**DAILY ASSESSMENT**

|  |  |  |  |
| --- | --- | --- | --- |
| Date: | 10/06/2020 | Name: | GAURAV N R |
| Course: | VLSI | USN: | 4AL15EC025 |
| Topic: | |  | | --- | | **MOS transistor basics-1** | | Semester & Section: | 8TH SEM & A Section |
| Github Repository: | gaurav |  |  |

|  |
| --- |
| **FORENOON SESSION DETAILS**        A metal–oxide–semiconductor field-effect transistor (MOSFET, MOS-FET, or MOS FET) is a field-effect transistor (FET with an insulated gate) where the voltage determines the conductivity of the device. It is used for switching or amplifying signals. The ability to change conductivity with the amount of applied voltage can be used for amplifying or switching electronic signals. MOSFETs are now even more common than [BJT](https://www.electronicsforu.com/videos-slideshows/slideshows-presentations/introduction-bipolar-junction-transistor-bjt)s (bipolar junction transistors) in digital and analog circuits.  MOSFET structureMOSFET structure  A MOSFET is by far the most common [transistor](https://www.electronicsforu.com/videos-slideshows/videos/how-do-transistors-work-2) in digital circuits, as hundreds of thousands or millions of them may be included in a memory chip or microprocessor. Since they can be made with either p-type or n-type semiconductors, complementary pairs of MOS transistors can be used to make switching circuits with very low power consumption, in the form of [CMOS](https://en.wikipedia.org/wiki/CMOS) logic. Why MOSFET?MOSFETs are particularly useful in amplifiers due to their input impedance being nearly infinite which allows the amplifier to capture almost all the incoming signal. The main advantage is that it requires almost no input current to control the load current, when compared with bipolar transistors. MOSFETs are available in two basic forms:  * **Depletion Type:** The transistor requires the Gate-Source voltage (VGS) to switch the device “OFF”. The depletion-mode MOSFET is equivalent to a “Normally Closed” switch. * **Enhancement Type:** The transistor requires a Gate-Source voltage(VGS) to switch the device “ON”. The enhancement-mode MOSFET is equivalent to a “Normally Open” switch.   **MOSFET structure**  It is a four-terminal device with source(S), gate (G), drain (D) and body (B) terminals. The body is frequently connected to the source terminal, reducing the terminals to three. It works by varying the width of a channel along which charge carriers flow (electrons or holes).  The charge carriers enter the channel at source and exit via the drain. The width of the channel is controlled by the voltage on an electrode is called gate which is located between source and drain. It is insulated from the channel near an extremely thin layer of metal oxide. A metal-insulator-semiconductor field-effect transistor or MISFET is a term almost synonymous with MOSFET. Another synonym is IGFET for the insulated-gate field-effect transistor. MOSFET Operation The working of a MOSFET depends upon the MOS capacitor. The MOS capacitor is the main part of MOSFET. The semiconductor surface at the below oxide layer which is located between source and drain terminals. It can be inverted from p-type to n-type by applying positive or negative gate voltages.  When we apply positive gate voltage the holes present under the oxide layer with a repulsive force and holes are pushed downward with the substrate. The depletion region populated by the bound negative charges which are associated with the acceptor atoms. The electrons reach the channel is formed. The positive voltage also attracts electrons from the n+ source and drain regions into the channel. Now, if a voltage is applied between the drain and source, the current flows freely between the source and drain and the gate voltage controls the electrons in the channel. If we apply negative voltage, a hole channel will be formed under the oxide layer. P-Channel MOSFET p-channel mosfet  **P-Channel MOSFET**  The drain and source are heavily doped p+ region and the substrate is in n-type. The current flows due to the flow of positively charged holes also known as p-channel MOSFET. When we apply negative gate voltage, the electrons present beneath the oxide layer experience repulsive force and they are pushed downward in to the substrate, the depletion region is populated by the bound positive charges which are associated with the donor atoms. The negative gate voltage also attracts holes from p+ source and drain region into the channel region. N-Channel MOSFET n-channel MOSFET  **N-Channel MOSFET**  The drain and source are heavily doped n+ region and the substrate is p-type. The current flows due to the flow of negatively charged electrons, also known as n-channel MOSFET. When we apply the positive gate voltage the holes present beneath the oxide layer experience repulsive force and the holes are pushed downwards in to the bound negative charges which are associated with the acceptor atoms. The positive gate voltage also attracts electrons from n+ source and drain region in to the channel thus an electron reach channel is formed. |

**DAILY ASSESSMENT**

|  |  |  |  |
| --- | --- | --- | --- |
| **Date:** | **10/06/2020** | **Name:** | **GAURAV N R** |
| **Course:** | **Begineer PHP and SQL** | **USN:** | **4AL15EC025** |
| **Topic:** | **MySQL Joins**  **PHP Errors and security**  **Building a template page** | **Semester & Section:** | **8TH SEM & A Section** |
| **Github Repository:** | **gaurav** |  |  |

|  |
| --- |
| **AFTERNOON SESSION DETAILS** |
|  |

|  |
| --- |
| **Report**- MySQL: Joins This MySQL tutorial explains how to use MySQL **JOINS** (inner and outer) with syntax, visual illustrations, and examples.  **Description**  MySQL **JOINS** are used to retrieve data from multiple tables. A MySQL JOIN is performed whenever two or more tables are joined in a SQL statement.  There are different types of MySQL joins:   * MySQL INNER JOIN (or sometimes called simple join) * MySQL LEFT OUTER JOIN (or sometimes called LEFT JOIN) * MySQL RIGHT OUTER JOIN (or sometimes called RIGHT JOIN)   So let's discuss MySQL JOIN syntax, look at visual illustrations of MySQL JOINS, and explore MySQL JOIN examples.  **INNER JOIN** (simple join)  Chances are, you've already written a statement that uses a MySQL INNER JOIN. It is the most common type of join. MySQL INNER JOINS return all rows from multiple tables where the join condition is met. Syntax The syntax for the INNER JOIN in MySQL is:  SELECT columns  FROM table1  INNER JOIN table2  ON table1.column = table2.column; Visual Illustration In this visual diagram, the MySQL INNER JOIN returns the shaded area:  MySQL  The MySQL INNER JOIN would return the records where table1 and table2 intersect. Example Here is an example of a MySQL INNER JOIN:  SELECT suppliers.supplier\_id, suppliers.supplier\_name, orders.order\_date  FROM suppliers  INNER JOIN orders  ON suppliers.supplier\_id = orders.supplier\_id;  This MySQL INNER JOIN example would return all rows from the suppliers and orders tables where there is a matching supplier\_id value in both the suppliers and orders tables.  If we run the MySQL SELECT statement (that contains an INNER JOIN) below:  SELECT suppliers.supplier\_id, suppliers.supplier\_name, orders.order\_date  FROM suppliers  INNER JOIN orders  ON suppliers.supplier\_id = orders.supplier\_id; Old Syntax As a final note, it is worth mentioning that the MySQL INNER JOIN example above could be rewritten using the older implicit syntax as follows (but we still recommend using the INNER JOIN keyword syntax):  SELECT suppliers.supplier\_id, suppliers.supplier\_name, orders.order\_date  FROM suppliers, orders  WHERE suppliers.supplier\_id = orders.supplier\_id; LEFT OUTER JOIN Another type of join is called a MySQL LEFT OUTER JOIN. This type of join returns all rows from the LEFT-hand table specified in the ON condition and **only** those rows from the other table where the joined fields are equal (join condition is met). Syntax The syntax for the LEFT OUTER JOIN in MySQL is:  SELECT columns  FROM table1  LEFT [OUTER] JOIN table2  ON table1.column = table2.column;  In some databases, the LEFT OUTER JOIN keywords are replaced with LEFT JOIN. Visual Illustration In this visual diagram, the MySQL LEFT OUTER JOIN returns the shaded area:  MySQL  The MySQL LEFT OUTER JOIN would return the all records from table1 and only those records from table2 that intersect with table1. Example Here is an example of a MySQL LEFT OUTER JOIN:  SELECT suppliers.supplier\_id, suppliers.supplier\_name, orders.order\_date  FROM suppliers  LEFT JOIN orders  ON suppliers.supplier\_id = orders.supplier\_id;  This LEFT OUTER JOIN example would return all rows from the suppliers table and only those rows from the orders table where the joined fields are equal.  If a supplier\_id value in the suppliers table does not exist in the orders table, all fields in the orders table will display as <null> in the result set. RIGHT OUTER JOIN Another type of join is called a MySQL RIGHT OUTER JOIN. This type of join returns all rows from the RIGHT-hand table specified in the ON condition and **only** those rows from the other table where the joined fields are equal (join condition is met). Syntax The syntax for the RIGHT OUTER JOIN in MySQL is:  SELECT columns  FROM table1  RIGHT [OUTER] JOIN table2  ON table1.column = table2.column;  In some databases, the RIGHT OUTER JOIN keywords are replaced with RIGHT JOIN. Visual Illustration In this visual diagram, the MySQL RIGHT OUTER JOIN returns the shaded area:  MySQL  The MySQL RIGHT OUTER JOIN would return the all records from table2 and only those records from table1 that intersect with table2. Example Here is an example of a MySQL RIGHT OUTER JOIN:  SELECT orders.order\_id, orders.order\_date, suppliers.supplier\_name  FROM suppliers  RIGHT JOIN orders  ON suppliers.supplier\_id = orders.supplier\_id;  This RIGHT OUTER JOIN example would return all rows from the orders table and only those rows from the suppliers table where the joined fields are equal.  If a supplier\_id value in the orders table does not exist in the suppliers table, all fields in the suppliers table will display as <null> in the result set. |