UNIT 5 SEQUENTIAL LOGIC CIRCUITS 2

Types of RAM

RAM is volatile memory, meaning it loses its data when power is turned off. The two primary types are:

1. Static RAM (SRAM):

Characteristics:

Faster and more expensive.

Uses flip-flops to store data, requiring six transistors per bit.

No need for refreshing as long as power is supplied.

Applications: Cache memory in CPUs, small high-speed memory.

2. Dynamic RAM (DRAM):

Characteristics:

Slower but more cost-effective.

Stores data in capacitors that require periodic refreshing due to charge leakage.

Denser and used for larger memory capacities.

Applications: Main memory in computers.

Variants of DRAM:

Synchronous DRAM (SDRAM): Operates in sync with the system clock.

Double Data Rate SDRAM (DDR, DDR2, DDR3, etc.): Transfers data on both edges of the clock signal.

Graphics DRAM (GDDR): Optimized for GPUs.

Embedded DRAM (eDRAM): Integrated into chips for performance.

Types of ROM

ROM is non-volatile memory, meaning it retains data even when the power is off. Types include:

1. Mask ROM:

Characteristics:

Data is permanently written during manufacturing.

Cannot be modified after production.

Applications: Fixed firmware in devices.

2. Programmable ROM (PROM):

Characteristics:

Programmable once after manufacturing.

Uses fusible links that are burned during programming.

Applications: Custom firmware updates.

3. Erasable Programmable ROM (EPROM):

Characteristics:

Can be erased and reprogrammed using UV light.

Requires a special EPROM programmer.

Applications: Development and testing.

4. Electrically Erasable Programmable ROM (EEPROM):

Characteristics:

Erased and reprogrammed electrically.

Slower than flash memory.

Applications: BIOS, configuration settings.

5. Flash Memory:

Characteristics:

A type of EEPROM with faster access and erasure.

Supports block-level erasure.

Applications: USB drives, SSDs, embedded systems.