PROBLEMS

- There are 5 Processors P1 is consuming 50µsec & every successive process consumes double the time of previous process. Calculate SPEC rating of each process & SPEC of entire suite(Assume reference system which can execute P1 in 100µsec & each successive process with increase of 50µsec

You

Performance Measurement

- T is difficult to compute.
- Measure computer performance using benchmark programs.
- System Performance Evaluation Corporation (SPEC) selects and publishes representative application programs for different application domains, together with test results for many commercially available computers.
- Compile and run (no simulation)
- Reference computer

$$SPEC \ \ rating = \frac{\text{Running time on the reference computer}}{\text{Running time on the computer under tes}}$$

$$SPEC \ \ rating = \left(\prod_{i=1}^{n} SPEC_i\right)^{\frac{1}{n}}$$

You

Problem 2

- A program contains 1000 instruction. Out of that 25% instructions require 4 clock cycles,40% instruction require 5 clock cycles & remaining require 3 clock cycles for execution. Find the total time required to execute the program running in a 1 GHz machine

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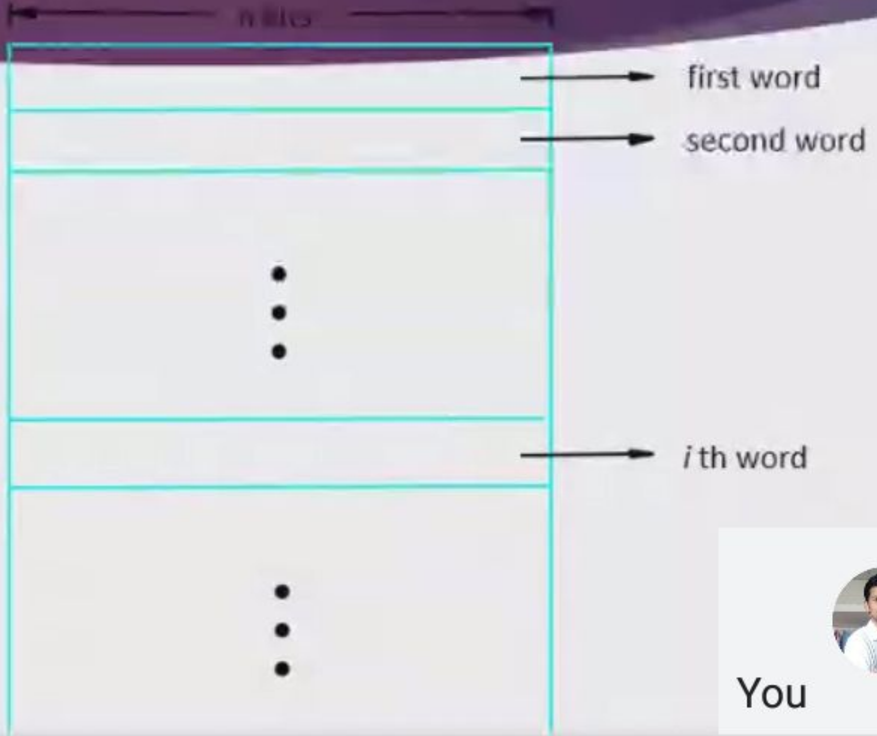
Problem 2

- A program contains 1000 instruction. Out of that 25% instructions require 4 clock cycles,40% instruction require 5 clock cycles & remaining require 3 clock cycles for execution. Find the total time required to execute the program running in a 1 GHz machine
- N=1000
- 25% OF N=250 INSTRUCTIONS REQUIRE 4 CLOCK CYCLES
- 40% =400 5
- 35 =350 3 CLO

Memory Locations, Addresses, and Operations

- Memory consists of many millions of storage cells, each of which can store 1 bit.
- Data is usually accessed in *n*-bit groups. *n* is called word length.

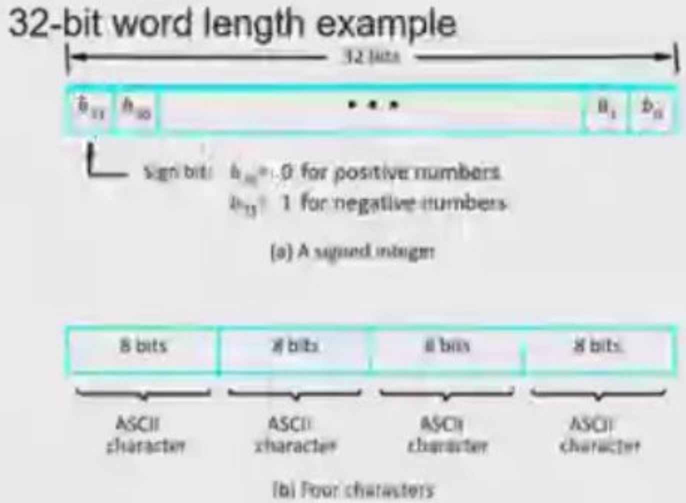


Memory Location, Addresses, and Operation

- To retrieve information from memory, either for one word or one byte (8-bit), addresses for each location are needed.
- A *k*-bit address memory has 2^k memory locations, namely $0 - 2^k-1$, =0 TO 15 called memory space.
- 24-bit memory: $2^{24} = 16,777,216 = 16M$ ($1M=2^{20}$)
- 32-bit memory: $2^{32} = 4G$ ($1G=2^{30}$)
- $1K(kilo)=2^{10}$
- $1T(tera)=2^{40}$

Memory Location, Addresses, and Operation

- 32-bit word length example

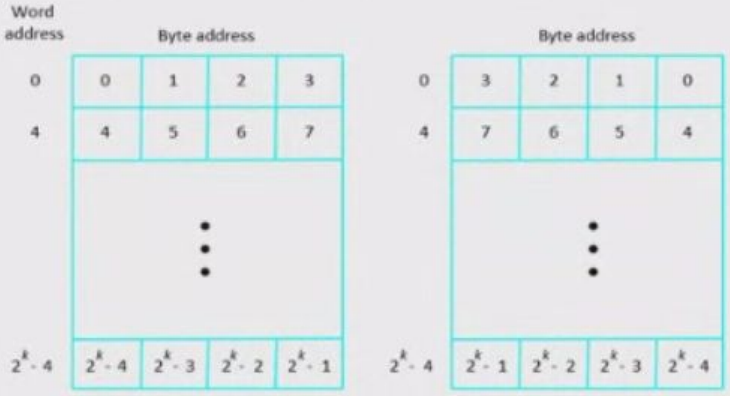


Memory Location, Addresses, and Operation

- Address ordering of bytes
- Word alignment
  - Words are said to be aligned in memory if they begin at a byte addr. that is a multiple of the num of bytes in a word.
    - 16-bit word: word addresses: 0, 2, 4,….
    - 32-bit word: word addresses: 0, 4, 8,….
    - 64-bit word: word addresses: 0, 8,16,….
- Access numbers, characters, and character strings

Big-Endian and Little-Endian Assignments

- Big-Endian: lower byte addresses are used for the most significant bytes of the word
- Little-Endian: opposite ordering. lower byte addresses are used for the less significant bytes of the word



(a) Big-endian assignment

(b) Little-endian assignment