

Assignment 1: Computer Applications in CEE

Date Due: January 29, 2021 (12 noon)

Instructor: Trani

Problem 1

One of the best web sites to learn about the development of computers is the History of Computers Museum (<http://www.computerhistory.org/revolution/timeline>). Look at the Museum timeline and briefly answer the following questions:

- a) In two sentences explain what is virtual memory and name the first computer to have such memory.
- b) Magnetic tapes were used in early computers to store and backup data. Name the company that introduced the first magnetic tape drives for computers. By the way, magnetic tapes are still in use today to perform backups.
- c) Name the British computer pioneers that developed the Bombe machine. In a sentence explain the purpose of the Bombe.
- d) This early smart phone was perhaps the first one with a web browser application. Name the company that produced this device around 1997.
- e) The Apollo Domain DN100 was one of the earliest workstations. Name the operating system used by this workstation.
- f) Name two contributions of the Xerox Palo Alto Research Center (PARC).
- g) Name the physicist and the laboratory that developed hypertext and paved the way for the development of the World Wide Web.
- h) Name the California-based company that developed the first relational database.
- i) Name the computer that defeated famous chess player Garry Kasparov. How many positions per second could the computer do?
- j) One of the most popular scripting languages across the Internet is Javascript. Name the company and the person who developed this important language.

Problem 2

For your own personal computer find the following:

- a) Number and model of CPU processor used
- b) CPU clock speed
- c) Computer Random Access Memory (RAM) size
- d) Graphics processing unit if any (GPU)
- e) Name and version of the operating system used in your computer

Problem 3

- a) An algorithm is a series of steps to solve a problem. Describe in a couple of paragraphs an algorithm that you implemented using Excel, an engineering tool (like Matlab or Mathematica) or any programming language (i.e., Python, Java).
- b) The Top500 site lists the largest supercomputers worldwide (<https://en.wikipedia.org/wiki/TOP500>). Look at the top 5 supercomputers and tell me what kind and how many of microprocessors are used in the construction of the supercomputers.

- c) The second fastest supercomputer in the world (named Sierra) can perform 2.9 petaflops (flop = floating point operation). If a human takes 3 seconds to do a floating point operation, find how many years will a human have to perform calculations to match one second of the top supercomputer computing power.

Problem 4

Use the Car Data file posted on Week 1 of our syllabus web page to answer the following questions.

- a) Import the data into an Excel file.
- b) Create a new column in the spreadsheet to assign the category of each car according to the engine horsepower. For this exercise use IF statements in each cell to determine the class for each vehicle.
 - a. Class 1 if the vehicle horsepower is less than 80 HP.
 - b. Class 2 if the vehicle horsepower is between 81 and 130 HP.
 - c. Class 3 if the vehicle horsepower is between 131 and 200 HP.
 - d. Class 4 if the vehicle horsepower is greater than 200 HP.
- c) Count how many cars belong to each engine power class using the Excel COUNT or COUNTA function (as applicable).
- d) Use Excel conditional formatting to color code the values based on car weight. Assign red to the highest weights and green to the lowest weights.