Assignment One

Read all related Chapters (Chapter 1, 2, 3.4, 5, 7 of "Computer Organization and Architecture" and Chapter 0 of "The 80x86 IBM PC and Compatible Computers") and answer the following questions.

1. Which part is central to the Von Neumann architecture?
   A. Input B. Output C. CU D. ALU E. Memory
2. Briefly describe the main difference between the Von Neumann architecture and the Harvard architecture and their pros and cons.
3. Briefly describe the concept of micro-processor, micro-computer, and micro-computer system and their components.
4. What is the memory hierarchy and why?
5. If the width of the address bus and the data bus in one micro-computer is 20-bit and 32-bit, respectively, then what is the address space range and what is the size of a word for this computer?
6. What does "system bus" mean in a micro-computer? What kinds of information can be conveyed on the system bus?
7. When there are multiple modules connected to the system bus, why do we need some method of arbitration? Briefly describe the two main methods that deal with bus arbitration.
8. What are the two solutions for addressing I/O devices? Briefly describe the features of each solution.
9. What does the Moore's Law talk about?
10. Convert the following hexadecimal numbers to decimal.
    1) A3.3H
    2) 129.CH
    3) AC.DCH
    4) FAB.3H

13. Convert the following decimal numbers to binary, octal, and hexadecimal.
    1) 23
    2) 107
    3) 1238
    4) 92

$214 - 128 = 86$

$= 22$

$1238 = 2^{10} + 2^7 + 2^6 + 2^4$

$64 \times 8 = 512 \quad + 2^2 + 2$

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