METRO STATE UNIVERSITY

ICS 232 Computer Organization & Architecture
Homework 1 - Chapter 1 - 10 points
Due Date: 5/24/2023

Name:

Note: Please post your homework to ICS232 D2L on or before the due date.

Read Chapter 1 – Introduction

Essential Terms and Concepts

2. What is an ISA?

Instruction set architecture: the interface between hardware and software

4. Name the three basic components of every computer?

1. processor
2. memory
3. transfer in/out of the world

28. How does the fetch-decode-execute cycle work?

1. control unit fetch instruction from memory
2. instructions are decoded
3. any instructions are fetched from memory and placed inside registers
4. ALU executes the instructions and place in register/memory

29. What is a multicore processor?

- have 2/2+ processor cores sharing a single die
- provides the ability to multi-task

Exercises

1. In what ways are hardware and software different? In what ways are they the same?

hardware: the physical components of a computer
software: the applications running in a computer
same: both are important to the functions of a computer

2. a) How many milliseconds (ms) are in 1 second? 1000

b) How many microseconds (µs) are in 1 second? 1,000,000

c) How many nanoseconds (ns) are in 1 millisecond? 1,000,000

d) How many microseconds are in 1 millisecond? 1,000

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e) How many nanoseconds are in 1 microsecond? 1000
f) How many kilobytes (KB) are in 1 gigabyte (GB)? 1,000,000
g) How many kilobytes are in 1 megabyte (MB)? 1000
h How many megabytes are in 1 gigabyte (GB)? 1000
i) How many bytes are in 20 megabytes? 2e+7
j) How many kilobytes are in 2 gigabytes? 1.6e+7

8. Briefly explain two breakthroughs in the history of computing.
1. mouse → invented in 1941 where the metallic balls would roll between the wheels to send movement to the computer
2. microprocessors → allows computers to get smaller and more powerful

12. List five applications of personal computers. Is there a limit to the applications of computers? Do you envision any radically different and exciting applications in the near future? If so, what?
- word processing
- gmail
- excel
- youtube
- drive

13. In the von Neumann model, explain the purpose of the:
a) processing unit → carry out instructions of the computer by performing arithmetic operations
b) program counter → memory address of the next executed instructions

14. Under the von Neumann architecture, a program and its data are both stored in memory. It is therefore possible for a program, thinking a memory location holds a piece of data when it actually holds a program instruction, to accidentally (or on purpose) modify itself. What implications does this present to you as a programmer?

need to be more careful to make sure code won't modify itself

19. Explain what it means to "fetch" an instruction.
- for instructions/datas loaded from memory into the CPU registers

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23. What are the limitations of Moore's Law? Why can't this law hold forever? Explain.
- the physical limits of transistor technology is reached
- cannot hold forever because of Rock's law, only I can survive. chips are no longer doubling every 2 years
- nature potentials are reached

Prepare for next class by reading Chapter 2 – Data Representation.

Read over the Group Projects document. Begin to decide which project may interest you and who you may like in your group.

Optional Questions:

1. If you have a nickname what name would you like me to use?

   Cindy

2. What other computer science classes have you taken?

   ICS 141 Problem solving with programming

   bootcamp

   Discrete math

3. What computer programming languages do you know?

   HTML, CSS, Java, JavaScript, C++

4. Is there anything else you would like to tell me that you will help you succeed in this class?

   N/A