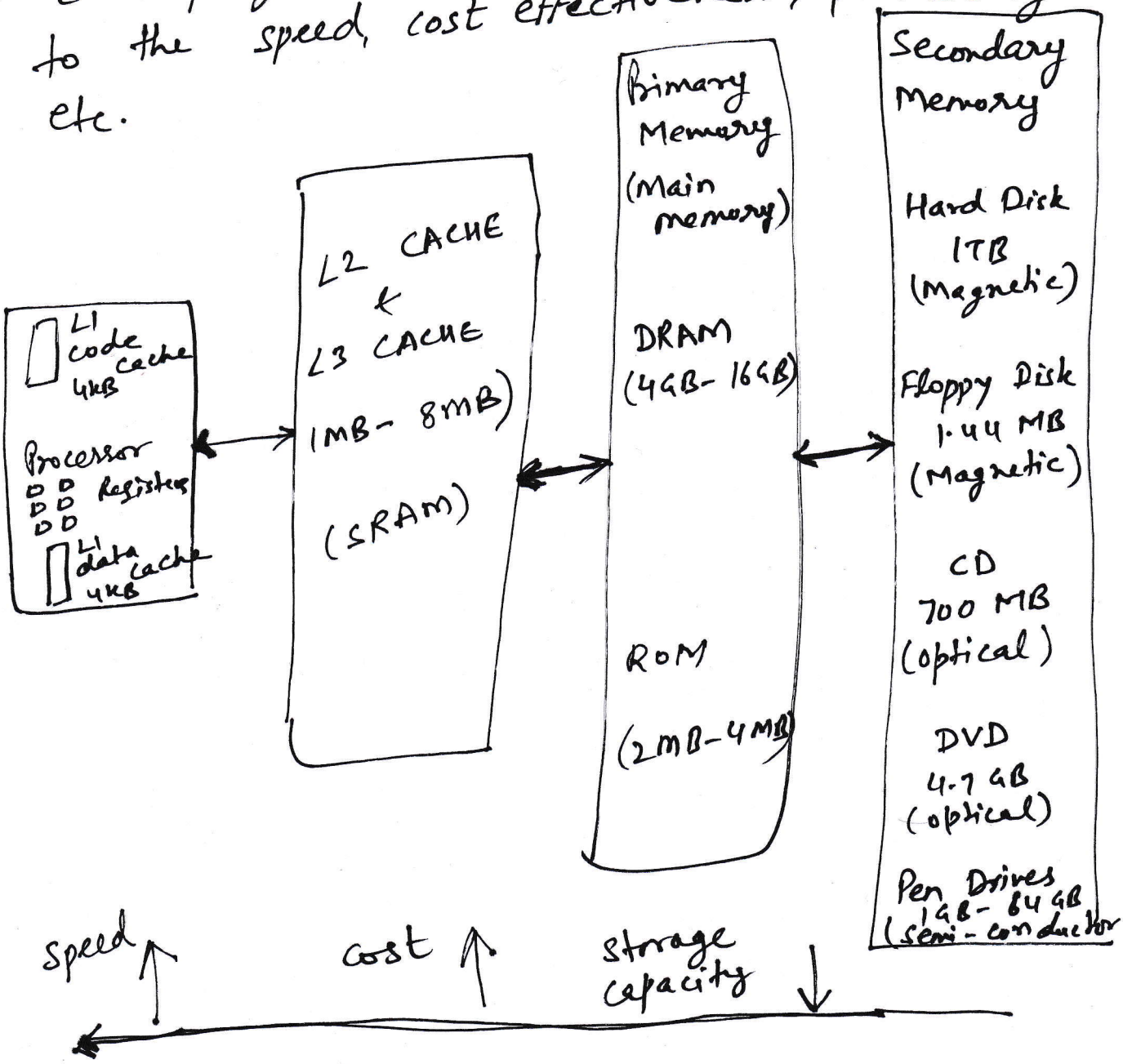
Memory

1) The purpose of any memory device is to store programs and data.

→ Several types of memory devices are used in the computer forming a memory Hierarchy.

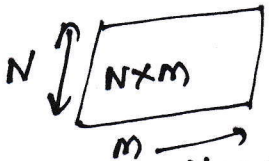
→ Each plays a specific role contributing to the speed, cost effectiveness, portability etc.



Registers

→ Registers are present inside the processor
→ There are basically a set of flip-flops.
→ " store data and addresses and can directly take part in arithmetic and logic operations.
→ There are very small in size typically just a few bytes.

→ Primary Memory:
→ Secondary Memory:
→ Portable secondary Memory:
→ Cache Memory:
→ Memory characteristics:
1) Location: (On-chip, Internal, External)
2) Storage Capacity:



(4k x 8)
|
N x M
|
4k locations, and each location size is 8 bits

→ Transfer Modes: Word transfer & Block Transfer

→ Access modes:
1) serial Access
2) Random Access

→ Physical Properties:
1) Writable
2) Non-Writable
3) Volatile
4) Non-volatile

→ Access time (t_A)

→ Reliability

→ Cost

→ Average cost: Consider a system having two memories M_1 (RAM) & M_2 (ROM).
If C_1 is the cost of memory M_1 of size S_1
& C_2 " " " " " M_2 of " S_2
Then the average cost

$$C_{AVG} = (C_1S_1 + C_2S_2) / (S_1 + S_2)$$

Hit Ratio (H)

Consider two memories M_1 & M_2.

→ M_1 is closer to the processor (RAM) than M_2 (Hard disk)

→ If the desired data is found in M_1, then it is called a Hit, else it is a Miss

→ Let N_1 be the number of hits and N_2 the number of misses

The hit Ratio H

$$H = (N_1) / (N_1 + N_2)$$

It is expressed as percentage

H can never be 100%. In most computers it is maintained around 98%