

ASSIGNMENT-1

1) Why we moved from BJT to MOSFET:

MOSFETs i.e Metal Oxide Silicon Field Effect Transistors, were invented to overcome the disadvantages posed by BJTs, FETs, such as the slow operation, high drain resistance, and moderate input impedance. They are used to switch or amplify voltages in circuits. They are Voltage controlled device which serves as an advantage for the same to be used in the circuits. Some of the reasons for the opting MOSFET over BJT are :

- MOSFET is efficient because its output depends on the input voltage and not the input current.
- MOSFET has less risk of thermal runaway than BJT.
- MOSFET is more heat tolerant and can stimulate good resistance.
- MOSFET is a Voltage controlled device while BJT is a controlled current device.
- MOSFET has a very low power loss and a high speed.
- Positive temperature coefficient i.e the resistance increases as the temperature increases.
- Suitable for high-current and high-frequency applications

2) Difference between MOSFET and FINFET:

	MOSFET	FINFET
Structure	Two-dimensional	Three - dimensional
Pattern	Planner pattern	Double pattern
Fabrication cost	Low	High
Channel	Flat channel	Features a 'fin' structure that forms a channel
Gate-to-source voltage	Lower	Higher
Gate capacitance	More	Less
Electricity usage	More	Less

3) Difference between RAM and ROM and evolution of memory:

	RAM	ROM
Stands for	Random Access Memory	Read Only Memory
Operations performed	Used to read and write	Used to only write

Data retention	It is a volatile memory that could store the data as long as the power is supplied.	It is a non-volatile memory that could retain the data even when the power is turned off.
Speed	High - speed memory	Slower compared to RAM
Cost	More costly	Less costly
Function	Used for the temporary storage of data currently being processed by the CPU.	Used to store Firmware ,BIOS, and other data that needs to be retained.
Used as /in	CPU cache, Primary memory	Firmware , Micro-controllers.

Evolution of memory storage:

1834 - Charles Babbage begins to build his "Analytical Engine", a precursor to the computer. It uses read-only memory in the form of punch cards.

1939 - Helmut Schreyer invents a prototype memory using neon lamps.

1942 - The Atanasoff-Berry Computer has 60 50-bit words of memory in the form of capacitors mounted on two revolving drums. For secondary memory, it uses punch cards.

1949 - Jay Forrester conceives the idea of magnetic core memory as it is to become commonly used, with a grid of wires used to address the cores. The first practical form manifests in 1952-53 and renders obsolete previous types of computer memory.

1951 - Jay Forrester files a patent for matrix core memory.

1952 - The EDVAC computer is completed with 1024 44-bit words of ultrasonic memory. A core memory module is added to the ENIAC computer.

1969 - Intel begins as chip designers and produces a 1 KB RAM chip, the largest memory chip to date. Intel soon switches to being notable designers of computer microprocessors.

1970 - Intel releases the 1103 chip, the first generally available DRAM memory chip

1971 - Intel releases the 1101 chip, a 256-bit programmable memory, and the 1701 chip, a 256-byte erasable read-only memory (EROM).

1984 - Apple Computers releases the Macintosh personal computer. It is the first computer that came with 128KB of memory. The 1 MB memory chip is developed.

4) List out the mobile processors, frequency, process node:

Apple: A17 Pro 3nm, 3.78 GHz

Snapdragon® 8 Gen 3 - 3.3 GHz, Process Node: 4 nm

5) List out the semiconductor products and their companies:

Qualcomm:

CDMA/WCDMA chipsets, Snapdragon, BREW, OmniTRACS, MediaFLO, QChat, mirasol displays, uiOne, Gobi, Qizx, CPU.

Intel:

Produces processors, Graphics processing units, FPGAs & programmable devices, software , server products etc.,

Ex: Intel® Xeon® Platinum Processors, Intel® Xeon® Gold Processors, Intel® Xeon® Silver Processors, Intel® Xeon® Bronze Processors, Single Node Servers,

Samsung:

Their products and services include Smartphones, Tablets, Audio Sound, Watches, Smart Switch, Mobile Accessories, TVs, Sound Devices, Refrigerators, Air Solutions , Cooking Appliances, Monitors,

6) What are the different jobs available in VLSI domain:

Front End

- RTL Design
- ASIC/SOC/IP Verification
- RTL Integration
- CPU/Processor Verification
- Pre Silicon Validation/Verification

Back end VLSI design engineers.

- STA/Synthesis Engineer
- Physical Design Engineer
- Physical Verification
- Memory Characterization
- DFT Engineer
- Post Silicon Validation
- Emulation Engineer