

# Lesson 1

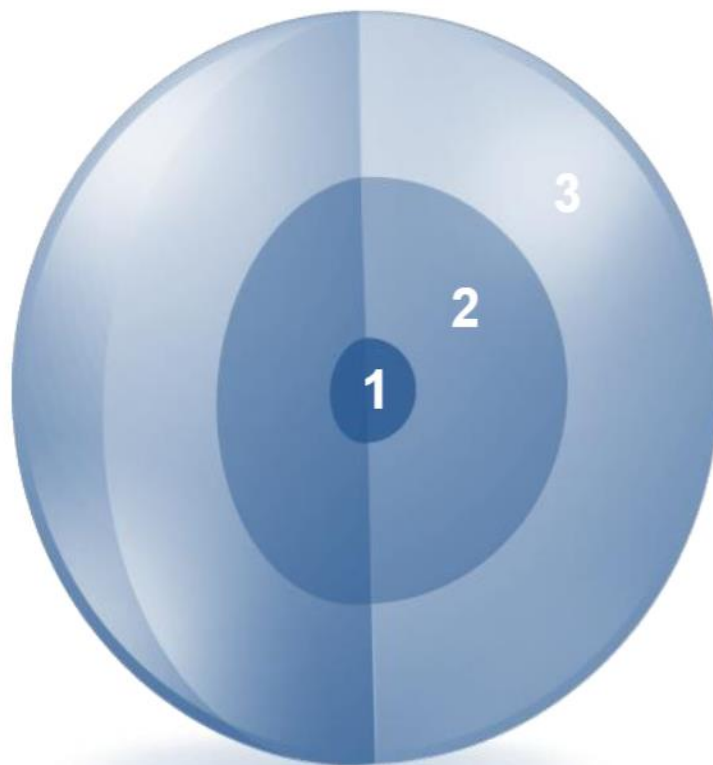
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## Restricting and Sorting Data

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## What You will learn at the end of this Session?



1. Limit the rows that are retrieved by a query
2. Sort the rows that are retrieved by a query
3. Use ampersand substitution to restrict and sort output at run time

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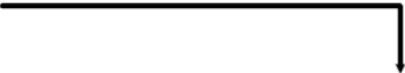
## Limiting Rows Using a Selection

### EMPLOYEES

	EMPLOYEE_ID	LAST_NAME	JOB_ID	DEPARTMENT_ID
1	200	Whalen	AD_ASST	10
2	201	Hartstein	MK_MAN	20
3	202	Fay	MK_REP	20
4	205	Higgins	AC_MGR	110
5	206	Gietz	AC_ACCOUNT	110

...

“retrieve all  
employees in  
department 90”



	EMPLOYEE_ID	LAST_NAME	JOB_ID	DEPARTMENT_ID
1	100	King	AD_PRES	90
2	101	Kochhar	AD_VP	90
3	102	De Haan	AD_VP	90

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## Limiting the Rows That Are Selected

- Restrict the rows that are returned by using the :
- WHERE clause

```
SELECT * | { [DISTINCT] column | expression [alias], ... }  
FROM    table  
[WHERE condition(s)];
```

- The WHERE clause follows the FROM clause.

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## Using the WHERE Clause

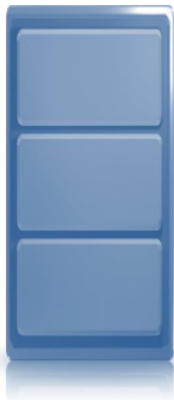
```
SELECT order_id, order_date, order_status  
FROM orders  
WHERE order_status = 1 ;
```

	ORDER_ID	ORDER_DATE	ORDER_STATUS
1	2397	20-NOV-99 04.11.54.696211000 AM	1
2	2454	03-OCT-99 05.19.34.678340000 AM	1
3	2421	13-MAR-99 09.23.54.562432000 AM	1
4	2431	14-SEP-98 06.33.04.763452000 PM	1
5	2439	31-AUG-99 09.49.37.811132000 PM	1
6	2444	28-JUL-99 01.52.27.462632000 AM	1

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## Character Strings and Dates



Character strings and date values are enclosed with single quotation marks.

Character values are case-sensitive and date values are format-sensitive.

The default date display format is DD-MON-RR.

```
SELECT order_id, order_date, order_mode
FROM orders
WHERE order_mode = 'direct' ;
```

```
SELECT last_name
FROM employees
WHERE hire_date = '17-FEB-96' ;
```

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## Comparison Operators

Operator	Meaning
=	Equal to
>	Greater than
>=	Greater than or equal to
<	Less than
<=	Less than or equal to
<>	Not equal to
BETWEEN ...AND...	Between two values (inclusive)
IN (set)	Match any of a list of values
LIKE	Match a character pattern
IS NULL	Is a null value

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## Using Comparison Operators

```
SELECT order_id, order_date  
FROM orders  
WHERE order_id <= 2400 ;
```

	ORDER_ID	ORDER_DATE
1	2354	15-JUL-00 05.48.23.234567000 AM
2	2355	26-JAN-98 10.52.51.962632000 PM
3	2356	26-JAN-00 10.52.41.934562000 PM
4	2357	09-JAN-98 09.49.44.123456000 AM
5	2358	09-JAN-00 06.33.12.654278000 AM
6	2359	09-JAN-98 11.04.13.112233000 AM

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## Range Conditions Using the BETWEEN Operator

- Use the BETWEEN operator to display rows based on a range of values:

```
SELECT product_id, quantity_on_hand  
FROM inventories  
WHERE product_id BETWEEN 3100 AND 3108;
```

Lower limit      Upper limit

	PRODUCT_ID	QUANTITY_ON_HAND
1	3108	122
2	3108	110
3	3108	194
4	3108	170
5	3108	146

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## Membership Condition Using the IN Operator

- Use the IN operator to test for values in a list:

```
SELECT order_id, order_mode, order_status  
FROM orders  
WHERE order_id IN (2458, 2397, 2454);
```

	ORDER_ID	ORDER_MODE	ORDER_STATUS
1	2397	direct	1
2	2454	direct	1
3	2458	direct	0

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## Pattern Matching Using the LIKE Operator

Use the LIKE operator to perform wildcard searches of valid search string values.

Search conditions can contain either literal characters or numbers:

- % denotes zero or many characters.
- \_ denotes one character.

```
SELECT first_name  
FROM employees  
WHERE first_name LIKE 'S%':
```

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## Combining Wildcard Characters

- You can combine the two wildcard characters (% , \_) with literal characters for pattern matching:

```
SELECT last_name  
FROM employees  
WHERE last_name LIKE '_o%';
```

	LAST_NAME
1	Kochhar
2	Lorentz
3	Mourgos

- You can use the ESCAPE identifier to search for the actual % and \_ symbols.

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## Using the NULL Conditions

- Test for nulls with the IS NULL operator.

```
SELECT order_ID, order_status, sales_rep_id
FROM orders
WHERE sales_rep_id IS NULL;
```

	ORDER_ID	ORDER_STATUS	SALES_REP_ID
1	2355	8	(null)
2	2356	5	(null)
3	2359	9	(null)
4	2361	8	(null)
5	2362	4	(null)
6	2363	0	(null)

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## Defining Conditions Using the Logical Operators

Operator	Meaning
AND	Returns TRUE if <i>both</i> component conditions are true
OR	Returns TRUE if <i>either</i> component condition is true
NOT	Returns TRUE if the condition is false

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## Using the AND Operator

- AND requires both the component conditions to be true:

```
SELECT order_mode, order_status, customer_id
FROM orders
WHERE order_mode = 'direct'
AND customer_id = 103;
```

	ORDER_MODE	ORDER_STATUS	CUSTOMER_ID
1	direct	1	103
2	direct	4	103

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## Using the OR Operator

- OR requires either component condition to be true:

```
SELECT order_id, order_status, order_total
FROM orders
WHERE order_status = 0
      OR order_total >= 100000 ;
```

	ORDER_ID	ORDER_STATUS	ORDER_TOTAL
1	2458	0	70647.34
2	2354	0	46257
3	2434	8	242458.25
4	2361	8	120131.3
5	2363	0	10082.3
6	2367	10	144054.8
7	2369	0	11097.4
8	2375	2	103834.4
9	2385	4	295892
10	2388	4	282694.3
11	2399	0	25270.3

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## Using the NOT Operator

```
SELECT order_id, order_status, order_total
FROM orders
WHERE order_status
      NOT IN (0,1,2,3);
```

	ORDER_ID	ORDER_STATUS	ORDER_TOTAL
1	2357	5	59872.4
2	2394	5	21863
3	2435	6	62303
4	2455	7	14087.5
5	2379	8	17848.2
6	2396	8	34930
7	2434	8	242458.25
8	2436	8	6394.8
9	2446	8	93570.57
10	2447	8	33893.6
11	2432	10	10523

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## Rules of Precedence

Operator	Meaning
1	Arithmetic operators
2	Concatenation operator
3	Comparison conditions
4	IS [NOT] NULL, LIKE, [NOT] IN
5	[NOT] BETWEEN
6	Not equal to
7	NOT logical condition
8	AND logical condition
9	OR logical condition

**You can use parentheses to override rules of precedence.**

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## Rules of Precedence

```
SELECT *  
FROM inventories  
WHERE warehouse_id = 9  
OR quantity_on_hand = 150  
AND product_id = 3139;
```

1

	PRODUCT_ID	WAREHOUSE_ID	QUANTITY_ON_HAND
1	3139	8	150
2	1729	9	23
3	1733	9	35

■ ■ ■

```
SELECT *  
FROM inventories  
WHERE ( warehouse_id = 9  
OR quantity_on_hand = 150 )  
AND product_id = 3139;
```

2

	PRODUCT_ID	WAREHOUSE_ID	QUANTITY_ON_HAND
1	3139	8	150
2	3139	9	135

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## Using the ORDER BY Clause

Sort the retrieved rows with the ORDER BY clause:

- ASC: Ascending order, default
- DESC: Descending order

The ORDER BY clause comes last in the SELECT statement:

```
SELECT order_id, order_date, order_status  
FROM orders  
ORDER BY order_date ;
```

	ORDER_ID	ORDER_DATE	ORDER_STATUS
1	2442	27-JUL-90 11.52.59.662632000 PM	9
2	2445	28-JUL-90 03.04.38.362632000 AM	8
3	2418	21-MAR-96 05.48.21.862632000 AM	4
4	2357	09-JAN-98 09.49.44.123456000 AM	5

...

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Sorting in descending order:

```
SELECT order_id, round(order_date), order_status  
FROM orders  
ORDER BY order_date desc;
```

1


Sorting by column alias:

```
SELECT order_id, round(order_date), order_status "Order Status"  
FROM orders  
ORDER BY order_date desc;
```

2


Sorting by using the column's numeric position:

```
SELECT last_name, job_id, department_id, hire_date
FROM employees
ORDER BY 3;
```

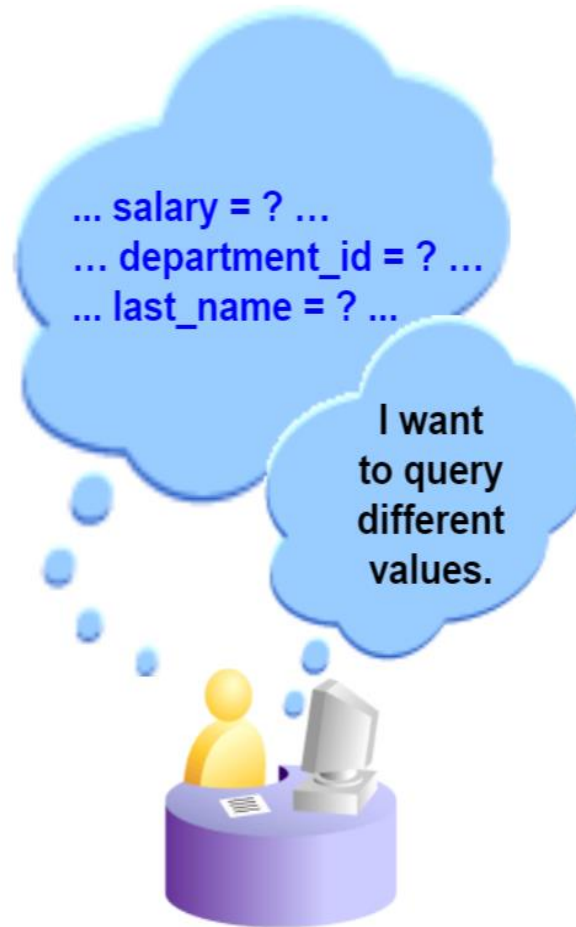


Sorting by multiple columns:

```
SELECT last_name, department_id, salary
FROM employees
ORDER BY department_id, salary DESC;
```



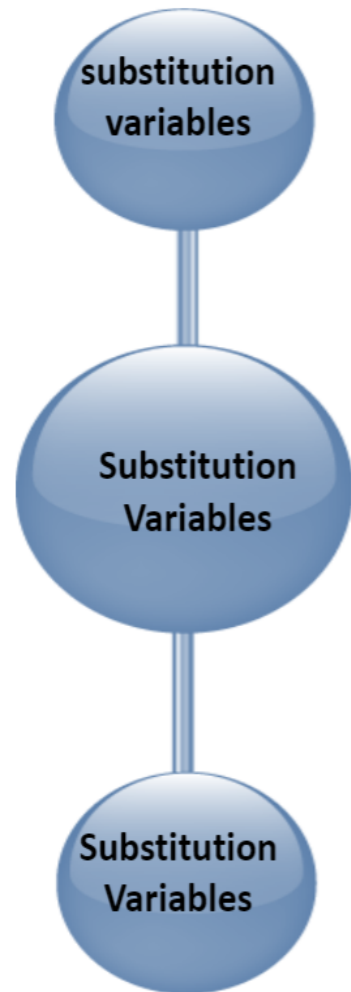
## Substitution Variables



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# Substitution Variables



Use substitution variables to:

Temporarily store values with single-ampersand (&) and double-ampersand (&&) substitution

Use substitution variables to supplement the following:

WHERE conditions

ORDER BY clauses

Column expressions

Table names

Entire SELECT statements

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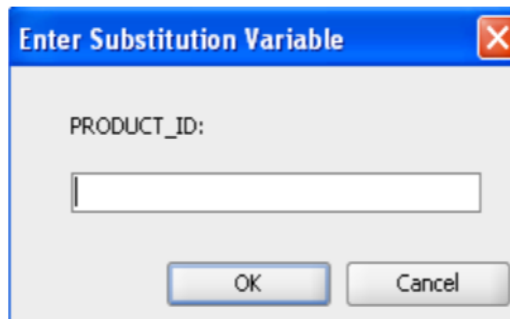
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## Using the Single-Ampersand Substitution Variable

- Use a variable prefixed with an ampersand (&) to prompt the user for a value:

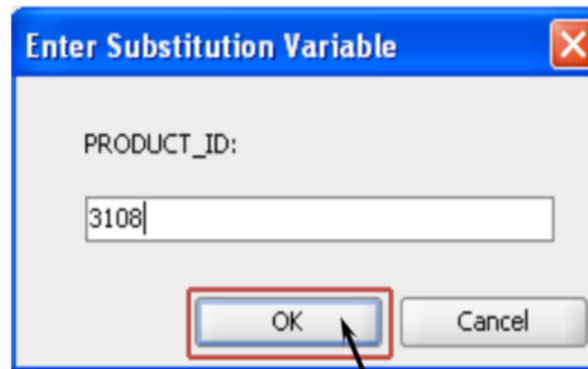
```
SELECT product_id, warehouse_id, quantity_on_hand  
FROM inventories  
WHERE product_id = &product_id ;
```






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## Using the Single-Ampersand Substitution Variable



	 PRODUCT_ID	 WAREHOUSE_ID	 QUANTITY_ON_HAND
1	3108	8	122
2	3108	9	110
3	3108	2	194
4	3108	4	170
5	3108	6	146

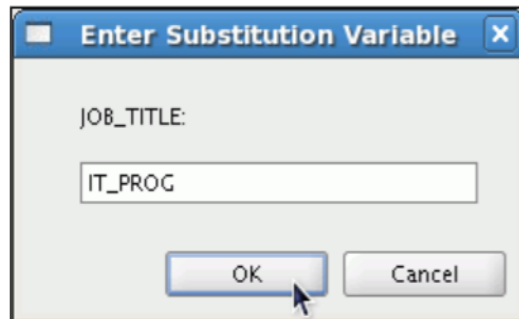
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## Character and Date Values with Substitution Variables

- Use single quotation marks for date and character values:

```
SELECT last_name, department_id, salary*12
FROM   employees
WHERE  job_id = '&job_title' ;
```



A dialog box titled "Enter Substitution Variable" with a close button (X). It contains a label "JOB\_TITLE:" followed by a text input field containing "IT\_PROG". At the bottom are "OK" and "Cancel" buttons. A mouse cursor is pointing at the "OK" button.

	LAST_NAME	DEPARTMENT_ID	SALARY*12
1	Hunold	60	108000
2	Ernst	60	72000
3	Lorentz	60	50400

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## Specifying Column Names, Expressions, and Text

```
SELECT &column_name  
FROM inventories  
WHERE &Condition  
ORDER BY &Order_column ;
```

Enter Substitution Variable

COLUMN\_NAME:

quantity\_on\_hand

OK Cancel

Enter Substitution Variable

CONDITION:

quantity\_on\_hand = 150

OK Cancel

Enter Substitution Variable

ORDER\_COLUMN:

product\_id

OK Cancel

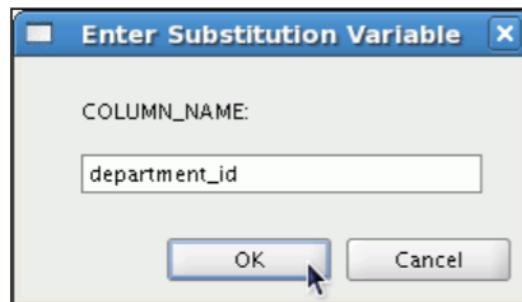
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## Using the Double-Ampersand Substitution Variable

- Use double ampersand (&&) if you want to reuse the variable value without prompting the user each time:

```
SELECT  employee_id, last_name, job_id, &&column_name
FROM    employees
ORDER BY &column_name ;
```



A dialog box titled "Enter Substitution Variable" with a close button (X) in the top right corner. It contains a label "COLUMN\_NAME:" followed by a text input field containing the value "department\_id". At the bottom, there are two buttons: "OK" and "Cancel". A mouse cursor is pointing at the "OK" button.

	EMPLOYEE_ID	LAST_NAME	JOB_ID	DEPARTMENT_ID
1	200	Whalen	AD_ASST	10
2	201	Hartstein	MK_MAN	20
3	202	Fay	MK_REP	20

...

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## Using the DEFINE Command

Use the DEFINE command to create and assign a value to a variable.

```
DEFINE order_num = 2458  
  
SELECT order_id, order_date, order_mode, order_total  
FROM orders  
WHERE order_id = &order_num;  
  
UNDEFINE order_num
```

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## Using the VERIFY Command

- Use the VERIFY command to toggle the display of the substitution variable, both before and after SQL Developer replaces substitution variables with values:

```
SET VERIFY ON
```

```
SELECT employee_id, last_name, salary  
FROM   employees  
WHERE  employee_id = &employee_num;
```

Enter Substitution Variable

EMPLOYEE\_NUM:

200

OK Cancel

Results Script Output Explain Autotrace DBMS Output OWA Output

SELECT employee\_id, last\_name, salary  
FROM employees  
WHERE employee\_id = 200

EMPLOYEE_ID	LAST_NAME	SALARY
200	Whalen	4400

1 rows selected

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•Which of the following are valid operators for the `WHERE` clause?

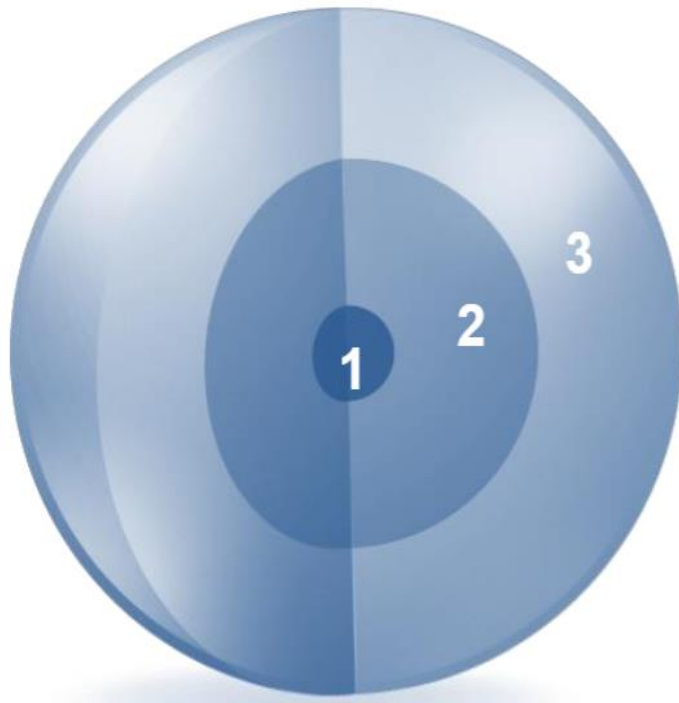
1. `>=`
2. `IS NULL`
3. `!=`
4. `IS LIKE`
5. `IN BETWEEN`
6. `<>`

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## Session Summary



1. Use the WHERE clause to restrict rows of output:
  - Use the comparison conditions
  - Use the BETWEEN, IN, LIKE, and NULL operators
  - Apply the logical AND, OR, and NOT operators
2. Use ampersand substitution to restrict and sort output at run time
3. Use the ORDER BY clause to sort rows of output:

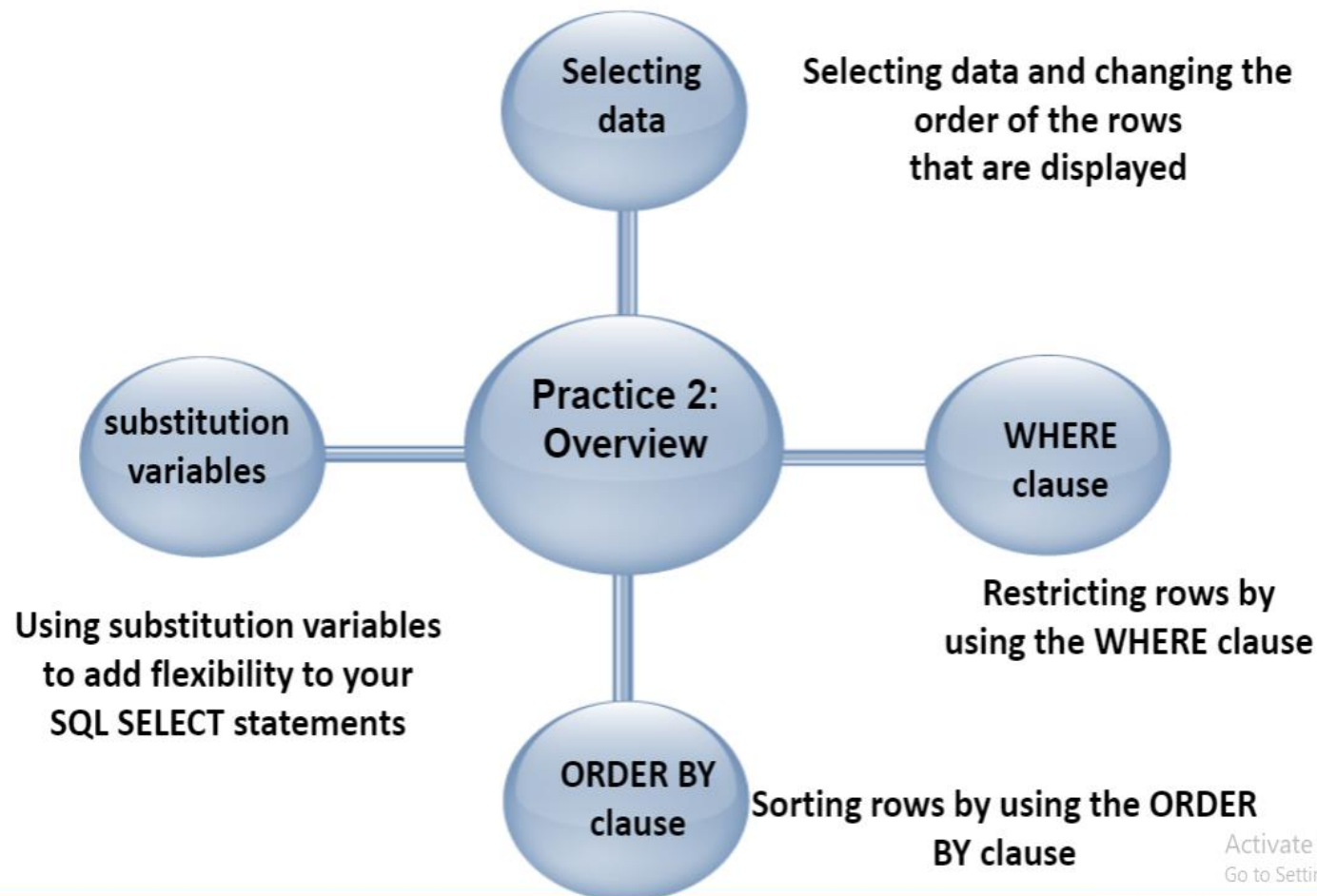
```
SELECT * | {[DISTINCT] column|expression [alias],...}  
FROM table  
[WHERE condition(s)]  
[ORDER BY {column, expr, alias} [ASC|DESC]] ;
```

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## Practice 2: Overview

This practice covers the following topics:



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