1. Addressing and Address Decoding:

Addressing: In computing, addressing refers to the process of specifying a unique identifier for a particular memory location. Memory devices, such as RAM (Random Access Memory) and ROM (Read-Only Memory), are organized into addressable locations. The CPU uses addresses to read from or write to specific locations in memory.

Address Decoding: It is the process of translating memory addresses into physical locations. Address decoding circuits are used to select the desired memory or peripheral device based on the address generated by the CPU.

2. Interfacing RAM, ROM, EPROM:

RAM (Random Access Memory): Volatile memory used for temporary storage of data that can be quickly read and written to by the CPU.

ROM (Read-Only Memory): Non-volatile memory that stores permanent data. The data in ROM is typically written during manufacturing and cannot be easily modified.

EPROM (Erasable Programmable Read-Only Memory): A type of memory that can be reprogrammed after erasure. It retains data even when the power is turned off.

3. Programmable Peripheral Interface (PPI):

A programmable device that allows the CPU to communicate with external peripherals. It can be configured to work with different input and output devices.

4. Cache Memory:

- Mapping and Hit Ratio:
  - Cache Mapping refers to the method used to allocate data in the cache. Common mapping techniques include direct mapping, associative mapping, and set-associative mapping.
  - Hit Ratio is the ratio of cache hits to total memory access attempts. A higher hit ratio indicates better cache performance.

5. Virtual Memory Technique:

- Logical Address: The address generated by the CPU. It is also known as a virtual address.
- Physical Address: The actual location in the physical memory (RAM) corresponding to the logical address.
- TLB (Translation Lookaside Buffer): A cache that stores recent translations of virtual addresses to physical addresses, reducing the time required for address translation.