending order.

Name	Amount
Edge SLA	60000
Grand Hotels Kite...	15000
Grand Hotels SLA	90000
Express Logistics ...	80000
Express Logistics ...	120000
Express Logistics ...	220000
University of AZ In..	100000
University of AZ P...	50000
University of AZ S...	90000
United Oil Emerg...	440000
United Oil Installa..	270000
United Oil Installa..	270000
United Oil Office ...	125000
GenePoint Stand...	85000
Test4	235000
United Oil Installa..	235000

32/32 records

The `Opportunity` instances where the `Amount` object is exactly equal to 1000 are not included in the results. If we want to include 1000 in our results, we have to use the greater than or equal to operator instead.



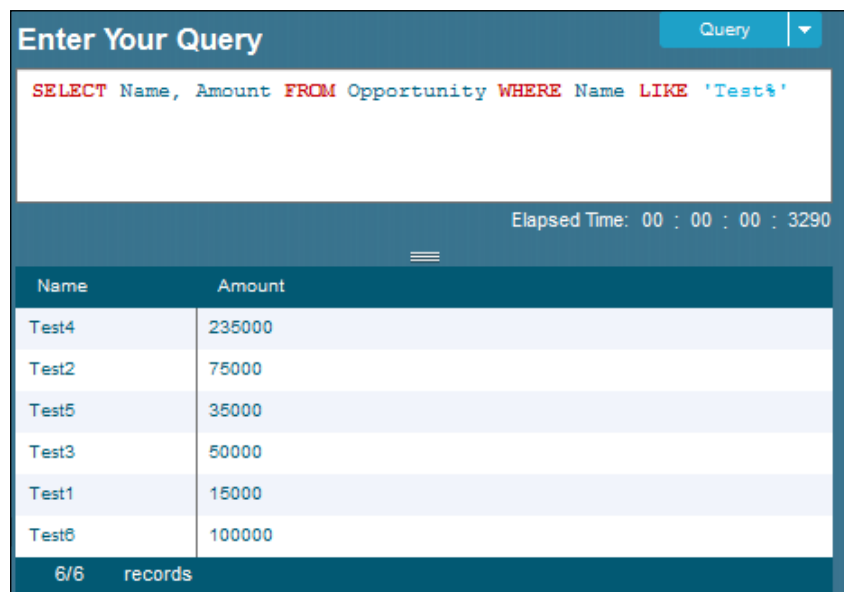
## The LIKE operator

Using the `LIKE` operator, we can retrieve records that match the substring provided. The `LIKE` operator is mainly used to compare a value to all similar values using wildcard characters. The `LIKE` operator is also called the pattern matching filtering technique. Any record that matches the pattern alone will be retrieved, which improves the filtering.

A sample query is given as follows:

```
SELECT Name, Amount FROM Opportunity WHERE Name LIKE 'Test%'
```

The preceding query will retrieve all the `Opportunity` instances where the name starts with `Test`. The following screenshot is the output of the SOQL execution:



The screenshot shows a query execution interface with a text input field containing the query: `SELECT Name, Amount FROM Opportunity WHERE Name LIKE 'Test%'`. Below the input field, the elapsed time is shown as `00 : 00 : 00 : 3290`. The results are displayed in a table with two columns: `Name` and `Amount`. The table contains six rows of data. At the bottom of the table, it indicates `6/6 records`.

Name	Amount
Test4	235000
Test2	75000
Test5	35000
Test3	50000
Test1	15000
Test6	100000

The `Opportunity` instances whose names end with `Test` will not be included in the results. If we also want to include names ending with `Test`, we have to use another percentage symbol to the left so that it will be `'%Test%'`. When we do this, any `Opportunity` instance with `Name` that includes `Test` will also be included in the result. We have to use `_` instead of `%` if we want to just match it with a single character to its left or right. The `LIKE` operator is very useful if we are unsure about the exact value with which we have to match. While using the `LIKE` operator, make sure you have entered the correct matching pattern. For example, the `'%Test%'` matching pattern will not be as efficient as `'Test%'` due to the way indexes work and may take a longer time to retrieve the result set of a large object.

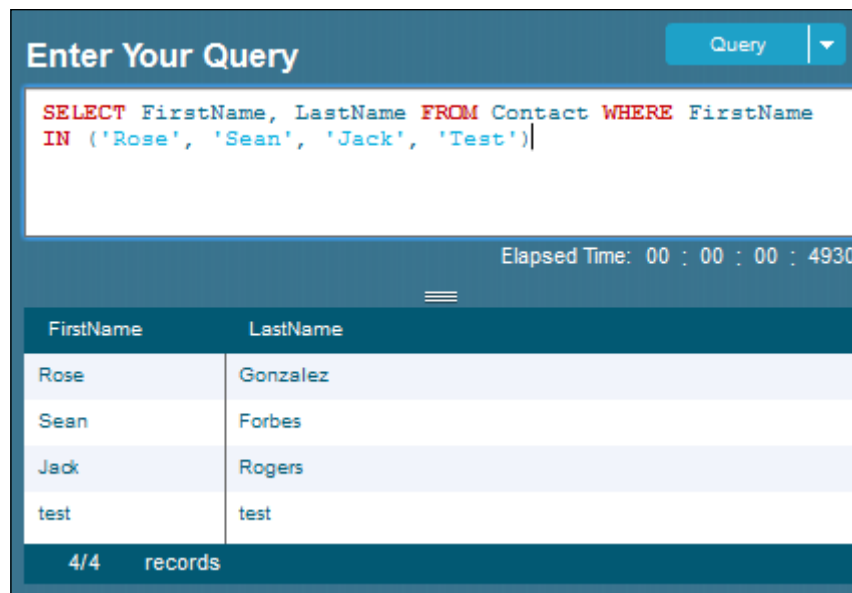
## The IN operator

The `IN` operator is used to specify multiple values in the `WHERE` clause for matching and filtering records. The SOQL query will fetch records that match the values specified. The `IN` operator is mainly used to compare a value to a list of values that have been specified, and it retrieves the records if it matches the values specified in the list. The `IN` operator is used if you want to compare a value with multiple values to ensure the retrieved records are accurate.

A sample query is given as follows:

```
SELECT FirstName, LastName FROM Contact WHERE FirstName IN ('Rose', 'Sean', 'Jack', 'Test')
```

The preceding query will return all contacts where the first name matches the values specified. Here, the values inside the brackets are case insensitive for the `IN` operator. The following screenshot is the output of the SOQL execution:



The screenshot shows a query execution interface with a text area containing the query: `SELECT FirstName, LastName FROM Contact WHERE FirstName IN ('Rose', 'Sean', 'Jack', 'Test')`. Below the text area, the elapsed time is shown as 00 : 00 : 00 : 4930. The results are displayed in a table with two columns: `FirstName` and `LastName`. The table contains four rows of data: Rose Gonzalez, Sean Forbes, Jack Rogers, and test test. At the bottom of the table, it indicates 4/4 records.

FirstName	LastName
Rose	Gonzalez
Sean	Forbes
Jack	Rogers
test	test

4/4 records

## The NOT IN operator

The `NOT IN` operator is used to specify multiple values in the `WHERE` clause for unmatching and filtering records. The SOQL will fetch records that do not match the values specified. The `NOT IN` operator is mainly used to compare a value to a list of values that have been specified, and it retrieves the records if it does not match the values specified in the list.

The `NOT IN` operator works in an opposite manner to the `IN` operator. It retrieves records that do not match the values specified, whereas the `IN` operator retrieves records that match the values specified.

A sample query is given as follows:

```
SELECT FirstName, LastName FROM Contact WHERE FirstName NOT IN ('Rose', 'Sean', 'Jack', 'Test')
```

The preceding query will return all the contacts where the first name does not match the values specified. The following screenshot is the output of the SOQL execution:



The screenshot shows a web interface for entering and executing a SOQL query. The query entered is: `SELECT FirstName, LastName FROM Contact WHERE FirstName NOT IN ('Rose', 'Sean', 'Jack', 'Test')`. The execution time is 00 : 00 : 01 : 4970. The results are displayed in a table with two columns: `FirstName` and `LastName`. The table contains 21 records, with the first 18 visible in the screenshot. The records are:

FirstName	LastName
Pat	Stumuller
Andy	Young
Tim	Barr
John	Bond
Stella	Pavlova
Lauren	Boyle
Babara	Levy
Josh	Davis
Jane	Grey
Arthur	Song
Ashley	James
Tom	Ripley
Liz	D'Cruz
Edna	Frank
Avi	Green
Siddhartha	Nedank

At the bottom of the table, it indicates "21/21 records".

The result does not contain records that match the specified values.

---

## The logical operators

The concept behind logical operators is simple and easy. Logical operators are mainly used to check multiple conditions in a single SOQL statement. Logical operators are connectors for connecting one or more conditions inside a single SOQL statement. It combines the conditions so that we can filter our records to be retrieved very accurately. Logical operator will return either `true` or `false`.

The two logical operators available in SOQL are the following:

- AND
- OR

### The AND operator

Using the `AND` operator, we can retrieve records that satisfy all the conditions specified. If a record matches the first condition and does not match the second condition, the record will not be retrieved. For example, say the condition states that the `city` parameter should be equal to `Chennai` and the `postal_code` parameter should not be null; if a record's `city` parameter is `Chennai` and `postal_code` is null, the record will not be retrieved.

### The OR operator

Using the `OR` operator, we can retrieve records that satisfy any one of the conditions specified. If a record matches the first condition and does not match the second condition, the record will be retrieved and vice versa. For example, say the condition states that the `city` parameter should be equal to `Chennai` or `Bangalore` and if a record's `city` parameter is `Mysore` for a record, the record will not be retrieved. However, if the `city` parameter is `Chennai` for a record, that record will be included in the results.

The use of `AND` and `OR` together is allowed in SOQL to filter our records to avoid unwanted ones in our result. The use of `AND` and `OR` together helps us in many ways to fetch our required records for manipulation.

A sample query for the `AND` operator is as follows:

```
SELECT Name, Amount FROM Opportunity WHERE Amount > 1000 AND Amount < 100000
```

The preceding query will retrieve opportunities where Amount is greater than 1000 and less than 100000. The following screenshot is the output of the SOQL execution:

The screenshot shows a query execution interface with the following components:

- Header:** "Enter Your Query" with a "Query" button.
- Query Text:**

```
SELECT Name, Amount FROM Opportunity WHERE Amount > 1000
AND Amount < 100000
```
- Elapsed Time:** 00 : 00 : 00 : 4380
- Table:** A table with two columns: "Name" and "Amount".
- Records:** 13 records are displayed, including "Edge SLA", "Grand Hotels Kitc...", "Grand Hotels SLA", "Express Logistics ...", "University of AZ P...", "University of AZ S...", "GenePoint Stand...", "GenePoint Lab G...", "GenePoint SLA", "Test2", "Test5", "Test3", and "Test1".
- Footer:** "13/13 records"

Name	Amount
Edge SLA	60000
Grand Hotels Kitc...	15000
Grand Hotels SLA	90000
Express Logistics ...	80000
University of AZ P...	50000
University of AZ S...	90000
GenePoint Stand...	85000
GenePoint Lab G...	60000
GenePoint SLA	30000
Test2	75000
Test5	35000
Test3	50000
Test1	15000

The Opportunity instances where amount is 1000 are not included in the result. If we want to include this, we have to use the greater than or equal to operator instead of the greater than operator.

A sample query for the OR operator is given as follows:

```
SELECT Name, Amount FROM Opportunity WHERE Name = 'Infallible' OR Name = 'Infallible Techie'
```

The preceding query will retrieve all the Opportunity instances where Name is Infallible or Infallible Techie. The following screenshot is the output of the SOQL execution:



The screenshot shows a query execution interface with a dark blue header. The header contains the text "Enter Your Query" on the left and a "Query" button with a dropdown arrow on the right. Below the header is a white text area containing the SQL query: `SELECT Name, Amount FROM Opportunity WHERE Name = 'Infallible' OR Name = 'Infallible Techie'`. Below the query area, the text "Elapsed Time: 00 : 00 : 00 : 3030" is displayed. Below the elapsed time is a table with two columns: "Amount" and "Name". The table has one row with the values "120000" and "Infallible Techie". At the bottom of the table, the text "1/1 records" is displayed.

Amount	Name
120000	Infallible Techie

1/1 records

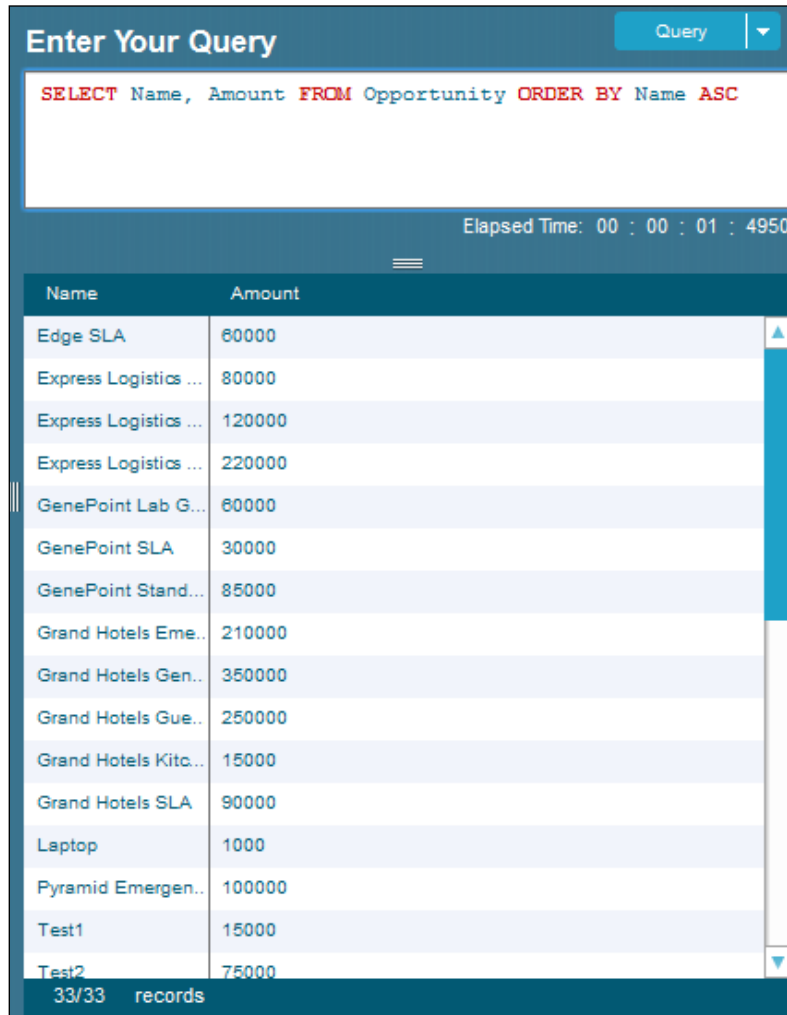
## The ORDER BY clause

The ORDER BY clause in SOQL is used to sort the records retrieved in the ascending or descending order.

An ascending order sample query is given as follows:

```
SELECT Name, Amount FROM Opportunity ORDER BY Name ASC
```

The preceding query will retrieve all the `Opportunity` instances arranged in the ascending order of the name. The following screenshot is the output of the SOQL execution:



The screenshot shows a query execution interface with the following components:

- Header:** "Enter Your Query" with a "Query" button and a dropdown arrow.
- Query Text:** `SELECT Name, Amount FROM Opportunity ORDER BY Name ASC`
- Elapsed Time:** 00 : 00 : 01 : 4950
- Table:** A table with two columns: "Name" and "Amount". The records are sorted by Name in ascending order.
- Footer:** "33/33 records"

Name	Amount
Edge SLA	60000
Express Logistics ...	80000
Express Logistics ...	120000
Express Logistics ...	220000
GenePoint Lab G...	60000
GenePoint SLA	30000
GenePoint Stand...	85000
Grand Hotels Eme..	210000
Grand Hotels Gen..	350000
Grand Hotels Gue..	250000
Grand Hotels Kitc..	15000
Grand Hotels SLA	90000
Laptop	1000
Pyramid Emergen..	100000
Test1	15000
Test2	75000

A descending order sample query is given as follows:

```
SELECT Name, Amount FROM Opportunity ORDER BY Name DESC
```

The preceding query will retrieve all the `Opportunity` instances arranged in the descending order of the name. The following screenshot is the output of the SOQL execution:


Enter Your Query
Query

```
SELECT Name, Amount FROM Opportunity ORDER BY Name DESC
```

Elapsed Time: 00 : 00 : 01 : 1710

Name	Amount
University of AZ S...	90000
University of AZ P...	50000
University of AZ In..	100000
United Oil Standb..	120000
United Oil SLA	120000
United Oil Refiner..	270000
United Oil Refiner..	915000
United Oil Plant S..	675000
United Oil Office ...	125000
United Oil Installa..	270000
United Oil Installa..	235000
United Oil Installa..	270000
United Oil Emerg...	440000
Test6	100000
Test5	35000
Test4	235000

33/33 records

[

]

Here, ASC means ascending order and DESC means descending order. By default, it will always be ascending order.

## The INCLUDES and EXCLUDES operators

The INCLUDES and EXCLUDES operators are mainly used for filtering the multipick list field in Salesforce.com. The standard way to filter multipick list field values in SOQL is using the INCLUDES and EXCLUDES operators. These operators are discussed in detail in *Chapter 3, Advanced SOQL Statements with Examples*.



## Summary

In this chapter, we saw how to write basic SOQL statements in Salesforce.com. We started with a simple alias notation. We tried many examples to differentiate objects using alias notation.

Later, we saw the logical operators, comparison operators, the `IN` operator, and the `NOT IN` operator. The logical operators `AND` and `OR` were explained in detail. The comparison operators, `=`, `!=`, `<`, `>`, `<=`, `>=`, and `LIKE`, were also explained in detail. We learned where, when, and the ways in which these operators can be used in our SOQL statements in Salesforce.com.

We also covered how to sort retrieved records, and this was explained with sample queries using the `ORDER BY` clause.

# 3

## Advanced SOQL Statements

In the previous chapter, we saw the basic SOQL statements that deal with one object in a SOQL statement. This chapter gives more information on how to write advanced SOQL statements. This chapter deals with querying the records for one or more objects in a single SOQL statement. In this case, there should be some relationship among the objects. In Salesforce.com, we cannot query the records from two or more objects if they don't have a relationship between them. The relationships that are available in Salesforce.com are **lookup** relationship and **master-detail** relationship.

Filtering a multiselect picklist field using the `INCLUDES` and `EXCLUDES` operators will be discussed in detail. In *Chapter 2, Basic SOQL Statements*, only the definition was given for the `INCLUDES` and `EXCLUDES` operators.

The grouping of records with more than one field using `GROUP BY ROLLUP` and `GROUP BY CUBE` will be explained here with examples. Sorting the records in both the ascending and descending orders together in a SOQL statement will also be further discussed.

### Relationship queries

Relationship queries are mainly used to query the records from one or more objects in a single SOQL statement in Salesforce.com. As discussed earlier, we cannot query the records from more than one object without having a relationship between the objects.

Let us see an example for relationship queries with standard objects to query the records. The relationship between `Account` and `Contact` is a lookup. `Account` is the parent object, and `Contact` is the child object. `Account` can have multiple `Contacts`.

A sample query is given as follows:

```
SELECT Id, Name, (SELECT Id, Name FROM Contacts) FROM Account
```

The preceding query will retrieve all the accounts and their associated Contacts. The following screenshot shows the output of the SOQL execution:

The screenshot shows a query execution interface with the following SQL query: `SELECT Id, Name, (SELECT Id, Name FROM Contacts) FROM Account`. The results are displayed in a table with three columns: Name, Id, and Contacts. The table contains 19 records, with the last one being 'sForce'. Each record lists the account name, its ID, and the number of associated contacts, with a link to view the contacts.

Name	Id	Contacts
TCS	001900000nBQL..	<a href="#">Contacts(3)</a>
Infallible	001900000Qs8f...	<a href="#">Contacts(2)</a>
test	001900000kGeP..	<a href="#">Contacts(1)</a>
Test	001900000ki8tU...	<a href="#">Contacts(2)</a>
Accord	001900000S7CZ..	
GenePoint	001900000Pn9i...	<a href="#">Contacts(1)</a>
United Oil & Gas, ..	001900000Pn9i...	<a href="#">Contacts(1)</a>
United Oil & Gas, ..	001900000Pn9i...	<a href="#">Contacts(2)</a>
Edge Communica..	001900000Pn9i...	<a href="#">Contacts(2)</a>
Burlington Textile..	001900000Pn9i...	<a href="#">Contacts(1)</a>
Pyramid Construct..	001900000Pn9i...	<a href="#">Contacts(1)</a>
Dickenson plc	001900000Pn9i...	<a href="#">Contacts(1)</a>
Grand Hotels & R...	001900000Pn9i...	<a href="#">Contacts(2)</a>
Express Logistics ...	001900000Pn9i...	<a href="#">Contacts(2)</a>
University of Arizo..	001900000Pn9i...	<a href="#">Contacts(1)</a>
United Oil & Gas ...	001900000Pn9i...	<a href="#">Contacts(4)</a>
sForce	001900000Pn9i...	<a href="#">Contacts(2)</a>

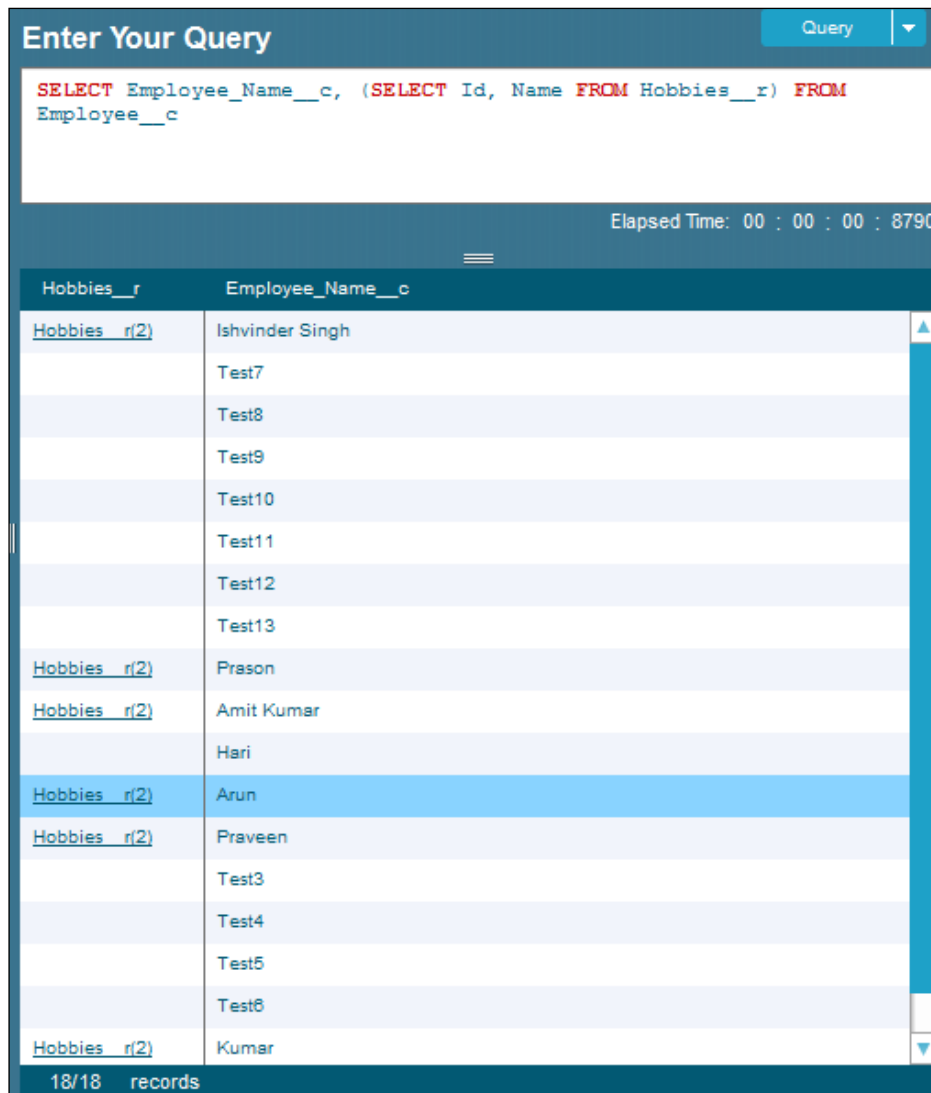
19/19 records

Let us see another example for relationship queries with custom objects to query the records. The relationship between Employee and Hobby is a master-detail relationship. Employee is the parent object, and Hobby is the child object. Employee can have multiple Hobbies.

A sample query is given as follows:

```
SELECT Employee_Name__c, (SELECT Id, Name FROM Hobbies__r) FROM Employee__c
```

The preceding query will retrieve all the names of the employees and their associated Hobbies. The following screenshot shows the output of the SOQL execution:



Enter Your Query Query

```
SELECT Employee_Name__c, (SELECT Id, Name FROM Hobbies__r) FROM Employee__c
```

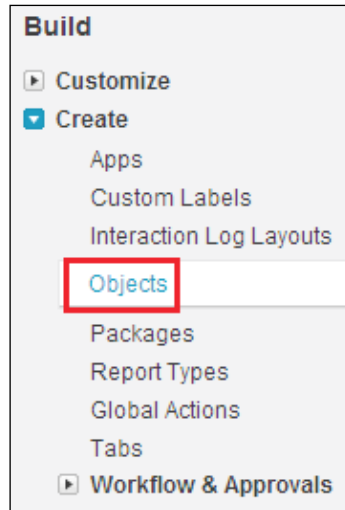
Elapsed Time: 00 : 00 : 00 : 8790

Hobbies__r	Employee_Name__c
Hobbies__r(2)	Ishvinder Singh
	Test7
	Test8
	Test9
	Test10
	Test11
	Test12
	Test13
Hobbies__r(2)	Prason
Hobbies__r(2)	Amit Kumar
	Hari
Hobbies__r(2)	Arun
Hobbies__r(2)	Praveen
	Test3
	Test4
	Test5
	Test6
Hobbies__r(2)	Kumar

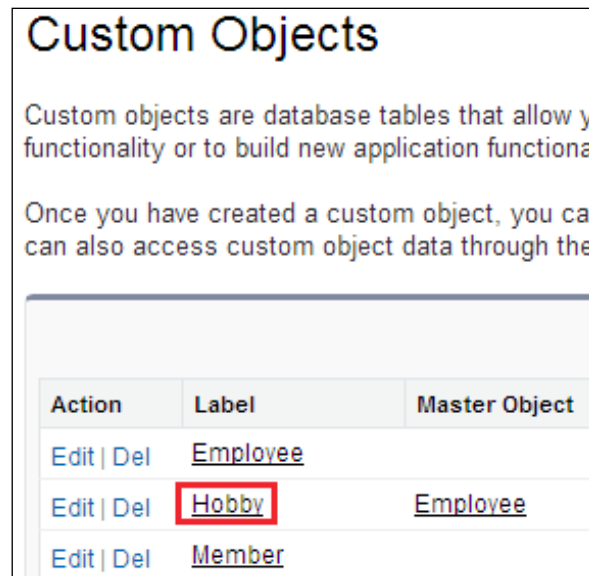
18/18 records

To find out the name of the relationship, go to the objects' definition and select the relationship field. The **Child Relationship Name** option gives us the relationship name. The `__r` symbol should be added along with the child relationship name to query in the case of custom relationships. For standard relationships, we should not add `__r`. The following steps will help us to get the relationship name for relationship queries:

1. Navigate to **Setup | Build | Create | Objects** as shown in the following screenshot:



2. Select the child object. In our example, *Hobby* is our child object as shown in the following screenshot:



3. Select the relationship field:

Standard Fields		
Action	Field Label	Field Name
	<a href="#">Created By</a>	CreatedBy
<a href="#">Edit</a>	<a href="#">Hobby Name</a>	Name
	<a href="#">Last Modified By</a>	LastModifiedBy

Custom Fields & Relationships			
		<a href="#">New</a>	<a href="#">Field Dependencies</a>
Action	Field Label	API Name	Data Type
<a href="#">Edit</a>   <a href="#">Del</a>	<b>Employee</b>	Employee__c	Master-Detail(Employee)

4. The **Child Relationship Name** option denotes the relationship name. We have to add \_\_r to the child relationship name when querying the records using SOQL. In the case of a standard relationship, we need not add \_\_r when we query the records using SOQL.

Custom Field Definition Detail			
		<a href="#">Edit</a>	<a href="#">Set Field-Level Security</a>
<b>Field Information</b>			
Field Label	Employee	Object Name	<a href="#">Hobby</a>
Field Name	Employee	Data Type	Master-Detail
API Name	Employee__c		
Description			
Help Text			
Created By	<a href="#">Maqulan D.</a> , 17/1/2014 4:36 PM	Modified By	<a href="#">Maqulan D.</a> , 17/1/2014
<b>Master-Detail Options</b>			
Related To	<a href="#">Employee</a>	<b>Child Relationship Name</b>	<b>Hobbies</b>



A custom relationship in Salesforce.com always ends with \_\_r. But a standard relationship, which exists between the standard Salesforce.com objects, does not end with \_\_r.

## Filtering multiselect picklist values

The `INCLUDES` and `EXCLUDES` operators are used to filter the multiselect picklist field. The multiselect picklist field in Salesforce allows the user to select more than one value from the list of values provided.

Let us see a few examples of filtering the multiselect picklist values. `Skills__c` is a multiselect picklist field.

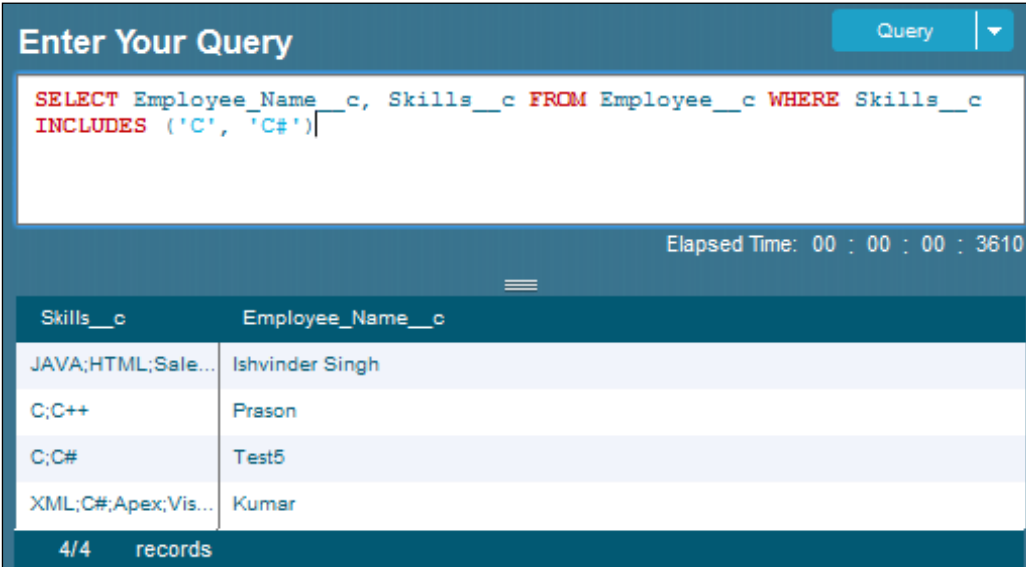
## The `INCLUDES` operator

The `INCLUDES` operator is used to retrieve the records that contain any one of the specified values.

A sample query is given as follows:

```
SELECT Employee_Name__c, Skills__c FROM Employee__c WHERE Skills__c
INCLUDES ('C', 'C#')
```

The preceding query will fetch the names of all the employees whose `Skills` match either with `C` or `C#`. The following screenshot is the output of the SOQL execution:



The screenshot shows a query execution interface with a text area containing the following SOQL query:

```
SELECT Employee_Name__c, Skills__c FROM Employee__c WHERE Skills__c
INCLUDES ('C', 'C#')
```

Below the query, the elapsed time is shown as 00 : 00 : 00 : 3610. The results are displayed in a table with two columns: `Skills__c` and `Employee_Name__c`.

Skills__c	Employee_Name__c
JAVA;HTML;Sale...	Ishvinder Singh
C;C++	Prason
C;C#	Test5
XML;C#;Apex;Vis...	Kumar

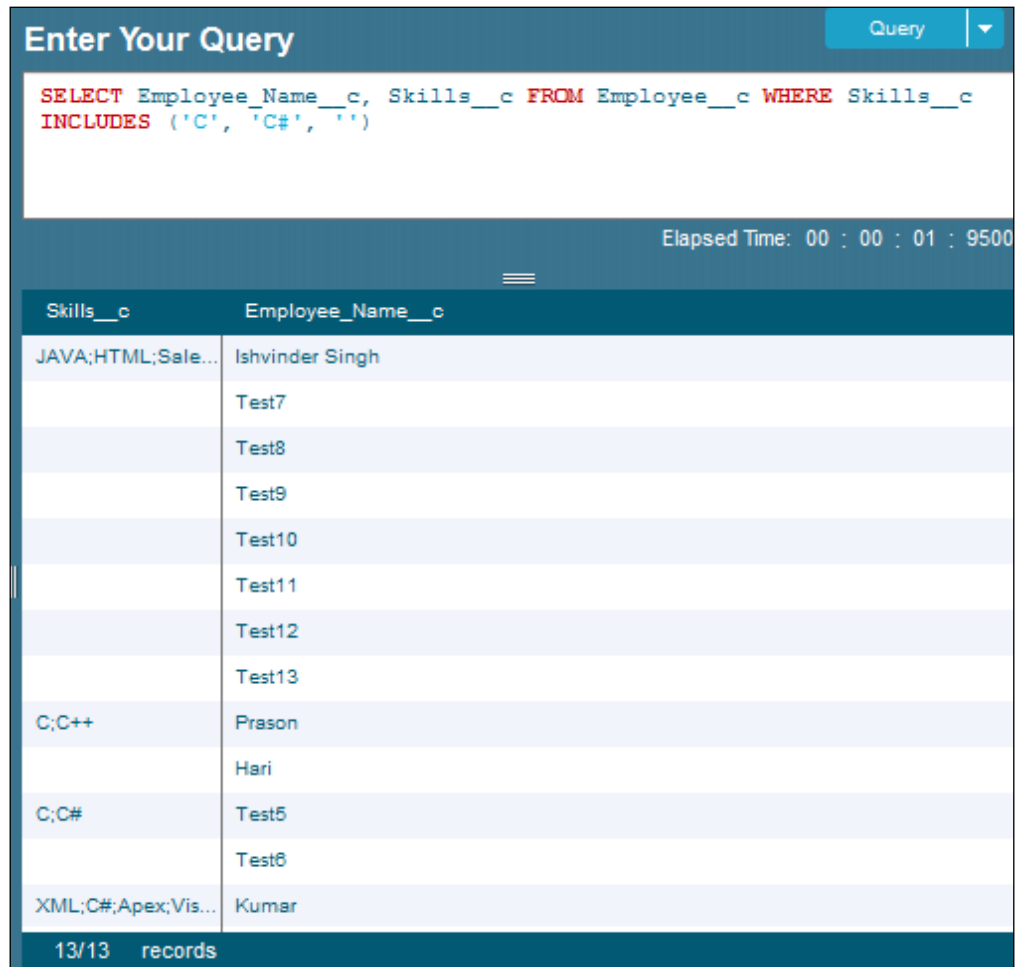
At the bottom of the table, it indicates 4/4 records.

Let us see an example for including a null value.

A sample query is given as follows:

```
SELECT Employee_Name__c, Skills__c FROM Employee__c WHERE Skills__c  
EXCLUDES ('C', 'C#', '')
```

The preceding query will fetch the names of all employees whose Skills match either with C or C# and null. The following screenshot shows the output of the SOQL execution:



The screenshot shows a query execution interface with the following components:

- Header:** "Enter Your Query" with a "Query" dropdown menu.
- Query Text:**

```
SELECT Employee_Name__c, Skills__c FROM Employee__c WHERE Skills__c  
INCLUDES ('C', 'C#', '')
```
- Elapsed Time:** 00 : 00 : 01 : 9500
- Table:** A table with two columns: "Skills\_\_c" and "Employee\_Name\_\_c".
- Records:** 13/13 records.

Skills__c	Employee_Name__c
JAVA;HTML;Sale...	Ishvinder Singh
	Test7
	Test8
	Test9
	Test10
	Test11
	Test12
	Test13
C;C++	Prason
	Hari
C;C#	Test5
	Test6
XML;C#;Apex;Vis...	Kumar



## The EXCLUDES operator

The EXCLUDES operator is used to retrieve the records that do not contain any one of the specified values.

A sample query is given as follows:

```
SELECT Employee_Name__c, Skills__c FROM Employee__c WHERE Skills__c EXCLUDES ('C', 'C#')
```

The preceding query will fetch the names of all employees whose skills do not match either with c or c#. The following screenshot shows the output of the SOQL execution:

The screenshot shows a query execution interface with a text area containing the following SOQL query:

```
SELECT Employee_Name__c, Skills__c FROM Employee__c WHERE Skills__c EXCLUDES ('C', 'C#')
```

Below the query, the elapsed time is shown as 00 : 00 : 00 : 8550. The results are displayed in a table with two columns: Skills\_\_c and Employee\_Name\_\_c.

Skills__c	Employee_Name__c
	Test7
	Test8
	Test9
	Test10
	Test11
	Test12
	Test13
Salesforce.com;Si..	Amit Kumar
	Hari
C++;JAVA	Arun
HTML;Salesforce...	Praveen
HTML;Salesforce...	Test3
C++;JAVA	Test4
	Test6

Let us see an example for excluding the null value.

A sample query is given as follows:

```
SELECT Employee_Name__c, Skills__c FROM Employee__c WHERE Skills__c
EXCLUDES ('C', 'C#', '')
```

The preceding query will fetch the names of all the employees whose Skills do not match either with C or C# and null. The following screenshot shows the output of the SOQL execution:

The screenshot shows a query execution interface with the following components:

- Query Input:** A text area containing the SOQL query: `SELECT Employee_Name__c, Skills__c FROM Employee__c WHERE Skills__c EXCLUDES ('C', 'C#', '')`
- Elapsed Time:** 00 : 00 : 01 : 1650
- Results Table:** A table with two columns: `Skills__c` and `Employee_Name__c`. It contains 9 records.
- Footer:** 9/9 records

Skills__c	Employee_Name__c
JAVA;HTML;Sale...	Ishvinder Singh
C;C++	Prason
Salesforce.com;Si..	Amit Kumar
C++;JAVA	Arun
HTML;Salesforce...	Praveen
HTML;Salesforce...	Test3
C++;JAVA	Test4
C;C#	Test5
XML;C#;Apex;Vis...	Kumar

## The escape sequences

An escape character is a character that invokes an alternative interpretation of the subsequent characters in a character sequence. The following table shows the list of escape sequences that can be used in the SOQL statements:

Sequence name	Description
\n or \N	New line
\r or \R	Carriage return
\t or \T	Tab
\f or \F	Form feed
\b or \B	Bell
\"	One double-quote character
\'	One single-quote character
\\	Backslash
The LIKE operator expression: \_	Matches a single underscore character ( _ )
The LIKE operator expression: \%	Matches a single percentage sign character ( % )

## The date formats

When querying the records using the date field or the date and time field in the SOQL statement, the date formats should be followed. The following table shows the list of date formats that can be used in the SOQL statements:

Format	Examples
YYYY-MM-DD	1999-01-01
YYYY-MM-DDThh:mm:ss+hh:mm	1999-01-01T23:01:01+01:00
YYYY-MM-DDThh:mm:ss-hh:mm	1999-01-01T23:01:01-08:00
YYYY-MM-DDThh:mm:ssZ	1999-01-01T23:01:01Z

## The date literals

When querying the records using the date field in the SOQL statement, the date literals can be used. The following table shows the list of date literals that can be used in the SOQL statements:

<b>Date literal</b>	<b>Sample query</b>
YESTERDAY	SELECT Id FROM Employee__c WHERE Joining_Date__c = YESTERDAY
TODAY	SELECT Id FROM Employee__c WHERE Joining_Date__c > TODAY
TOMORROW	SELECT Id FROM Employee__c WHERE Joining_Date__c = TOMORROW
LAST_WEEK	SELECT Id FROM Employee__c WHERE Joining_Date__c > LAST_WEEK
THIS_WEEK	SELECT Id FROM Employee__c WHERE Joining_Date__c < THIS_WEEK
NEXT_WEEK	SELECT Id FROM Employee__c WHERE Joining_Date__c = NEXT_WEEK
LAST_MONTH	SELECT Id FROM Employee__c WHERE Joining_Date__c > LAST_MONTH
THIS_MONTH	SELECT Id FROM Employee__c WHERE Joining_Date__c < THIS_MONTH
NEXT_MONTH	SELECT Id FROM Employee__c WHERE Joining_Date__c = NEXT_MONTH
LAST_90_DAYS	SELECT Id FROM Employee__c WHERE Joining_Date__c = LAST_90_DAYS
NEXT_90_DAYS	SELECT Id FROM Employee__c WHERE Joining_Date__c > NEXT_90_DAYS
LAST_N_DAYS:n	SELECT Id FROM Employee__c WHERE Joining_Date__c = LAST_N_DAYS:365
NEXT_N_DAYS:n	SELECT Id FROM Employee__c WHERE Joining_Date__c > NEXT_N_DAYS:15
THIS_QUARTER	SELECT Id FROM Employee__c WHERE Joining_Date__c = THIS_QUARTER
LAST_QUARTER	SELECT Id FROM Employee__c WHERE Joining_Date__c > LAST_QUARTER
NEXT_QUARTER	SELECT Id FROM Employee__c WHERE Joining_Date__c < NEXT_QUARTER

<b>Date literal</b>	<b>Sample query</b>
NEXT_N_QUARTERS:n	SELECT Id FROM Employee__c WHERE Joining_Date__c < NEXT_N_QUARTERS:2
LAST_N_QUARTERS:n	SELECT Id FROM Employee__c WHERE Joining_Date__c > LAST_N_QUARTERS:2
THIS_YEAR	SELECT Id FROM Employee__c WHERE Joining_Date__c = THIS_YEAR
LAST_YEAR	SELECT Id FROM Employee__c WHERE Joining_Date__c > LAST_YEAR
NEXT_YEAR	SELECT Id FROM Employee__c WHERE Joining_Date__c < NEXT_YEAR
NEXT_N_YEARS:n	SELECT Id FROM Employee__c WHERE Joining_Date__c < NEXT_N_YEARS:5
LAST_N_YEARS:n	SELECT Id FROM Employee__c WHERE Joining_Date__c > LAST_N_YEARS:5
THIS_FISCAL_QUARTER	SELECT Id FROM Employee__c WHERE Joining_Date__c = THIS_FISCAL_QUARTER
LAST_FISCAL_QUARTER	SELECT Id FROM Employee__c WHERE Joining_Date__c > LAST_FISCAL_QUARTER
NEXT_FISCAL_QUARTER	SELECT Id FROM Employee__c WHERE Joining_Date__c < NEXT_FISCAL_QUARTER
NEXT_N_FISCAL_QUARTERS:n	SELECT Id FROM Employee__c WHERE Joining_Date__c < NEXT_N_FISCAL_QUARTERS:6
LAST_N_FISCAL_QUARTERS:n	SELECT Id FROM Employee__c WHERE Joining_Date__c > LAST_N_FISCAL_QUARTERS:6
THIS_FISCAL_YEAR	SELECT Id FROM Employee__c WHERE Joining_Date__c = THIS_FISCAL_YEAR

---

Date literal	Sample query
LAST_FISCAL_YEAR	SELECT Id FROM Employee__c WHERE Joining_Date__c > LAST_FISCAL_YEAR
NEXT_FISCAL_YEAR	SELECT Id FROM Employee__c WHERE Joining_Date__c < NEXT_FISCAL_YEAR
NEXT_N_FISCAL_YEARS:n	SELECT Id FROM Employee__c WHERE Joining_Date__c < NEXT_N_FISCAL_YEARS:3
LAST_N_FISCAL_YEARS:n	SELECT Id FROM Employee__c WHERE Joining_Date__c > LAST_N_FISCAL_YEARS:3

## Querying with the date fields

Let us see an example for querying with the date field using one of the date literals we just covered.

A sample query is given as follows:

```
SELECT Employee_Name__c, Joining_Date__c FROM Employee__c WHERE Joining_Date__c < LAST_MONTH
```

The preceding query will fetch the names of all the employees whose joining date values are less than the values for the current date last month. The following screenshot shows the output of the SOQL execution:

The screenshot shows a query execution interface with the following components:

- Header:** "Enter Your Query" with a "Query" button and a dropdown arrow.
- Query Text:** `SELECT Employee_Name__c, Joining_Date__c FROM Employee__c WHERE Joining_Date__c < LAST_MONTH`
- Elapsed Time:** 00 : 00 : 03 : 6420
- Results Table:**

Joining_Date__c	Employee_Name__c
2002-01-22	Ishvinder Singh
1985-01-14	Prason
2009-01-23	Amit Kumar
1990-08-24	Arun
1978-01-08	Praveen
1988-03-25	Test4
1983-05-16	Test222
1983-10-07	Test221
2000-07-23	Kumar
- Footer:** 9/9 records

## Sorting in both the ascending and descending orders

Sometimes, we may get a chance to sort the records when we fetch these using the SOQL statements based on two fields, one field in the ascending order and another field in the descending order. The following sample query will help us to achieve this easily:

```
SELECT Name, Industry FROM Account ORDER By Name ASC, Industry DESC
```

Using the preceding SOQL query, the accounts will first be sorted by Name in the ascending order and then by Industry in the descending order. The following screenshot shows the output of the SOQL execution:



The screenshot shows a query execution interface with a text area containing the SOQL query: `SELECT Name, Industry FROM Account ORDER By Name ASC, Industry DESC`. Below the query, the elapsed time is shown as 00 : 00 : 00 : 347. The results are displayed in a table with two columns: Name and Industry. The records are sorted by Name in ascending order, and then by Industry in descending order. The table contains 19 records.

Name	Industry
Accord	Banking
Burlington Textile..	Apparel
Dickenson plc	Consulting
Edge Communica..	Electronics
Express Logistics ...	Transportation
GenePoint	Biotechnology
Grand Hotels & R...	Hospitality
Infallible	Engineering
manager acct	
Pyramid Construct..	Construction
sForce	
System admin	
TCS	
Test	
test	
United Oil & Gas ...	Energy
United Oil & Gas ..	Energy
United Oil & Gas ..	Energy

19/19 records

First, the records are arranged in the ascending order of the account's Name, and then it is sorted by Industry in the descending order.

## Using the GROUP BY ROLLUP clause

The GROUP BY ROLLUP clause is used to add subtotals for aggregated data in query results. A query with a GROUP BY ROLLUP clause returns the same aggregated data as an equivalent query with a GROUP BY clause. It also returns multiple levels of subtotal rows. You can include up to three fields in a comma-separated list in a GROUP BY ROLLUP clause.

A sample query is given as follows:

```
SELECT City__c, State__c, COUNT(Employee_Name__c) Counts FROM Employee__c
GROUP BY ROLLUP(City__c, State__c)
```

The following screenshot shows the output of the SOQL execution:

State__c	City__c	Counts
	Coimbatore	1
Kerala	Trivandram	1
	Trivandram	1
Kerala	Cochin	1
	Cochin	1
	Pune	1
Maharashtra	Pune	2
	Pune	3
Maharashtra	Mumbai	2
	Mumbai	2
Maharashtra	Thane	3
	Thane	3
Andhra Pradesh	Hyderabad	3
	Hyderabad	3

21/21 records



In the previous example, we saw both the statewise and citywise count. This `GROUP BY ROLLUP` clause will be very useful to us when we get a chance to work with the Visualforce charting feature.

## Using the FOR REFERENCE clause

The `FOR REFERENCE` clause is used to find the date/time when a record has been referenced. The `LastReferencedDate` field is updated for any retrieved records. The `FOR REFERENCE` clause is used to track the date/time when a record has been referenced last while executing a SOQL query.

A sample query is given as follows:

```
SELECT City__c, State__c, LastReferencedDate FROM Employee__c FOR REFERENCE
```

When we execute the preceding query for the first time, it shows the last reference date of the record in the `LastReferencedDate` column. However, for the second time, all the records will show the same date and time (the date and time when we executed the query for the first time) for `LastReferencedDate`.

## Using the FOR VIEW clause

The `FOR VIEW` clause is used to find the date when a record has been last viewed. The `LastViewedDate` field is updated for any retrieved records. The `FOR VIEW` clause is used to track the date when the record was viewed last while executing a SOQL query.

A sample query is given as follows:

```
SELECT City__c, State__c, LastViewedDate FROM Employee__c FOR VIEW
```

When we execute the preceding query for the first time, it shows the last viewed date of the record in the `LastViewedDate` column. However, for the second time, all the records will show the same date and time (the date and time when we executed the query for the first time) for `LastViewedDate`.

## Using the GROUP BY CUBE clause

The `GROUP BY CUBE` clause is used to add subtotals for every possible combination of the grouped field in the query results. The `GROUP BY CUBE` clause can be used with aggregate functions such as `SUM()` and `COUNT(fieldName)`. A SQL query with a `GROUP BY CUBE` clause retrieves the same aggregated records as an equivalent query with a `GROUP BY` clause. It also retrieves additional subtotal rows for each combination of fields specified in the comma-separated grouping list as well as the grand total.

A sample query is given as follows:

```
SELECT City__c, State__c, GROUPING(City__c) CityGroup, GROUPING(State__c)
StateGroup, COUNT(Id) IdCount FROM Employee__c GROUP BY CUBE(City__c,
State__c)
```

The following screenshot shows the output of the SOQL execution:

The screenshot shows a query execution interface with the following components:

- Query Editor:** Contains the SQL query: `SELECT City__c, State__c, GROUPING(City__c) CityGroup, GROUPING(State__c) StateGroup, COUNT(Id) IdCount FROM Employee__c GROUP BY CUBE(City__c, State__c)`
- Elapsed Time:** 00 : 00 : 02 : 250
- Table Output:** A table with 5 columns: `State__c`, `StateGroup`, `CityGroup`, `IdCount`, and `City__c`. The table contains 26 rows of data, including subtotals for each state and city combination.
- Footer:** 26/26 records

State__c	StateGroup	CityGroup	IdCount	City__c
	1	0	2	Chennai
Tamilnadu	0	0	2	Chennai
	1	0	1	Coimbatore
Tamilnadu	0	0	1	Coimbatore
	1	0	2	Trivandram
Kerala	0	0	2	Trivandram
	1	0	1	Cochin
Kerala	0	0	1	Cochin
	1	0	3	Pune
	0	0	1	Pune
Maharashtra	0	0	2	Pune
	1	0	2	Mumbai
Maharashtra	0	0	2	Mumbai
	1	0	3	Thane
Maharashtra	0	0	3	Thane
	1	0	3	Hyderabad
Andhra Pradesh	0	0	3	Hyderabad

## Using the OFFSET clause

The `OFFSET` clause is used to specify the starting row number from which the records will be fetched. The `OFFSET` clause will be very useful when we implement pagination in the Visualforce page. The `OFFSET` clause along with `LIMIT` is very useful in retrieving a subset of the records. The `OFFSET` usage in SOQL has many limitations and restrictions. The limitation and guidelines for using `OFFSET` will be discussed in detail in *Chapter 5, Limitations and Best Practices*.

A sample query is given as follows:

```
SELECT Name FROM Account OFFSET 100
```

The preceding query will fetch all the accounts starting from the row number 101. The first 100 records will not be fetched.

Let us see an example for `OFFSET` along with `LIMIT`.

A sample query is given as follows:

```
SELECT Name FROM Account OFFSET 100 LIMIT 50
```

The preceding query will fetch all the accounts starting from row number 101 to 150. Only these 50 records will be fetched. The `OFFSET` clause along with `LIMIT` helps to create the pagination concept in the Visualforce page very easily. The offset calculation is done on the server side. So, we have to be very careful when implementing pagination since it fetches fresh data for each query call.

Salesforce.com recommends that we use the `ORDER BY` clause whenever we use `OFFSET`. Using the `ORDER BY` clause along with `OFFSET` ensures that the ordering of the result set is consistent.

## Summary

In this chapter, we saw how to query the records from more than one object using the relationship queries. The steps to get the relationship name among objects were also provided. Querying the records using both standard relationship and custom relationship was also discussed.

Filtering multiselect picklist field values using the `INCLUDES` and `EXCLUDES` operators was explained. The grouping of records using `GROUP BY ROLLUP` and `GROUP BY CUBE` were also discussed.

To find the last viewed date of the record and to find the last referenced date of the record using `FOR VIEW` and `FOR REFERENCE`, respectively, were also explained. We also discussed pagination in the Visualforce page using `OFFSET` and `LIMIT`.

The next chapter deals with the functions that are available in SOQL. The functions help us to reuse the commands instead of writing conditions again and again.



# 4

## Functions in SOQL

SOQL has many built-in functions to perform manipulations using the retrieved data. This chapter deals with the usage of functions in SOQL. We will learn how these functions of SOQL reduce and avoid the usage of long SOQL statements. It is mainly used to simplify complex SOQL statements. These functions can just be called to perform repeated tasks.

Summarizing the records using the `GROUP BY` clause will also be explained with real-time examples. We will also explain all the aggregated functions and discuss how to filter the aggregated values using the `HAVING` clause.

### Using the `toLabel()` method

The `toLabel()` method is used to convert the results of a particular field into the user's language. All organizations can use `toLabel()`. The `toLabel()` method is of great help to an organization whose **Translation Workbench** is enabled.

The `toLabel()` method is used to get the translated values. The translation will be done on the user's locale who is querying the records.

There are many limitations of using `toLabel()`. These limitations are discussed in detail in *Chapter 5, Limitations and Best Practices*. Keep these limitations while in mind using `toLabel()`.



The Translation Workbench is used to specify all the languages in which the configurations performed in your organization can be translated.

A sample query is given as follows:

```
SELECT Name, toLabel(Industry) FROM Account
```

The preceding query retrieves all the records from the `Account` object whose `Industry` field values will be displayed in the querying user's locale. The following screenshot shows us the output of the SOQL execution:



The screenshot shows a query execution interface. At the top, there is a header "Enter Your Query" with a "Query" button. Below the header, the SQL query is displayed: `SELECT Name, toLabel(Industry) FROM Account`. The execution time is shown as "Elapsed Time: 00 : 00 : 03 : 2680". Below the query, there is a table with two columns: "Name" and "Industry". The table contains 18 records. The "Industry" column values are displayed in the user's locale. At the bottom of the table, it says "18/18 records".

Name	Industry
TCS	
Infallible	Engineering
test	
Test	
GenePoint	Biotechnology
United Oil & Gas, ...	Energy
United Oil & Gas, ...	Energy
Edge Communica..	Electronics
Burlington Textile..	Apparel
Pyramid Construct..	Construction
Dickenson plc	Consulting
Grand Hotels & R...	Hospitality
Express Logistics ...	Transportation
University of Arizo..	Education
United Oil & Gas ...	Energy
sForce	
System admin	
manager acct	

The output of the query shows us the `Name` and `Industry` column in the querying user's locale. If the `Industry` values were in different languages, we would have been able to see those values in the current user's locale. Organizations that have the Translation Workbench enabled can effectively make use of this feature.

---

## Using the GROUP BY clause

So far, all the queries that we saw were used to retrieve the records that match the WHERE conditions. We can also summarize our records using the GROUP BY clause.

The GROUP BY clause is used to group the set of records by the values specified in the field. The GROUP BY clause will gather all of the records that contain data in the specified fields together and will allow aggregate functions to be performed on one or more fields.

The GROUP BY clause is used along with the aggregate functions to group the retrieved records using one or more fields. We can use a GROUP BY clause without an aggregated function to query all the distinct values, including the null values for an object. In order to avoid null values, COUNT\_DISTINCT() is used. The COUNT\_DISTINCT() usage is further discussed later.

The aggregate functions available in SQL are as follows:

- COUNT()
- COUNT(FIELD\_NAME)
- COUNT\_DISTINCT()
- SUM()
- MIN()
- MAX()

The preceding six aggregate functions are used along with the GROUP BY clause in SQL to fetch our required statistical data from the objects. These aggregate functions are very useful when the requirements need summarized or grouped values.

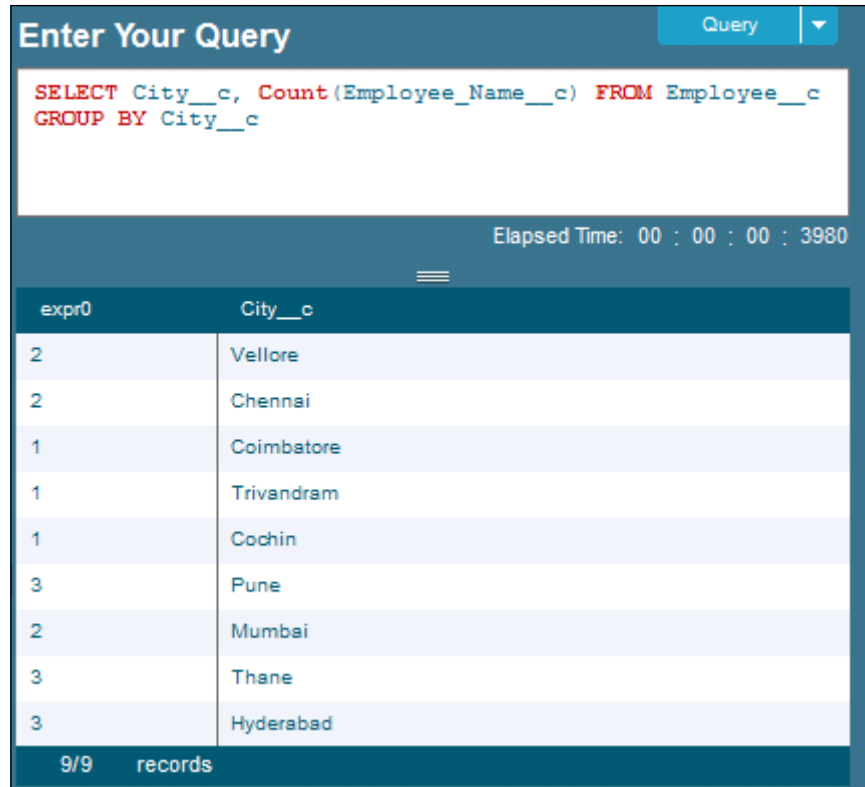
Let's see a sample query with the COUNT(FIELD\_NAME) aggregate function. All the aggregate functions are discussed in detail with examples.

A sample query is given as follows:

```
SELECT City__c, Count(Employee_Name__c) FROM Employee__c GROUP BY City__c
```



The preceding query is used to find the number of employees in each and every city. It also fetches the number of records and shows us the count of employees whose City column value is null or blank. The following screenshot shows us the output of the preceding query execution:



The screenshot shows a query execution interface. At the top, there is a text input field containing the SQL query: `SELECT City__c, Count(Employee_Name__c) FROM Employee__c GROUP BY City__c`. To the right of the input field is a blue button labeled "Query". Below the input field, the elapsed time is displayed as "Elapsed Time: 00 : 00 : 00 : 3980". The results are shown in a table with two columns: "expr0" and "City\_\_c". The table contains 9 rows of data. At the bottom of the table, it says "9/9 records".

expr0	City__c
2	Vellore
2	Chennai
1	Coimbatore
1	Trivandram
1	Cochin
3	Pune
2	Mumbai
3	Thane
3	Hyderabad

## Using the COUNT() method

The COUNT () method is used to find the total number of records that match the specified condition. The COUNT () method is also used to find the total number of records in an object. It is used to find the number of elements of a finite set of objects.

A sample query is given as follows:

```
SELECT COUNT() FROM Employee__c WHERE State__c = 'Tamilnadu'
```

## Using the COUNT(Field\_Name) method

The `Count(Field_Name)` method is used to find the total number of records of a particular value in the specified field. If we use `Count(Field_Name)`, it finds the total for each and every value of that field name. For example, if we use `Count(City__c)`, it will return the total number of records for each city.

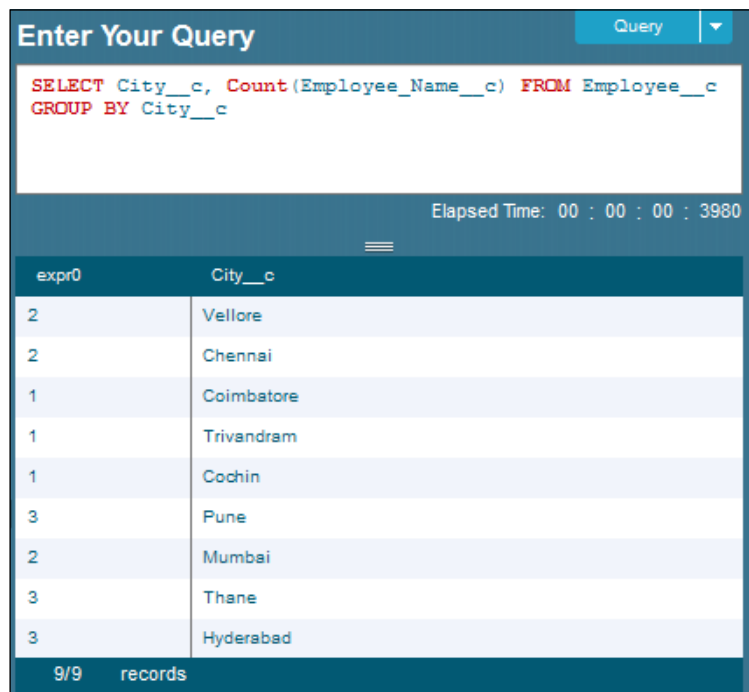
The syntax of the query is given as follows:

```
SELECT COUNT(FIELD_NAME) FROM Object_API_Name
```

A sample query is given as follows:

```
SELECT City__c, Count(Employee_Name__c) FROM Employee__c GROUP BY City__c
```

The following screenshot shows us the output of the preceding query execution:



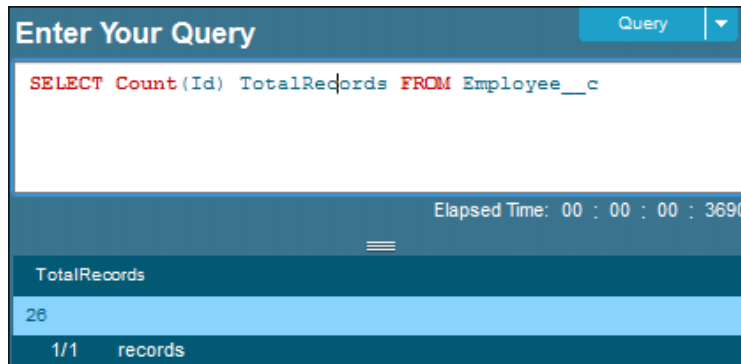
The screenshot displays a query execution interface. At the top, there is a header "Enter Your Query" with a "Query" button. Below the header, the SQL query is entered in a text area: `SELECT City__c, Count(Employee_Name__c) FROM Employee__c GROUP BY City__c`. Below the query area, the elapsed time is shown as "Elapsed Time: 00 : 00 : 00 : 3980". The results are displayed in a table with two columns: "expr0" and "City\_\_c". The table contains 9 rows of data, with the count of records for each city listed in the "expr0" column. The bottom of the table shows "9/9 records".

expr0	City__c
2	Vellore
2	Chennai
1	Coimbatore
1	Trivandram
1	Cochin
3	Pune
2	Mumbai
3	Thane
3	Hyderabad

A sample query is given as follows:

```
SELECT Count(Id) TotalRecords FROM Employee__c
```

The preceding query is used to find the total number of records in an object. The following screenshot shows us the output of the preceding query execution:



The output shows us that the total number of records in the Employee object is 26. The total number of records in any object will be very useful when we create charts using the Visualforce charting.

## Using the COUNT\_DISTINCT() method

The Count\_DISTINCT() method in SOQL is used to find the number of distinct non-null field values as mentioned in the query criteria. The COUNT\_DISTINCT() method ignores the null values and returns the non-null values while querying.

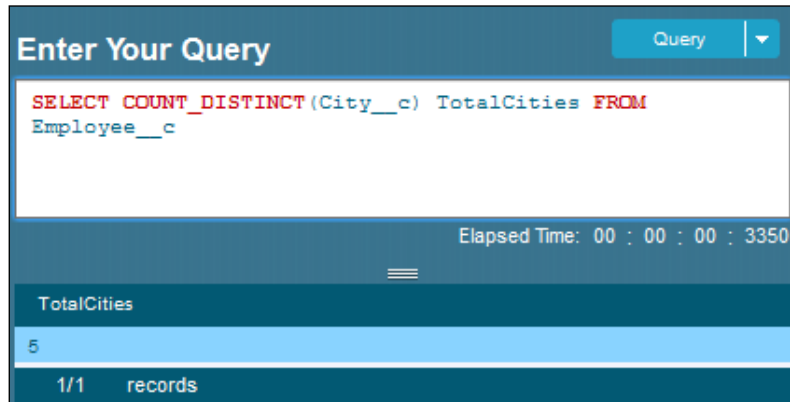
The syntax of the query is given as follows:

```
SELECT COUNT_DISTINCT (FIELD_NAME) FROM Object_API_Name
```

A sample query is given as follows:

```
SELECT COUNT_DISTINCT(City__c) TotalCities FROM Employee__c
```

The preceding query is used to find the number of distinct cities the employees belong to. The following screenshot shows us the output of the preceding query execution:



The output shows us that there are five unique or distinct cities that the employees belong to.

## Using the MIN() method

The `MIN()` method in SOQL is used to return the minimum or smallest value of the mentioned field. The `MIN(x)` method is used to return the minimum value of the `x` field.

The syntax of the query is given as follows:

```
SELECT MIN (FIELD_NAME) FROM Object_API_Name
```

A sample query is given as follows:

```
SELECT MIN(Age__c) MinAge, City__c FROM Employee__c GROUP BY City__c
```

The preceding query is used to find the minimum age of an employee in each and every city. It will not show us the values of employees if their `City` values are blank or null. The following screenshot shows us the output of the preceding query execution:

MinAge	City__c
45	Vellore
76	Chennai
45	Coimbatore
32	Trivandram
56	Cochin
23	Pune
34	Mumbai
32	Thane
21	Hyderabad

The output shows us the minimum age of an employee in a city.

## Using the MAX() method

The `MAX()` method in SOQL is used to return the maximum or the largest value of the mentioned field. The `MAX(x)` method is used to return the maximum value of the `x` field.

The syntax of the query is given as follows:

```
SELECT MAX (FIELD_NAME) FROM Object_API_Name
```

A sample query is given as follows:

```
SELECT MAX(Age__c) MaxAge, City__c FROM Employee__c GROUP BY City__c
```

The preceding query is used to find the maximum age of an employee in each and every city. The following screenshot shows us the output of the preceding query execution:

The screenshot shows a query execution interface with the following components:

- Query Editor:** Contains the SQL query: `SELECT MAX(Age__c) MaxAge, City__c FROM Employee__c GROUP BY City__c`
- Elapsed Time:** 00 : 00 : 02 : 3100
- Results Table:**

MaxAge	City__c
89	Vellore
98	Chennai
45	Coimbatore
34	Trivandram
56	Cochin
67	Pune
43	Mumbai
89	Thane
56	Hyderabad
- Footer:** 9/9 records

The output shows us the minimum age of an employee in a city.

## Using the SUM() method

The SUM() method is used to find the total of the specified numeric field. The numeric fields available in Salesforce.com are Currency, Percent, and Number. The SUM() method is used to add a sequence of numeric fields. The result of SUM() is their sum or total.

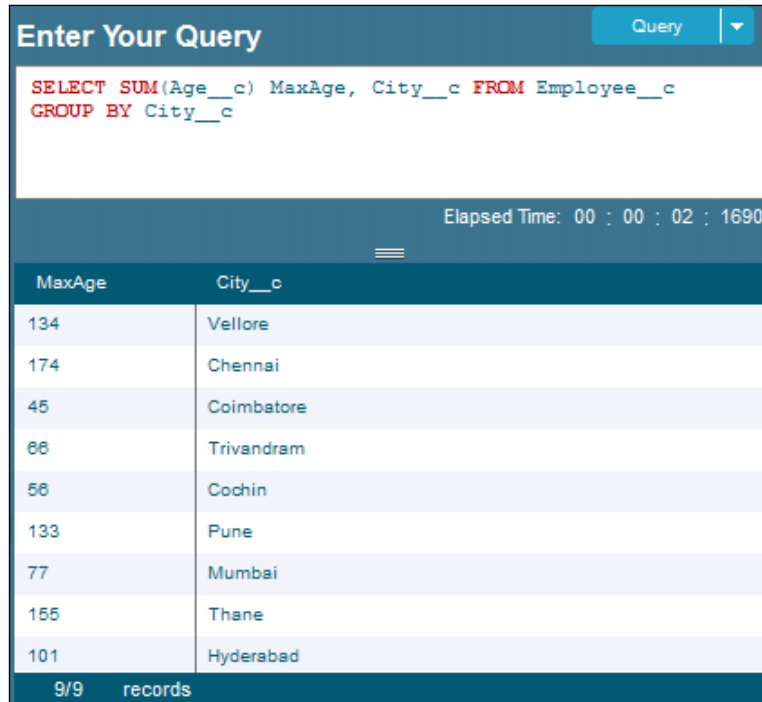
The syntax of the query is given as follows:

```
SELECT SUM (FIELD_NAME) FROM Object_API_Name
```

A sample query is given as follows:

```
SELECT SUM(Age__c) MaxAge, City__c FROM Employee__c GROUP BY City__c
```

The preceding query returns the total age of employees in each and every city. The following screenshot shows us the output of the preceding query execution:



The screenshot shows a query execution interface. At the top, there is a text input field containing the SQL query: `SELECT SUM(Age__c) MaxAge, City__c FROM Employee__c GROUP BY City__c`. To the right of the input field is a blue button labeled "Query". Below the input field, the elapsed time is displayed as "Elapsed Time: 00 : 00 : 02 : 1690". The results are shown in a table with two columns: "MaxAge" and "City\_\_c". The table contains 9 rows of data. At the bottom of the table, it indicates "9/9 records".

MaxAge	City__c
134	Vellore
174	Chennai
45	Coimbatore
66	Trivandram
58	Cochin
133	Pune
77	Mumbai
155	Thane
101	Hyderabad

## Using the HAVING clause

The HAVING clause is very similar to the WHERE clause. However, the only difference between the HAVING and WHERE clause is that the HAVING clause is used only with the aggregate functions.

The HAVING clause is used to specify the search condition in the GROUP BY clause or the aggregate functions. The HAVING clause limits the grouped records returned by a SOQL statement. However, the WHERE clause limits the records returned by a SOQL statement.

A HAVING clause in SOQL is used to specify that the SOQL SELECT statement should only return the records whose aggregate values meet the specified conditions.

A sample query is given as follows:

```
SELECT City__c, COUNT(Employee_Name__c) FROM Employee__c GROUP BY City__c
HAVING COUNT(City__c) >= 1
```

The following screenshot shows us the output of the preceding query execution:

The screenshot shows a query execution interface with the following components:

- Header:** "Enter Your Query" with a "Query" dropdown menu.
- Query Text:**

```
SELECT City__c, COUNT(Employee_Name__c) FROM Employee__c
GROUP BY City__c HAVING COUNT(City__c) >= 1
```
- Elapsed Time:** 00 : 00 : 26 : 9890
- Table Output:**

expr0	City__c
2	Vellore
2	Chennai
1	Coimbatore
1	Trivandram
1	Cochin
3	Pune
2	Mumbai
3	Thane
3	Hyderabad
- Footer:** 9/9 records

The output of the SOQL execution shows us the number of employees in each and every city whose number of records in each and every city is greater than one. This condition ignores all the employees whose `City` is null. It also ignores the employees if the number of employees in a city is less than or equal to one.

## Summary

In this chapter, we learned about all the functions that are available in SOQL. We discussed the method to translate the field values using `toLabel()`, which will be very useful when we want to translate the values and show them in a report.

Grouping or summarizing the records with aggregate functions was also discussed. The six aggregate functions were discussed with the syntax and real-time examples. We also discussed the situations in which we have to use the `HAVING` and `WHERE` clauses.





# 5

## Limitations and Best Practices

In this chapter, we will take a look at the standards and best practices to be followed by an administrator or a developer while writing SOQL statements during development and administration tasks. We will also cover the limitations that should be considered while writing the SOQL statements.

Salesforce has set many limitations as all the Apex code runs on the Apex engine. Apex is an object-oriented programming language that allows the Salesforce developers to execute flow and transaction control statements on the Force.com platform. So, whenever we write the SOQL statements, we should make sure that we do not hit the limitations set by Salesforce. All the limitations will be explained in detail.

We will also discuss in detail the limitations in `OFFSET`, `toLabel()`, `COUNT()`, and `ORDER BY` in the SOQL statements and the limitations in writing the relationship queries will.

### Standards to be followed in SOQL

Let's take a look the standards to be followed in SOQL.

If we want avoid the number of records fetched from an object, we have to use the `LIMIT` option. The `LIMIT` option limits the number of records that were fetched and avoids the limits in Salesforce.

We have seen the reserved keywords in SOQL in *Chapter 1, Introduction to SOQL*. In order to differentiate between the reserved keywords in a SOQL query, always write the reserved keywords in uppercase so that it will be easy for us to identify them. Write `SELECT`, `FROM`, `WHERE`, `HAVING`, `IN`, and so on in uppercase.

If we want to use a single quote inside our SOQL statement, we will have to use a backslash followed by a single quote. This is called as an escape sequence. We are allowed to use the escape sequences in SOQL as shown in the following table:

Sequence	Description
\n or \N	New line
\t or \T	Tab
\b or \B	Bell
\r or \R	Carriage return
\f or \F	Form feed
\"	One double-quote character
\\	Backslash
\'	One single-quote character

A sample query is given as follows:

```
SELECT Id, Industry FROM Account WHERE Name LIKE 'Infallible Techie\'s Company'
```

## Best practices

We can use SOQL in the following situations:

- When we know the object in which we have our required data
- When we want to fetch data from multiple objects with a lookup or master-detail relationship
- When we want to have the data set in a sorted manner
- When we want to summarize the data
- When we want to limit our data while retrieving it

For indexing, the following fields can be used in SOQL:

- `Id` can be used as the primary key.
- Lookup or master-detail relationship fields can be used as the foreign key.
- The custom fields can be used as the external IDs. An external ID in Salesforce is used as unique record identifiers from a system outside of Salesforce. When you select this option, the import wizard will detect existing records in Salesforce that have the same external ID. Note that this operation is not case-sensitive. For example, `ABC` will be matched with `abc`.

Here, `Id` is the record ID that is autogenerated whenever a new record is created. The record ID of Salesforce represents a unique record within a Salesforce instance. There are two versions of every record ID in Salesforce. They are as follows:

- A 15-digit case-sensitive version, which is referenced in the user interface
- An 18-digit case-insensitive version, which is referenced through the API

Fields that can't be indexed in SOQL are as follows:

- Multiselect picklists
- The `Currency` fields in a multicurrency organization
- The long text fields
- Some formula fields
- The binary fields (fields of the type `blob`, `file`, or encrypted text)

## Limitations in objects

An object represents database tables that contain your organization's information. Objects in Salesforce are mainly used to store records. There are two types of objects in Salesforce: standard objects and custom objects. Salesforce-defined objects are the standard objects, and the objects created by a user in an organization are the custom objects. While writing the SOQL statements to fetch records from the objects shown in the following table, we have to check the limits set by Salesforce:

Object	Limits in SOQL
ContentDocumentLink	In the ContentDocumentLink object, a SOQL query must filter on one of the Id, ContentDocumentId, or LinkedEntityId objects.
NewsFeed	In the NewsFeed object, the SOQL ORDER BY clause on the fields using relationships is not available.
KnowledgeArticleVersion	The archived article versions are stored in the articletype_kav object. To query the archived article versions, specify the article Id and setsLatestVersion='0'.
UserRecordAccess	In the UserRecordAccess object, the maximum number of records that can be queried is 200.
UserProfileFeed	In the UserProfileFeed object, the SOQL ORDER BY clause on the fields using relationships is not available.  A query must include WITH UserId = {userId}.

## Other limitations

The following sections cover the limitations in the objects, apart from those mentioned in the preceding section.

## Governor limits

As Apex runs in a multitenant environment, the Apex runtime engine strictly enforces a number of limits to ensure that the runaway Apex doesn't monopolize the shared resources. If some Apex code ever exceeds a limit, the associated governor issues a runtime exception that cannot be handled. The governor limits in the following table are subject to change, so use the following link to get the latest information:

[http://www.salesforce.com/us/developer/docs/apexcode/Content/apex\\_gov\\_limits.htm](http://www.salesforce.com/us/developer/docs/apexcode/Content/apex_gov_limits.htm)

Query usage	Limitation
The total number of SOQL queries issued	100
The total number of SOQL queries issued for the Apex batch and future methods	200
The total number of records retrieved by the SOQL queries	50,000
The total number of records retrieved by Database . getQueryLocator	10,000

If a SOQL query runs for more than 120 seconds, the request can be canceled by Salesforce.

## Understanding the limitations of the ORDER BY query

The limitations of the ORDER BY query are as follows:

- The data types that are not supported in ORDER BY are reference, multiselect picklists, and long text area.
- We can use ORDER BY with the optional LIMIT option in a SELECT statement.
- We are limited to using 32 fields in an ORDER BY SOQL query. If we exceed this limit, malformed query fault information is returned.

## Understanding the limitations of the toLabel() query

The limitations of the toLabel () query are as follows:

- The toLabel () method cannot be used along with ORDER BY in a SOQL
- We cannot use toLabel () in the WHERE clause for the division or currency ISO code picklists

## Understanding the limitations of the COUNT() query

The limitations of the COUNT query are as follows:

- The COUNT () query cannot be used with other elements in the SELECT list.
- We cannot use COUNT () with an ORDER BY clause. The option for this is COUNT (fieldname).
- We cannot use COUNT () with a GROUP BY clause for the API Version 19.0 and higher. The option for this is COUNT (fieldName).

## Understanding the limitations of the OFFSET clause

The limitations of the OFFSET clause are as follows:

- The maximum OFFSET limit is 2,000 rows. If we set an OFFSET limit higher than 2,000, we will get the result in a NUMBER\_OUTSIDE\_VALID\_RANGE error.
- The OFFSET clause is mainly focused to be used in a top-level query, and it is not allowed in most of the subqueries.
- The OFFSET clause is allowed in the SOQL that is used in SOAP API, REST API, and Apex. It's not allowed in SOQL used within bulk API or streaming API.

## Limitations of the relationship queries

The limitations of the relationship queries are as follows:

- Objects should have a relationship between them to write relationship queries. We cannot write relationship queries if the objects don't have any relationship between them.
- We cannot write more than 35 child-to-parent relationships in a SOQL statement.
- We cannot write more than 20 parent-to-child relationships in a SOQL statement.
- In each specified relationship between objects, no more than five levels can be specified in a child-to-parent relationship.

- In each specified relationship among objects, only one level of a parent-to-child relationship can be specified in a query.
- For custom relationships, `__r` should be mandatorily added at the end of the relationship name.

## Notes and Attachments limitations

The limitations of the `Notes` and `Attachments` objects are as follows:

- The `Notes` and `Attachments` objects cannot be filtered with the help of the content or body. It can be filtered only with `Name`, `CreatedDate`, and so on.
- The `Notes` and `Attachments` objects are not supported in the subquery.

## Summary

In this chapter, we saw the standards to be followed while writing the SOQL statements. The best practices explained in this chapter allow us to retrieve the required records by properly filtering the data. As a developer or an administrator, we should follow these standards and best practices.

Whenever we write SOQL statements to fetch the data, we should be very careful about the limitations. The different limitations with the objects are to be considered while writing the SOQL statements to fetch data from the objects. The other limitations with `OFFSET`, `ORDER BY`, `COUNT()`, `toLabel()`, and governor limits should also be considered while writing the SOQL statements with these functions.

In the next chapter, we are going to take a look at the recommended installation guidelines to be followed while installing the tools for the SOQL statement execution. These tools will help us execute all the queries that we have discussed so far.





# 6

## Tools with Installation Guidelines

We need some tools in order to execute SOQL statements. This chapter deals with the installation guidelines of some of the tools that are available. This chapter covers some basic tips that we can use during the installation of tools. It provides everything you need to complete the installation, from initial setup to the final SOQL execution. The chapter focuses on tools software and covers all recommended guidelines to be followed.

### Using the Force.com Explorer software

Using the Force.com Explorer software, we can build and test our SOQL queries. It also allows us to export the queried data in the **Comma Separated Value (CSV)** format. It's an AIR application. So, you need to install Adobe AIR before installing it. The Force.com Explorer software is mainly used for a smaller set of records. It cannot be used for bulk operations. For bulk operations, **Apex Data Loader** is the best tool.

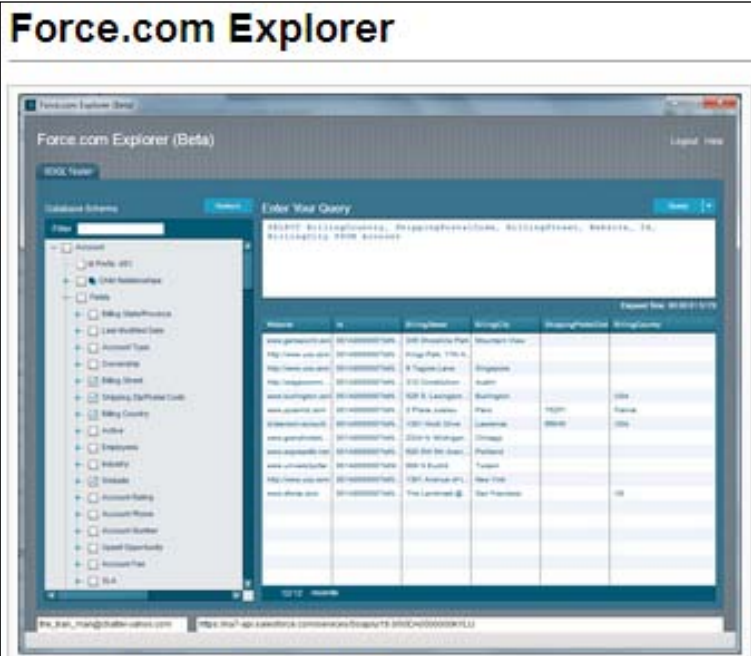
We can edit and delete records using the Force.com Explorer software.

### Installing Force.com Explorer

The steps to install the Force.com Explorer software are as follows:

1. Go to <http://wiki.developerforce.com/page/ForceExplorer>.

2. Install **Adobe Air** first and then **Force.com Explorer**. Without installing Adobe AIR, we will not be able to open the Force.com Explorer AIR file, as shown in the following screenshot:



The screenshot shows the Force.com Explorer (Beta) application window. The interface includes a sidebar with a tree view of database schemas, a central area for entering queries, and a table displaying query results. The table has columns for Account, ID, Billing/Postal, Billing/Phone, Billing/Website, and Billing/Name. Below the screenshot is the text "Force.com Explorer screenshot" and a copy icon.

**Installation**

1. Make sure you have **Adobe AIR** installed
2. Then download the latest release of **Force.com Explorer**

3. Open the **Force.com Explorer** window using the shortcut menu on the desktop or from the **Start** menu.
4. Enter your **Username, Password, and Security Token** (in case you are accessing from outside IP ranges).

5. Select an **Environment (Production or Sandbox)** option in **Advanced Options** as shown in the following screenshot:

Advanced Options ▲

6. Click on the **Login** button.
7. Build your query and click on the **Query** button to view the result as shown in the following screenshot:

Force.com Explorer (Beta) Logout Settings Help

SOQL Tester Static Resources

Database Schema Refresh

Schema Recently Viewed

Filter All objects ▼

Enter Your Query Query ▼

Select Id, Name, (Select Id, Name From Contacts) From Account

Elapsed Time: 00 : 00 : 00 : 0000

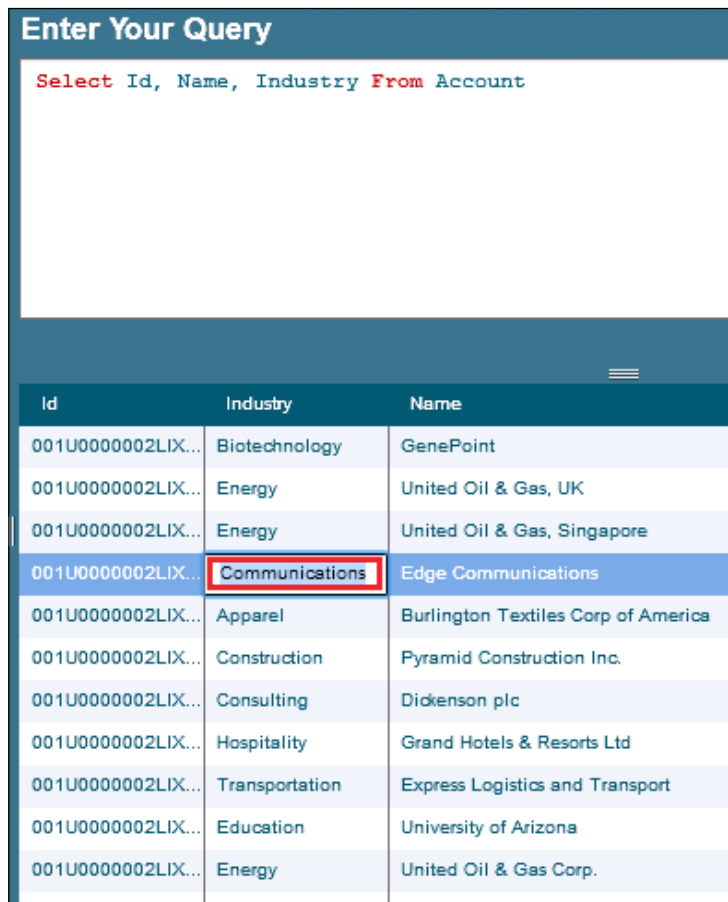
0/0 records

● Label name ● API level name

The Force.com Explorer also lists the static resources used in our Salesforce.com organization.

To update the record using Force.com Explorer, perform the following steps:

1. Log in to Force.com Explorer.
2. Query some records.
3. Double-click on the value to edit it. It will be highlighted as shown in the following screenshot:



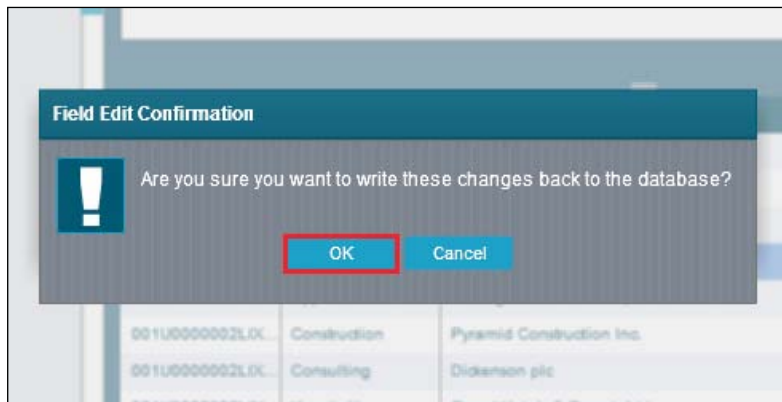
The screenshot shows a window titled "Enter Your Query" with a text input field containing the query: `Select Id, Name, Industry From Account`. Below the input field is a table with three columns: Id, Industry, and Name. The table contains several records, and the record with Industry "Communications" and Name "Edge Communications" is highlighted in blue. A red rectangular box is drawn around the "Communications" value in the Industry column of this row.

Id	Industry	Name
001U0000002LIX...	Biotechnology	GenePoint
001U0000002LIX...	Energy	United Oil & Gas, UK
001U0000002LIX...	Energy	United Oil & Gas, Singapore
001U0000002LIX...	Communications	Edge Communications
001U0000002LIX...	Apparel	Burlington Textiles Corp of America
001U0000002LIX...	Construction	Pyramid Construction Inc.
001U0000002LIX...	Consulting	Dickenson plc
001U0000002LIX...	Hospitality	Grand Hotels & Resorts Ltd
001U0000002LIX...	Transportation	Express Logistics and Transport
001U0000002LIX...	Education	University of Arizona
001U0000002LIX...	Energy	United Oil & Gas Corp.

4. Enter the new value and press *Enter*; you will get the **Save** and **Cancel** options.
5. Click on **Save** to update the new value entered into our organization.

Id	Industry	Name
001U0000002LIX...	Biotechnology	GenePoint
001U0000002LIX...	Energy	United Oil & Gas, UK
001U0000002LIX...	Energy	United Oil & Gas, Singapore
001U0000002LIX...	Electronics	Edge Communications
001U0000002LIX...	<b>SAVE</b> <b>CANCEL</b>	Jurlington Textiles Corp of America
001U0000002LIX...	Construction	Pyramid Construction Inc.
001U0000002LIX...	Consulting	Dickenson plc
001U0000002LIX...	Hospitality	Grand Hotels & Resorts Ltd
001U0000002LIX...	Transportation	Express Logistics and Transport
001U0000002LIX...	Education	University of Arizona
001U0000002LIX...	Energy	United Oil & Gas Corp.

6. You will get an alert message showing whether the record has been saved successfully. Click on **OK** to resume. Refer to the following screenshot:

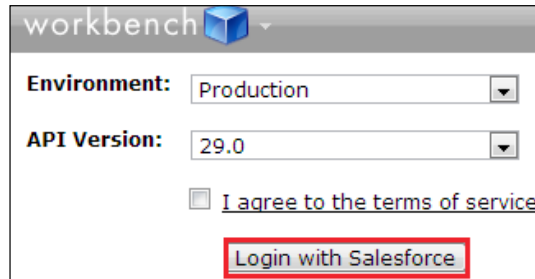


## Workbench

Workbench is a simple web-based tool that is very useful for Salesforce administrators and developers to interact with Salesforce organizations via the Force.com APIs. Workbench allows us to execute **Salesforce Object Search Language (SOSL)**. Unlike SOQL, which can only query one object at a time and multiple objects only if they have a relationship, SOSL enables you to search text, e-mail, and phone fields for multiple objects simultaneously.

To get started with Workbench, perform the following steps:

1. Go to <https://workbench.developerforce.com/login.php>.
2. Select an **Environment** option, **API Version**, check the **I agree to the terms of service** checkbox, and click on the **Login with Salesforce** button as shown in the following screenshot:



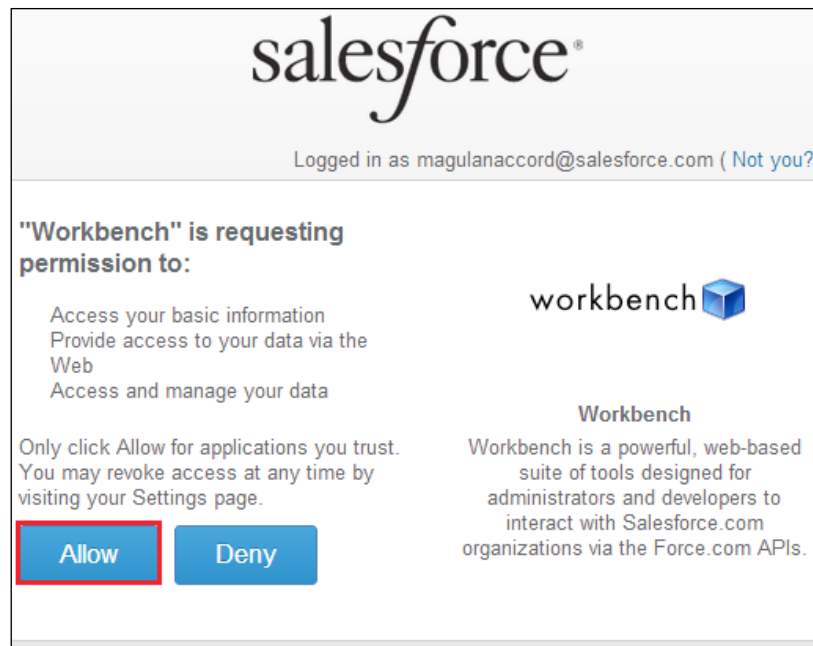
The screenshot shows the Workbench login interface. At the top left, the word "workbench" is displayed next to a blue cube icon. Below this, there are two dropdown menus: "Environment" set to "Production" and "API Version" set to "29.0". Underneath the dropdowns is a checkbox labeled "I agree to the terms of service". At the bottom of the form, a button labeled "Login with Salesforce" is highlighted with a red rectangular border.

3. Enter your username and password and click on the **Log in to Salesforce** button as shown in the following screenshot:

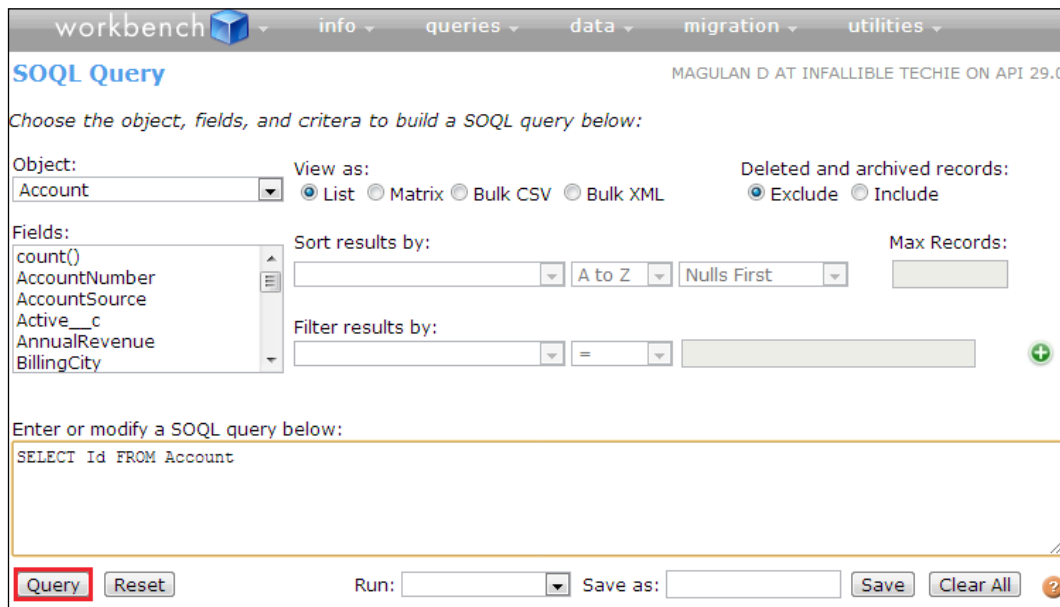


The screenshot shows the Salesforce login page. At the top, the "salesforce" logo is displayed in a serif font. Below the logo are two input fields: "User Name" and "Password". A blue button labeled "Log in to Salesforce" is positioned below the input fields. Underneath the button is a checked checkbox labeled "Remember User Name". At the bottom of the form, there is a link that says "Forgot your password?" in blue text.

4. Click on the **Allow** button as shown in the following screenshot:



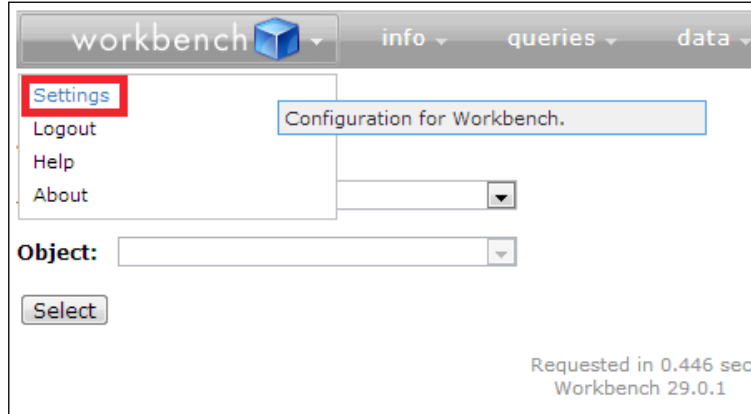
5. Enter your query and click on the **Query** button, as shown in the following screenshot, to view the result:



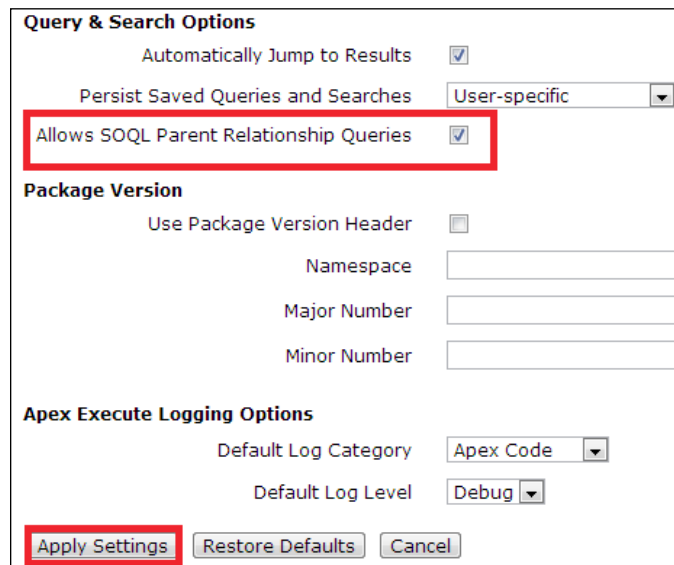


Parent-child relationship queries are not supported in Workbench before setting them first. Perform the following steps to enable parent-child relationship queries in Workbench:

1. Navigate to the **Settings** tab of Workbench as shown in the following screenshot:



2. In **Query & Search Options**, check the **Allows SOQL Parent Relationship Queries** checkbox and click on **Apply Settings** as shown in the following screenshot:



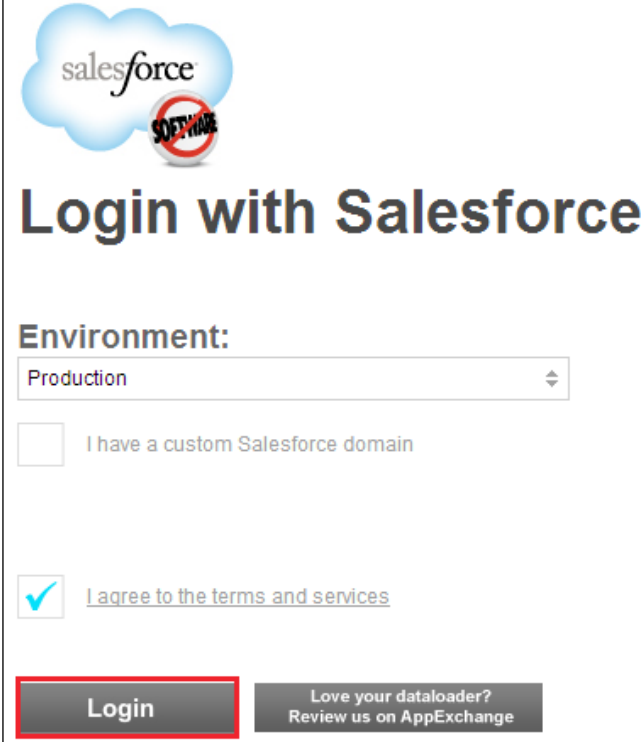
3. Now we will be able to access the parent relationship queries.

## Dataloader.io

Use `Dataloader.io` to import, export, and delete data from Salesforce. Everything is online in Data Loader. There will be no software hassle if we use `Dataloader.io`. A browser and an Internet connection are more than enough to use this feature provided by a third party. It is not a Salesforce tool.

To use `Dataloader.io`, perform the following steps:

1. Go to `https://dataloader.io/`.
2. Click on the **Login with Salesforce** button.
3. Select an **Environment** option and click on the **Login** button as shown in the following screenshot:



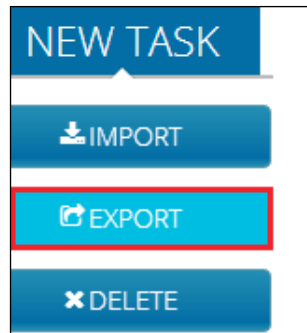
The screenshot shows the login interface for Dataloader.io. At the top left is the Salesforce logo. Below it is the heading "Login with Salesforce". Underneath is a form with the following elements:

- An "Environment:" label above a dropdown menu currently showing "Production".
- An unchecked checkbox labeled "I have a custom Salesforce domain".
- A checked checkbox labeled "I agree to the terms and services".
- A "Login" button, which is highlighted with a red border.
- A button labeled "Love your dataloader? Review us on AppExchange".

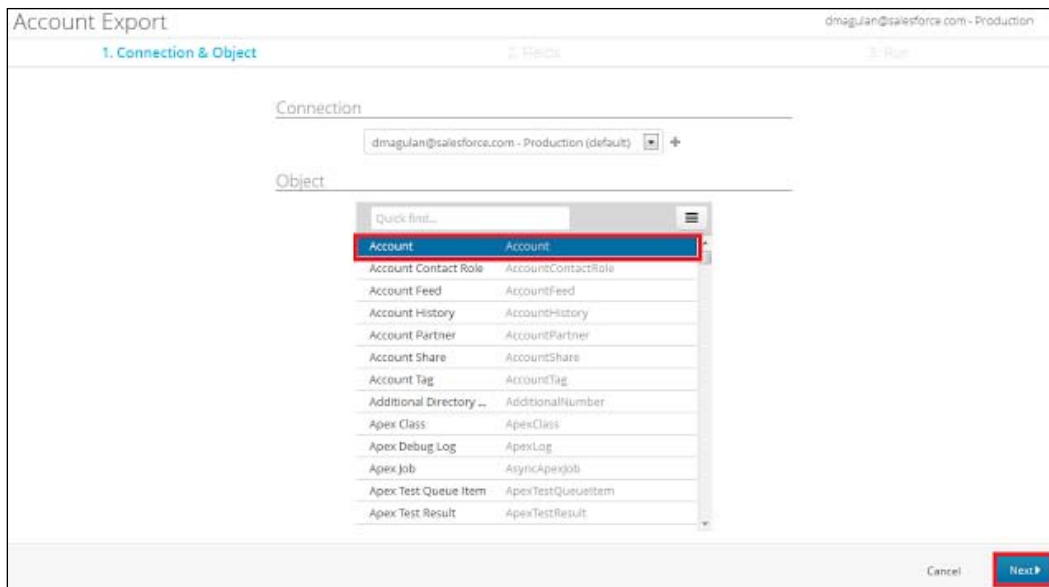
4. Enter your username and password and click on the **Log in to Salesforce** button as shown in the following screenshot:



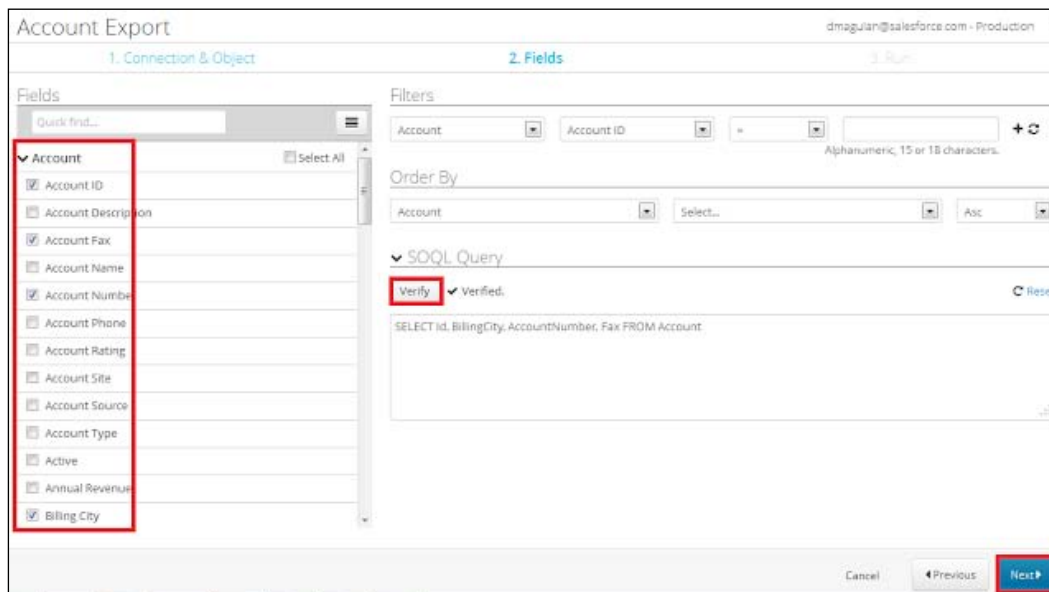
5. Select **Export** under **New Task** as shown in the following screenshot:



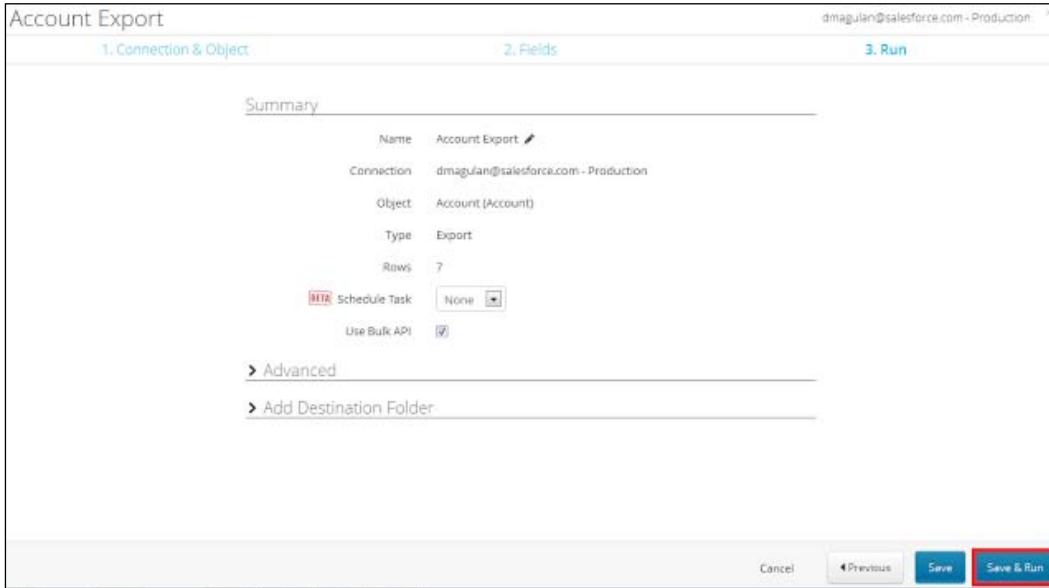
6. Select **Object** and click on the **Next** button as shown in the following screenshot:



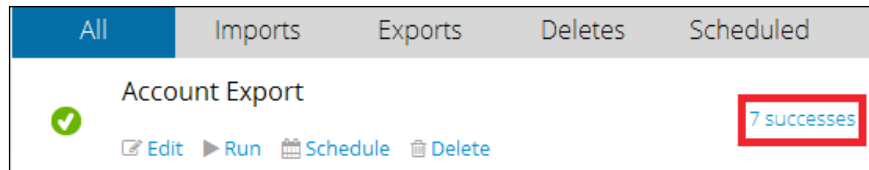
7. Select the fields and build your SOQL query; click on the **Verify** button to verify your query and then click on the **Next** button as shown in the following screenshot:



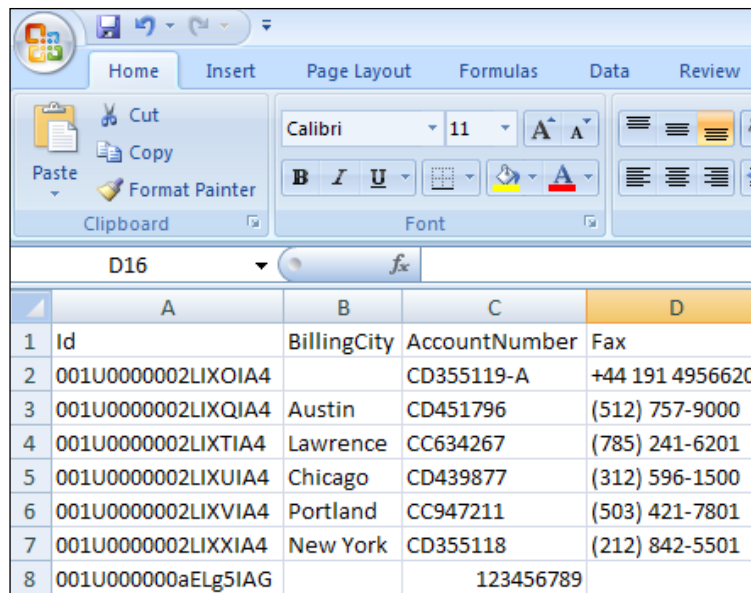
8. Schedule or run the query to be exported. Refer to the following screenshot:



9. After execution, it shows the successfully extracted records. Refer to the following screenshot:



10. We can open this file at any time by logging in to `DataLoader.io`. Refer to the following screenshot:



	A	B	C	D
1	Id	BillingCity	AccountNumber	Fax
2	001U0000002LIXOIA4		CD355119-A	+44 191 4956620
3	001U0000002LIXQIA4	Austin	CD451796	(512) 757-9000
4	001U0000002LIXTIA4	Lawrence	CC634267	(785) 241-6201
5	001U0000002LIXUIA4	Chicago	CD439877	(312) 596-1500
6	001U0000002LIXVIA4	Portland	CC947211	(503) 421-7801
7	001U0000002LIXXIA4	New York	CD355118	(212) 842-5501
8	001U000000aELg5IAG		123456789	

## The Apex Data Loader tool

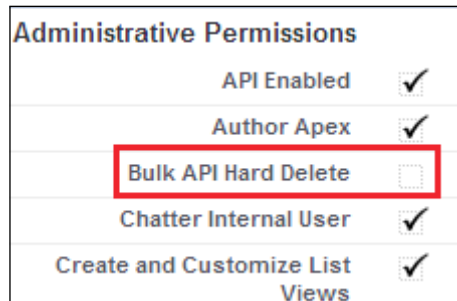
The Data Loader tool is used to export, update, insert, and delete records. It's mainly used for bulk operations.

The operations that can be performed using Apex Data Loader are as follows:

- **Insert:** On using this operation, we can insert new records into our Salesforce organization.
- **Update:** On using this operation, we can update existing records in our Salesforce organization.
- **Upsert:** On using this operation, we can insert new records into our Salesforce organization and update existing records in our Salesforce organization; in other words, Upsert is a combination of Insert and Update.

The Upsert operation makes use of the Object record's primary key (Salesforce's record ID) or the external ID, if specified, to determine whether new records should be created; otherwise, we will have to update the existing records. The following conditions explain when the Upsert operation creates a new record or updates the existing record:

- If the key is not matched, a new record is created
  - If the key is matched once, the existing record is updated
  - If the key is matched multiple times, an error is generated and the object record is neither inserted nor updated
- **Delete:** On using the Delete operation, we can delete existing records from our Salesforce organization. The deleted records will be available in the Recycle Bin for 15 days.
  - **Hard Delete:** On using the Hard Delete operation, we can delete existing records from our Salesforce organization permanently. The deleted records will not be available in the Recycle Bin. The **Bulk API Hard Delete** checkbox should be enabled, as shown in the following screenshot, in the user profile for permanently deleting records:



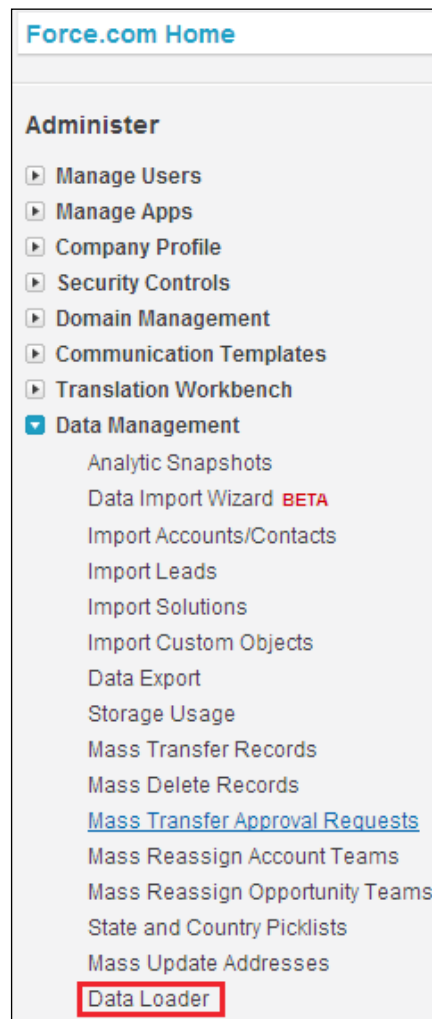
- **Export:** On using this operation, we can extract data from our Salesforce organization.
- **Export All:** On using this operation, we can extract data from our Salesforce organization. The extracted data contains the records from the **Recycle Bin** too, that is, soft-deleted records will be extracted.

The system requirements for installing Apex Data Loader are as follows:

- Microsoft Windows 7 or Windows XP
- 120 MB free disk space
- 256 MB available memory
- Java JRE 1.6 or later (Windows 7 or Windows XP)

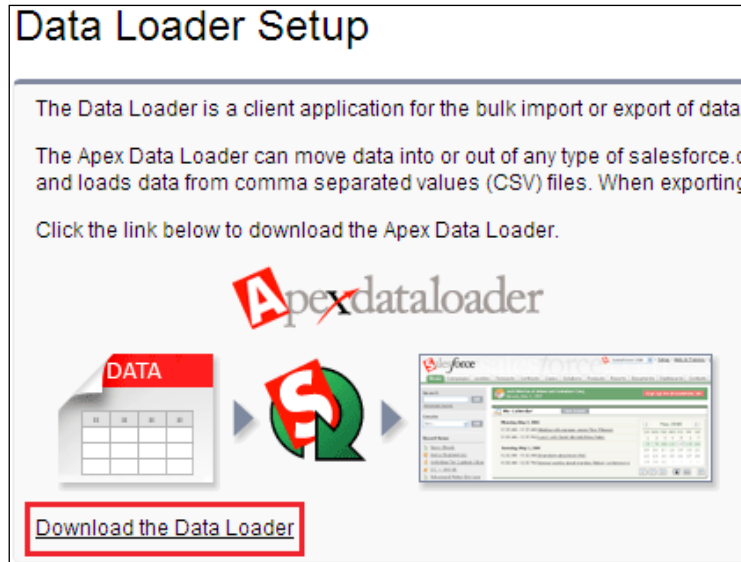
- Sun JVM 1.6 or later (Windows 7 or Windows XP)
- Administrator privileges on the machine

To download the data loader, navigate to **Administer | Data Management | Data Loader** as shown in the following screenshot:





Click on the **Download the Data Loader** link as shown in the following screenshot to download Apex Data Loader:

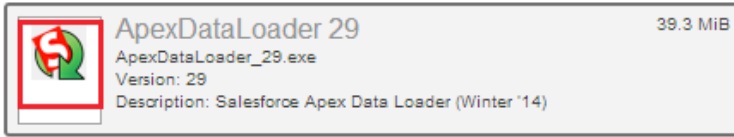


## Downloading Data Loader without the Salesforce.com login

Perform the following steps to download the Data Loader setup without a Salesforce.com login:

1. Go to <http://www.cloudsuccess.com/resource-centre/apex-data-loader-archive/>.
2. Select the latest version to download. Refer to the following screenshot:

The Salesforce Data Loader / Apex Data Loader is a client application for the bulk import or export of data. Use it to insert, update, delete, or extract salesforce.com records. Download the latest version below or scroll down the list for access to download historical releases. Apple Mac users will find download links for the LexiLoader towards the bottom of this page.

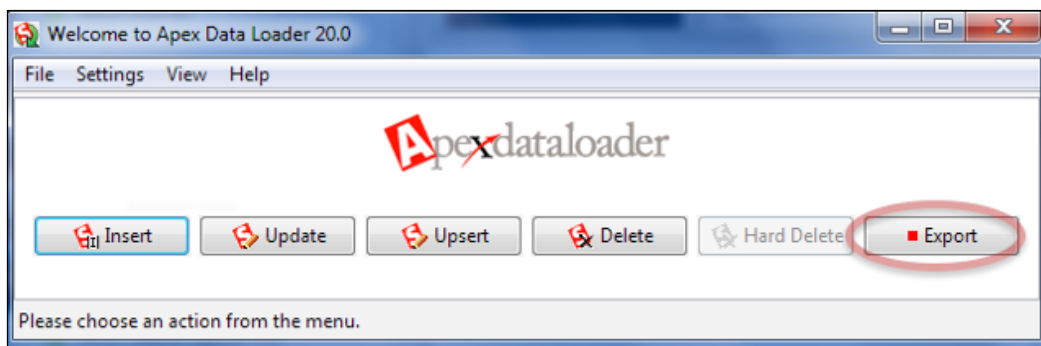


The steps for installation are as follows:

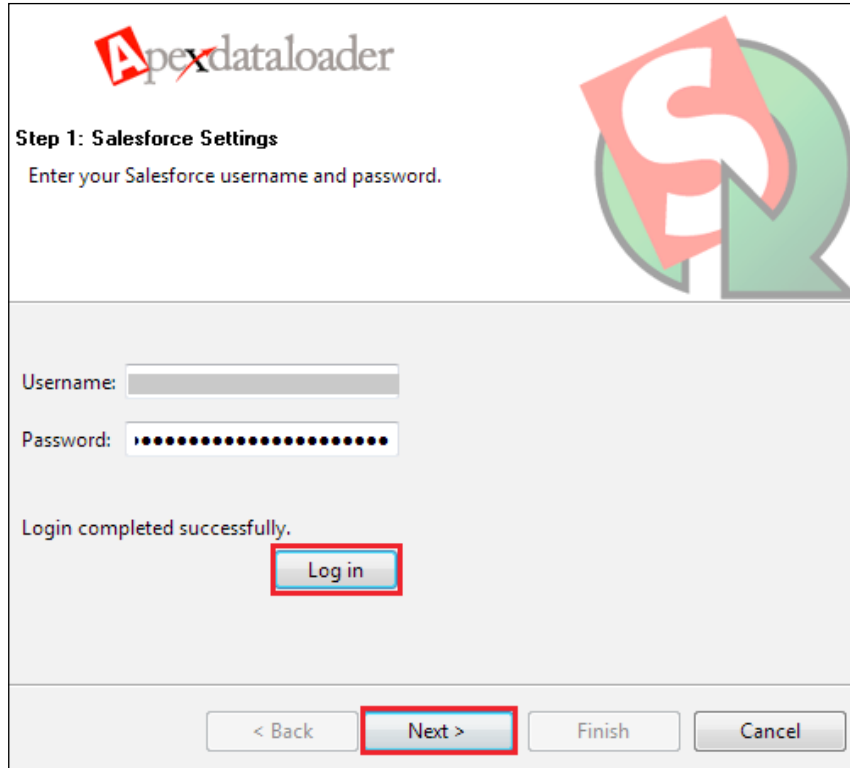
1. Double-click on the downloaded file to launch the installation wizard.
2. Click on the **Next** button.
3. Accept the license agreement and click on the **Next** button.
4. Accept the default installation directory or click on **Change...** to choose another directory. Click on the **Next** button.
5. Click on the **Install** button.
6. Click on the **Finish** button.

To start using Apex Data Loader, perform the following steps:

1. Install Apex Data Loader.
2. Open Apex Data Loader.
3. Click on the **Export** button as shown in the following screenshot:



4. Enter your username, password, and security token (in case you are accessing outside the IP ranges). Click on the **Login** button. Once login is successfully completed, click on the **Next** button as shown in the following screenshot:



5. Select an object and click on the **Next** button.
6. Build your query to fetch the required data. We can filter the records to be fetched using the filter logic available.
7. Click on the **Next** button.

- Click on the **Finish** button to extract the data as shown in the following screenshot:

**Apex data loader**

**Step 3: Edit your Query**  
Edit the SOQL query for extraction.

Choose the query fields below.

<input checked="" type="checkbox"/> Id
<input type="checkbox"/> IsDeleted
<input type="checkbox"/> MasterRecordId
<input checked="" type="checkbox"/> AccountId

Select all fields    Clear all fields

Create the where clauses to your query below.

Fields	Operation	Va
<input type="text"/>	<input type="text"/>	<input type="text"/>

Add condition    Clear all conditions

The generated query will appear below. You may edit it before finishing.

```
Select Id, AccountId, Name FROM Contact
```

< Back    Next >    Cancel    **Finish**

- The exported data will be in CSV format. We can use Excel to open the extracted file.
- It also has a built-in CSV format file viewer to view the extracted records.

## Summary

In this chapter, we came to know about many applications that are available for querying records from Salesforce objects using SOQL. The step-by-step installation guide helps avoid problems during installation. These are free versions of software and a few other software options are provided by `Salesforce.com` for free. These recommended guidelines help practitioners to install the software by choosing the appropriate setups. These software are also used for data migration from legacy systems to Salesforce.

The Data Loader software can also be used for extracting or performing DML operations on bulk data. The Force.com Explorer software gives us an option to perform the DML operation on a single record at a time. This software is mainly used for handling lesser amounts of data. The `DataLoader.io` tool allows us to save and export data for future reference, and it also allows us to schedule export jobs.

# Review Questions

This appendix lists the review questions of all the chapters, which will help us to recap all the chapters.

## Chapter 1

The following set of questions has multiple options. Choose the number that corresponds with your answer:

Q1. SOQL stands for ...

1. Structure Object Query Language
2. Salesforce Object Query Language
3. Both 1 and 2
4. None of the above

Q2. Using `Order By`, which of the following options are true (select two)?

1. Arrange in ascending order
2. Arrange in descending order
3. Descending order is the default
4. `Order By` is not supported

Q3. Custom objects always end with `__r`.

1. True
2. False

Q4. API names of the fields should be used in SOQL instead of the label of the field.

1. True
2. False

The answers for the preceding review questions are as follows:

Q1 - 2

Q2 - 1 and 2

Q3 - 2

Q4 - 1

## **Chapter 2**

Q1. The Alias notation in SOQL changes the label name of the field.

1. True
2. False

Q2. Select the comparison operators (select two).

1. AND
2. OR
3. >
4. =

Q3. The INCLUDES and EXCLUDES operators are used for filtering...

1. Multiselect picklists
2. Lookup
3. Master-detail
4. Many-to-many

The answers for the preceding review questions are as follows:

Q1 - 2

Q2 - 3 and 4

Q3 - 1

## Chapter 3

Q1. Which operators are used to filter the multiselect picklist field in Salesforce.com?

1. INCLUDES
2. EXCLUDES
3. Both
4. None

Q2. It is possible to sort records in both ascending and descending order together in a SOQL query.

1. True
2. False

Q3. FOR VIEW is used to update...

1. LastReferencedDate
2. LastViewedDate
3. LastModifiedDate
4. LastCreatedDate

Q4. FOR REFERENCE is used to update...

1. LastReferencedDate
2. LastViewedDate
3. LastModifiedDate
4. LastCreatedDate

The answers for the preceding review questions are as follows:

Q1 - 3

Q2 - 1

Q3 - 2

Q4 - 1



## Chapter 4

Q1. Which method in SOQL returns the number of distinct non-null field values?

1. COUNT\_DISTINCT()
2. MIN()
3. MAX()
4. COUNT()

Q2. Which method in SOQL returns the maximum value of a field?

1. COUNT\_DISTINCT()
2. MIN()
3. MAX()
4. COUNT()

Q3. Which method in SOQL returns the minimum value of a field?

1. COUNT\_DISTINCT()
2. MIN()
3. MAX()
4. COUNT()

Q4. Which method in SOQL returns the total value of a field?

1. SUM()
2. MIN()
3. MAX()
4. COUNT()

Q5. Which method in SOQL returns the total number of records in an object?

1. COUNT()
2. MIN()
3. MAX()
4. COUNT()

The answers for the preceding review questions are as follows:

Q1 - 1

Q2 - 3

Q3 - 2

Q4 - 1

Q5 - 1



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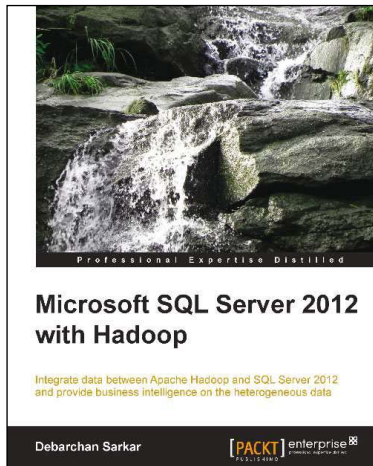
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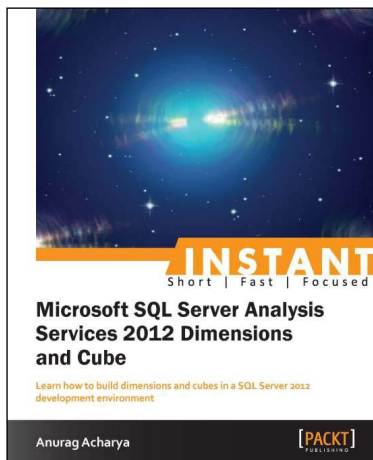


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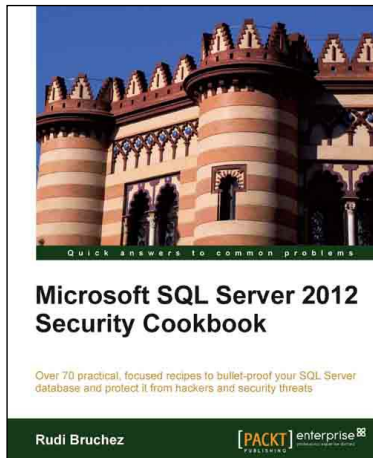
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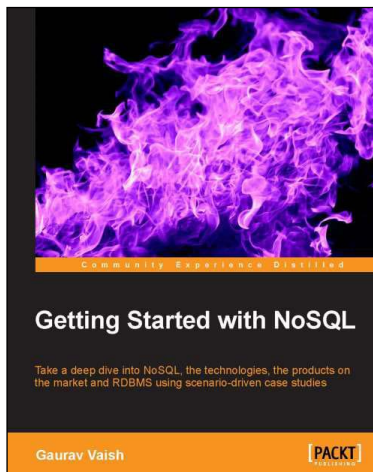


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