**DAILY ASSESSMENT FORMAT**

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| **Date:** | **11-June-2020** | **Name:** | **Raziya Banu** |
| **Course:** | **VLSI** | **USN:** | **4AL16EC058** |
| **Topic:** | **MOS transistor basics-II and III** | **Semester & Section:** | **8th sem & ‘B’ section** |
| **Github Repository:** |  |  |  |

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| **FORENOON SESSION DETAILS** |
| **Image of session** |
| **Report –**  In my first session today I have studied about the MOSFET - MOS transistor basics-II and III MOS Transistor theory 2.1 Introduction z An MOS transistor is a majority-carrier device, in which the current in a conducting channel between the source and the drain is modulated by a voltage applied to the gate. z Symbols z NMOS (n-type MOS transistor)  (1) Majority carrier = electrons  (2) A positive voltage applied on the gate with respect to the substrate enhances the number of electrons in the channel and hence increases the conductivity of the channel.  (3) If gate voltage is less than a threshold voltage Vt , the channel is cut-off (very low current between source & drain). z PMOS (p-type MOS transistor)  (1) Majority carrier = holes  (2) Applied voltage is negative with respect to substrate.  NMOS PMOS 2 z Threshold voltage (Vt): The voltage at which an MOS device begins to conduct ("turn on") z Relationship between Vgs (gate-to-source voltage) and the source-to-drain current (Ids) , given a fixed drain-to-source voltage (Vds).  (1) Devices that are normally cut-off with zero gate bias are classified as "enhancement-mode "devices.  (2) Devices that conduct with zero gate bias are called "depletion-mode "devices.  (3) Enhancement-mode devices are more popular in practical use.  NMOS Enhancement Transistor z Consist of  (1) Moderately doped p-type silicon substrate  (2) Two heavily doped n+ regions, the source and drain, are diffused.  (3) Channel is covered by a thin insulating layer of silicon dioxide (SiO2) called " Gate Oxide "  (4) Over the oxide is a polycrystalline silicon (polysilicon) electrode, referred to as the "Gate" z Features  (1) Since the oxide layer is an insulator, the DC current from the gate to channel is essentially zero.  (2) No physical distinction between the drain and source regions.  (3) Since SiO2 has low loss and high dielectric strength, the application of high gate fields is feasible.    z In operation  (1) Set Vds > 0 in operation  (2) Vgs =0 Æ no current flow between source and drain. They are insulated by two reversed-biased PN junctions (3) When Vg > 0 , the produced E field attracts electrons toward the gate and repels holes.  (4) If Vg is sufficiently large, the region under the gate changes from p-type to n-type(due to accumulation of attracted elections) and provides a conducting path between source and drain.ÅÆThe thin layer of p-type silicon is said to be "inverted".  (5) Three modes  a. Accumulation mode (Vgs << Vt)  b. Depletion mode (Vgs =Vt) c. Inversion mode (Vgs > Vt) 5 z Electrically  (1) An MOS device can be considered as a voltage-controlled switch that conducts when Vgs >Vt (given Vds>0) (2) An MOS device can be considered as a voltage-controlled resistor z Effective gate voltage (Vgs-Vt) z At the source end , the full gate voltage is effective in the inverting the channel. z At the drain end , only the difference between the gate and drain voltage is effective 6 z Pinch-off  (1) Vds > Vgs-Vt => Vgd < Vt => Vd > Vg –Vt (Vg is not big enough)  (2) The channel no longer reaches the drain.  (3) As electrons leave the drain depletion region and are subsequently accelerated toward the drain.  (4) The voltage across the pinched-off region remains at (Vgs-Vt) =>”saturated” state in which the channel current as controlled by Vg , and is independent of Vd z For fixed Vds and Vg , Ids is function of  (1) Distance between drain & source  (2) Channel width  (3) Vt  (4) Thickness of gate oxide  (5) The dielectric constant of gate oxide  (6) Carrier (hole or electron) mobility , μ. z Conducting mode  (1) “cut-off ” region : Ids ≈ 0 , Vgs < Vt  (2) “Nonsaturated” region : weak inversion region, when Ids depends on Vg & Vd  (3) “Saturated“ region: channel is strongly inverted and Ids is ideally independent of Vds (pinch-off region)  (4) “Avalanche breakdown” (pinch-through) : very high Vd => gate has no control over Ids |

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| **Date:** | **11-June-2020** | **Name:** | **Raziya Banu** | |
| **Course:** | **Udemy** | **USN:** | **4AL16EC058** | |
| **Topic:** | **Loops in Java** | **Semester & Section:** | **8th sem & ‘B’ section** | |
| **AFTERNOON SESSION DETAILS** | | | |
| **Image of session** | | | |
| **For Loops** In the fifth part of the Java tutorial for beginners video series using Eclipse, we look using 'for' loops and printf().  **public** **class** **Application** **{**  **public** **static** **void** **main(**String**[]** args**)** **{**  **for(int** i**=**0**;** i **<** 5**;** i**++)** **{**  System**.**out**.**printf**(**"The value of i is: %dn"**,** i**);**  **}**  **}**  **}**  The value of i is: 0  The value of i is: 1  The value of i is: 2  The value of i is: 3  The value of i is: 4 **If** A tutorial on the if() statement, plus some stuff on using **break** to break out of loops. When the video is running, click the maximize button in the lower-right-hand corner to make it full screen.  public class Application {  public static void main(String[] args) {  // Some useful conditions:  System.out.println(5 == 5);  System.out.println(10 != 11);  System.out.println(3 < 6);  System.out.println(10 > 100);  // Using loops with "break":  int loop = 0;  while(true) {  System.out.println("Looping: " + loop);  if(loop == 3) {  break;  }    loop++;  System.out.println("Running");  }  }  }  true  true  true  false  Looping: 0  Running  Looping: 1  Running  Looping: 2  Running  Looping: 3 | | | |