

COMPUTER ARCHITECTURE

TOPICS TO BE COVERED UNDER COMPUTER ARCHITECTURE

- BASIC 8085 MODEL
- PIPELINING
- SEGMENTATION
- CACHE MEMORY
- VIRTUAL MEMORY
- COMPARISION BETWEEN RISC AND CISC

SOME KEY POINTS

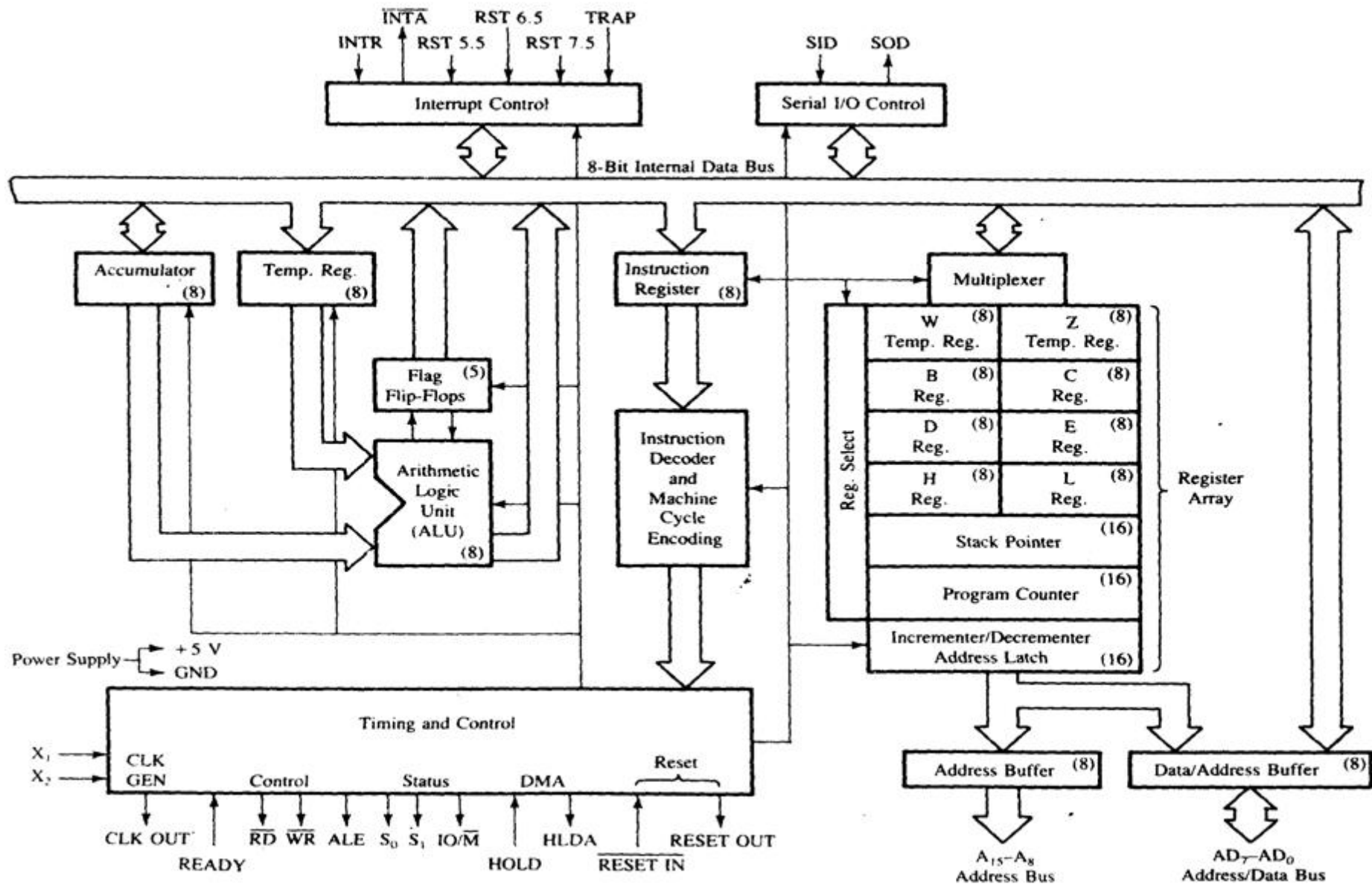
- THREE KINDS OF MEMORY ARE THERE-
CACHE
MAIN MEMORY OR RAM
HARD DRIVES OR STORE
- THREE FACTORS KEPT IN MIND IS
SPEED
COST
SIZE

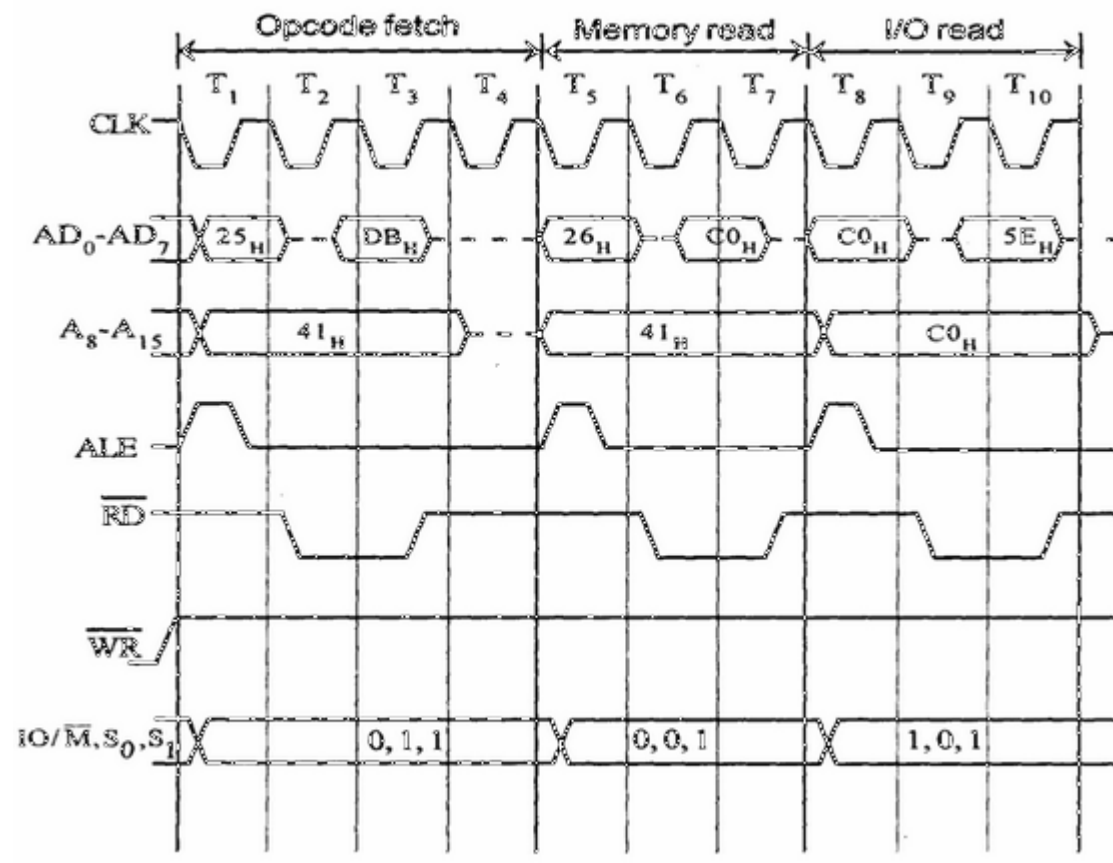
SOME FACTS

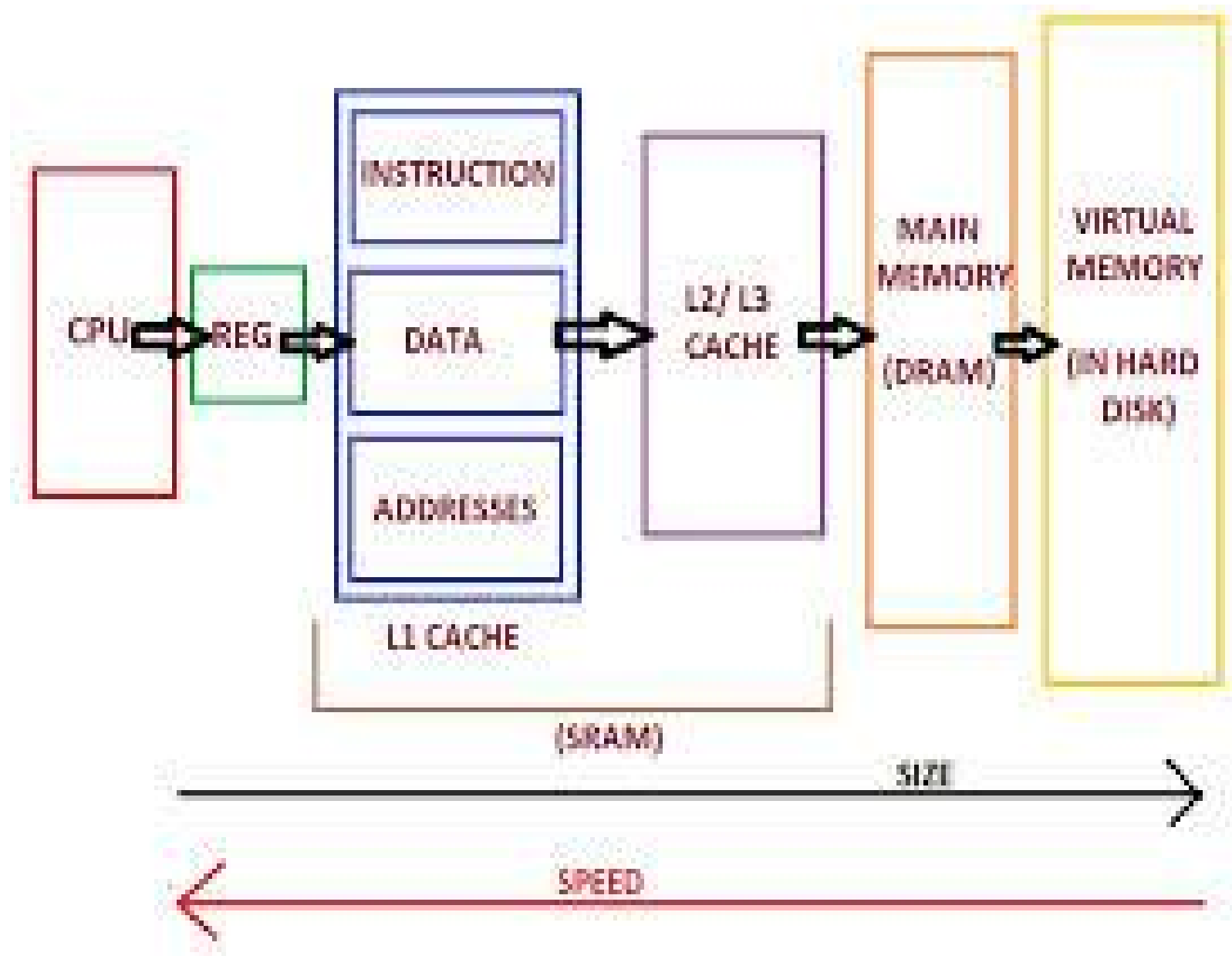
- SPEED OF CPU IS VERY FAST AND CAN BE NEGLECTED IN COMPARISON TO MEMORY
- CACHE MEMORY RESPONSE TIME IS IN ORDER OF 10 NS.
- SPEED OF RAM IS IN THE ORDER OF 100NS
- HARD DRIVES RESPONSE TIME IS IN ORDER OF 10MS.

TYPES OF INSTRUCTION SET

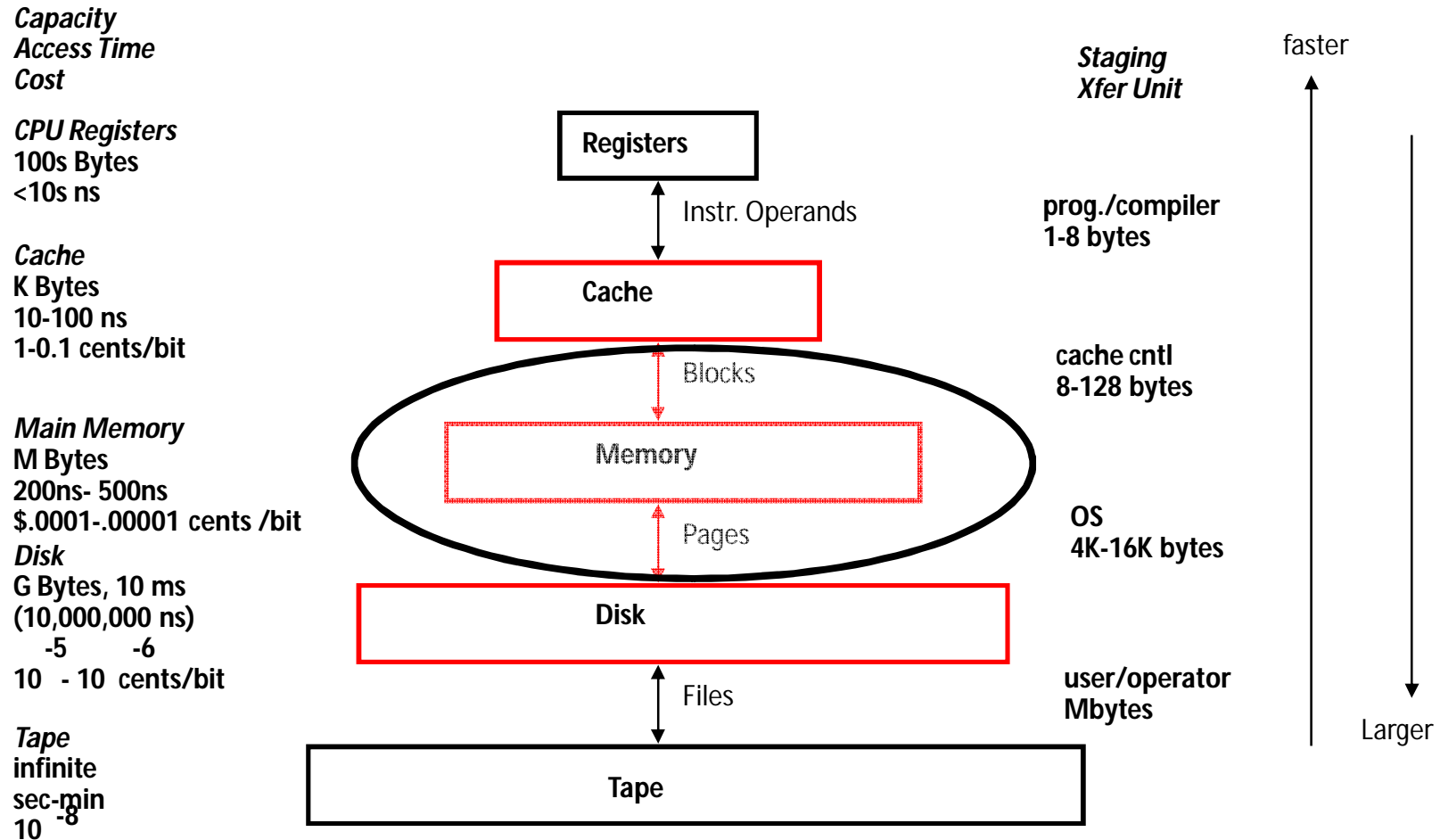
- ARITHMETIC OPERATION AND COPYING OPERATION LIKE- M2M, R2M, R2R
- BRANCHING OPERATION LIKE JUMP, CALL ,ETC
- INTEL GENERALLY FOLLOW CISC- CLOCK CYCLE REQUIRED FOR INST VARIES TREMENDOUSLY
- ARM PROCESSOR ARE BASED ON RISC, EQUAL NUMBER OF CLOCK CYCLES FOR ALL INSTRUCTION





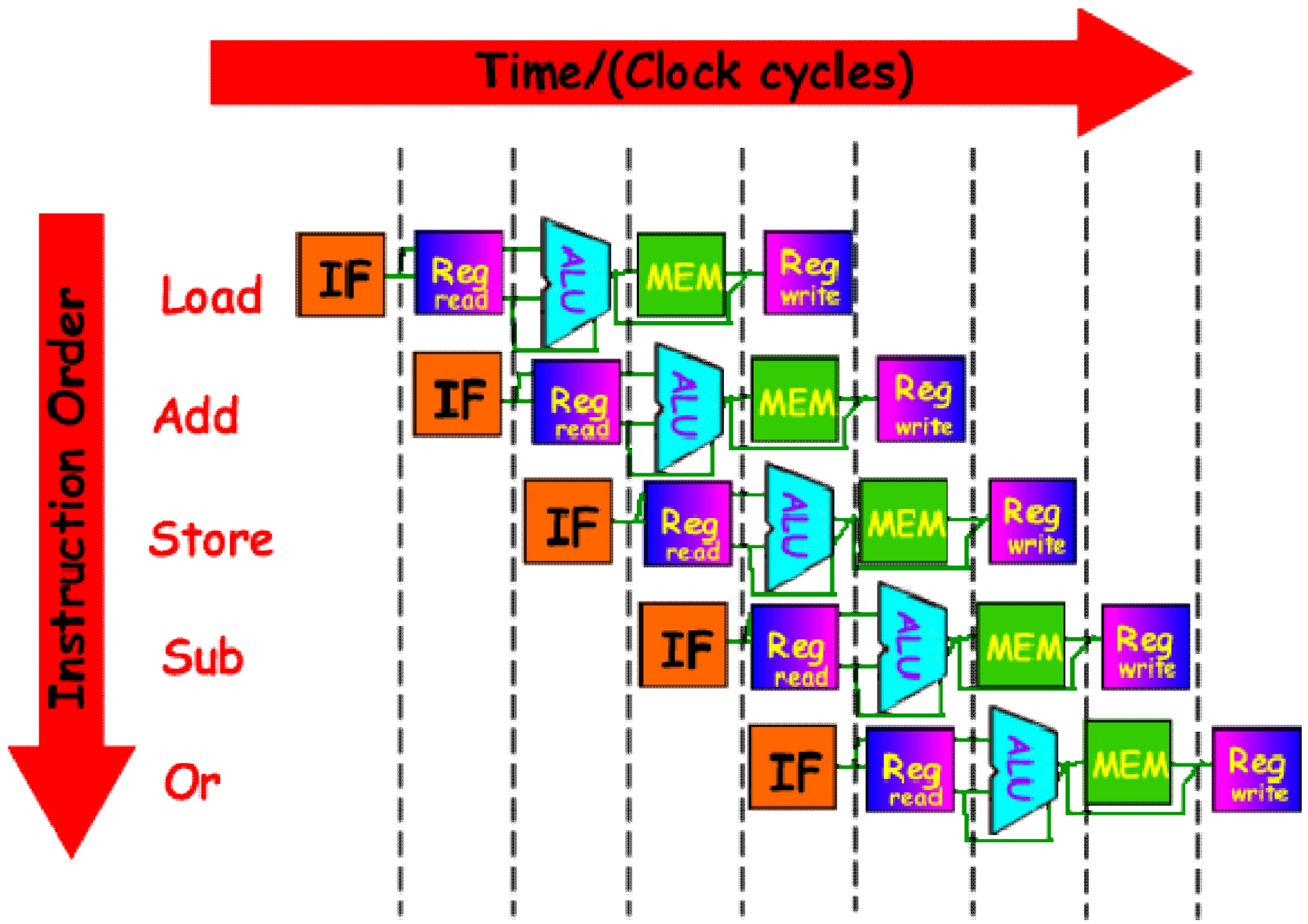


Memory Hierarchy Comparisons



PIPELINING

- REAL EXAMPLE: DISTRIBUTING MARKSHEET
- BUS INTERFACE UNIT IS MADE INDEPENDENT FROM PROCESSOR
- PIPELINING IS HEAVILY AFFECTED BY CALL, JUMP, LDA, ETC
- SAVES MUCH TIME

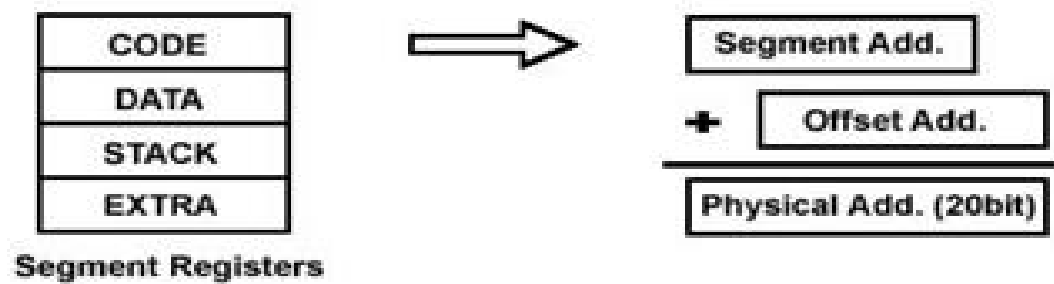
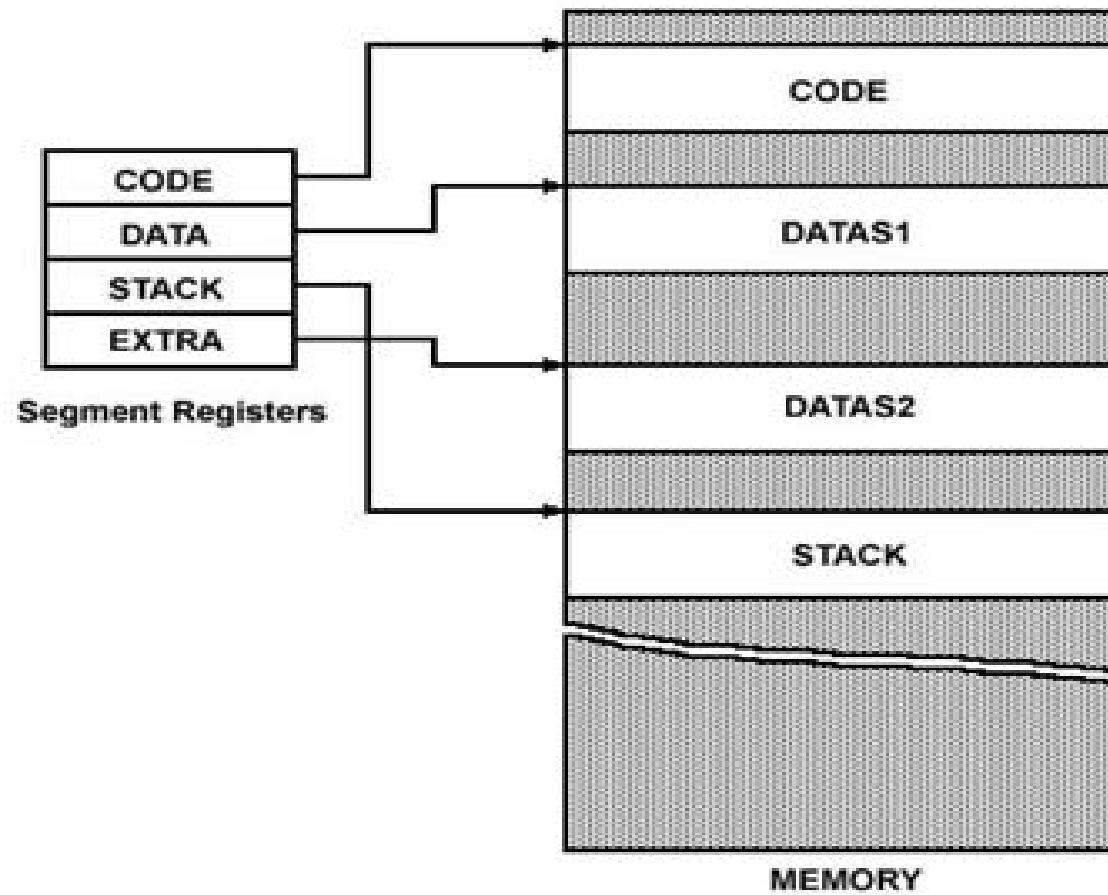


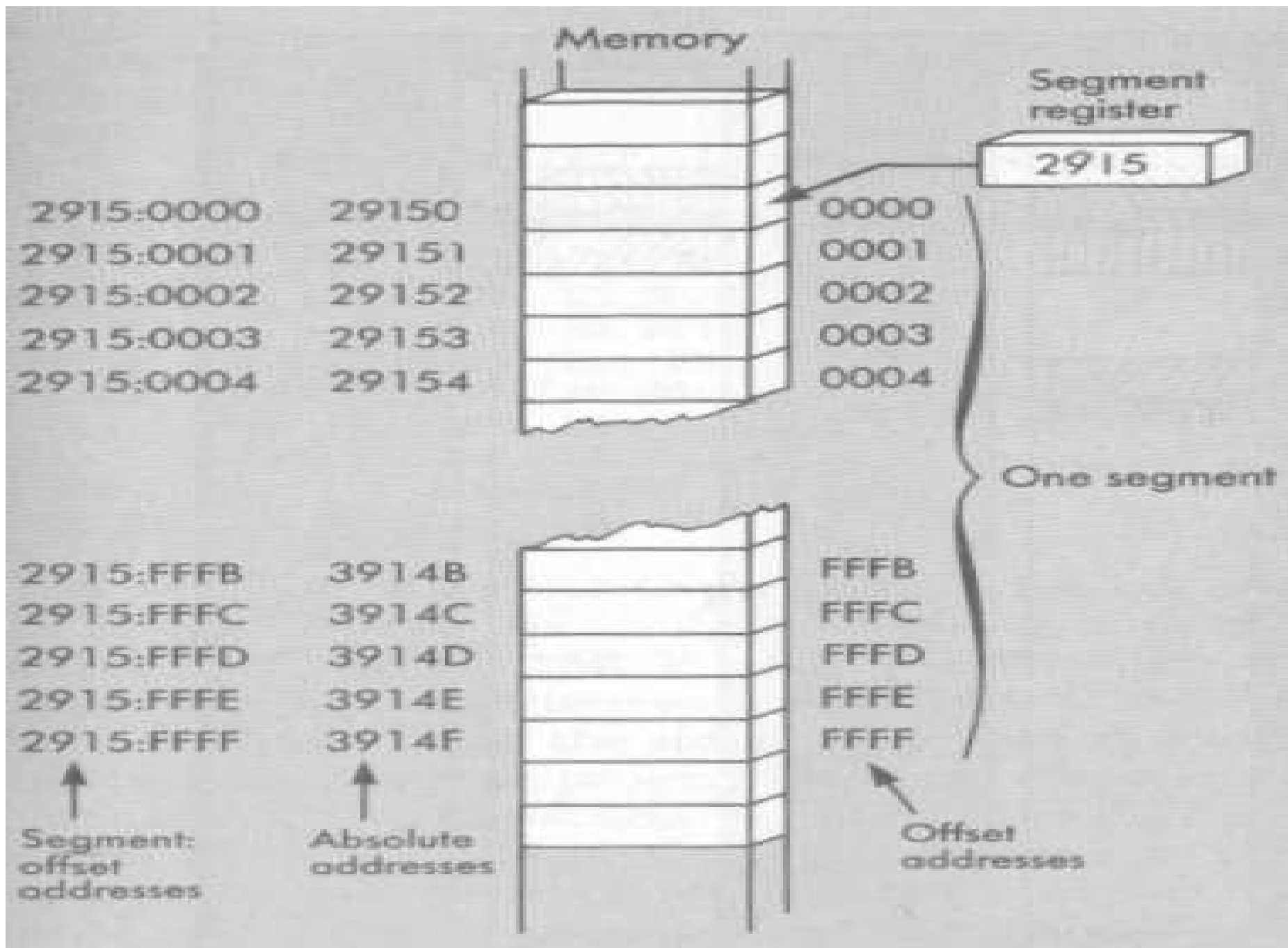
SEGMENTATION

- THIS WAS USED IN 8086, WHERE THE SIZE OF PHYSICAL ADDRESS BUS WAS 20 BIT.
- BUT WE DIVIDED INTO TWO PARTS CALLED SEGMENT REGISTER AND POINTER REGISTER
- THE PROGRAM IS DIVIDED INTO SEGMENTS SUCH AS
DATA , CODE , STACK , EXTRAS

USES

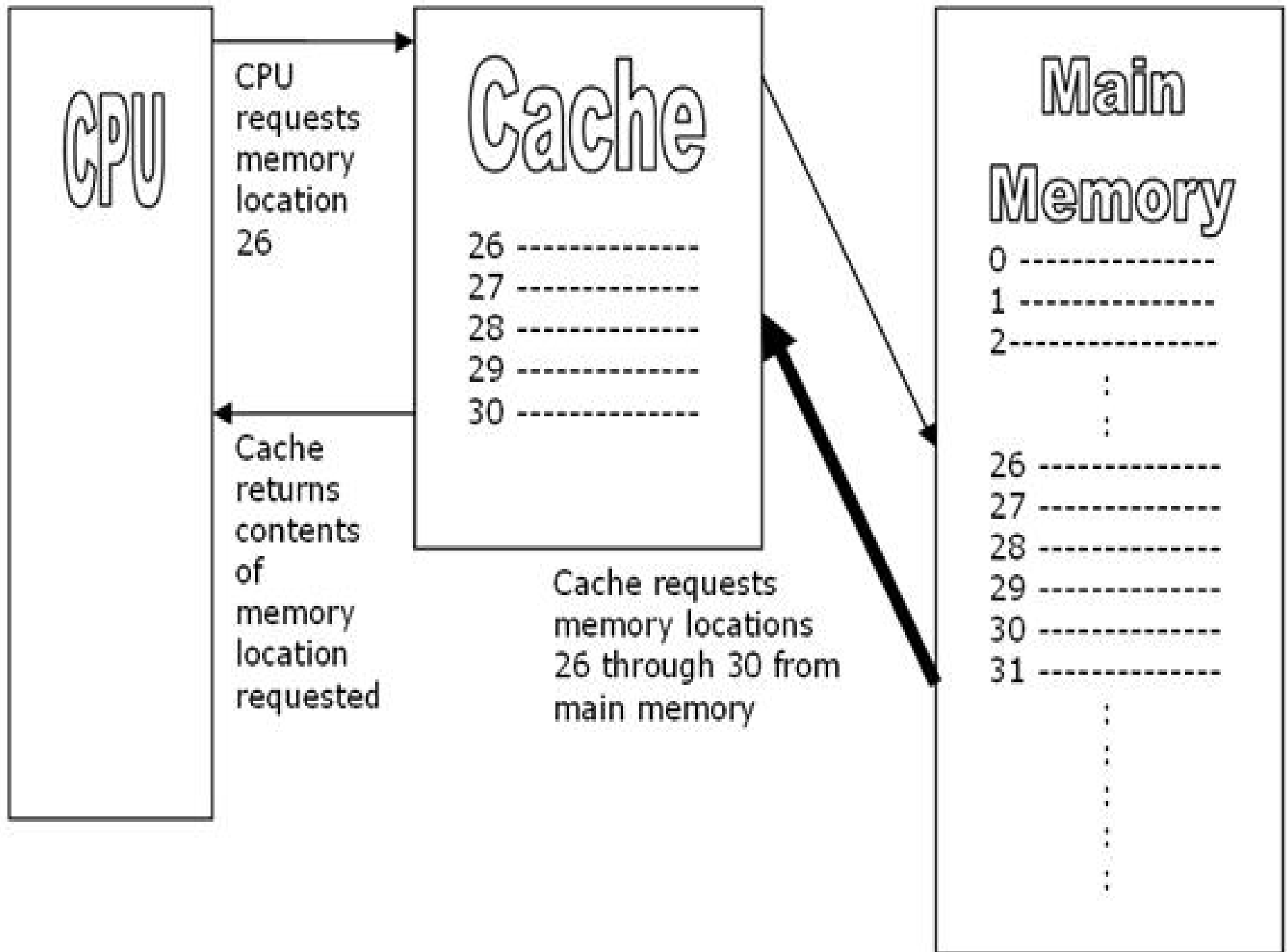
- DATA CAN BE THERE AT DIFFERENT PART AND CODE AT DIFFERENT PART, WHICH MAKES THE THINGS LESS COMPLICATED WHEREAS IN CONVENTIONAL WAY WE USED TO WRITE CODE AND THEN DATA DEPENDING ON USE
- BUT HAVE SERIOUS DRAWBACK DUE TO PIPELINING AS EACH TIME WE SWITCH TO DIFFERENT PHYSICAL MEMORY LOCATION.





CACHE MEMORY

- REAL EXAMPLE: BOOKS ON THE TABLE
- IT IS IN BETWEEN THE MAIN MEMORY AND CPU
- SIZE IS MUCH LESS THAN TOTAL PHYSICAL OR LOGICAL SIZE OF THE COMPUTER
- 2 TYPES OF MAPPING IS USED IN CACHE
DIRECT ,, SET ASSOCIATIVE
- PROBLEMS IN WRITING



VIRTUAL MEMORY

- THE SIZE OF RAM OR MAIN MEMORY IS VERY SMALL AS COMPARED TO THE TOTAL NUMBER OF PROGRAMS WE HAVE.