

Assignment 2: Computer Applications in CEE

Date Due: January 29, 2024

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) Early microchips had a modest number of transistors. Name the number of transistors in the Intel 4004.
- b) Considering the number of transistors in the Intel 4004 and the latest Apple M3 chip, explain if "Moore's Law" still applies.
- c) DENDRAL was an early artificial intelligence program developed in 1965. Name one of developers of the software.
- d) The CDC 6600 supercomputer was introduced in 1964. Name the company that produced the computer and the number of calculations per second possible with the CDC 6600.
- e) Briefly explain the difference between a byte and a bit.
- f) In 1984, Apple introduced the Macintosh computer. Name the microprocessor used and two novel features of the computer.
- g) Name the fastest supercomputer today and the number of CPU cores. You can consult the Top 500 Project (<https://www.top500.org/>)
- h) In 2007, the first one Terabyte (TB) hard disk drive (HDD) is introduced. Name the company that manufactured the HDD and the rotational speed of the hard drive platters.
- i) In 1969, the Apollo 11 reached the moon successfully. The Apollo Guidance Computer was primitive by today's standards. Name the equivalent memory of the guidance computer .
- j) In 1995 Sun Microsystems introduced the first version of the Java computer language. Name one important feature of the language that makes it popular even today.

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) How many **bytes** does your computer hard drive has to store information?

Problem 3

Use the United States Dams data file posted to answer the following questions.

Name	DamID	Longitude	Latitude	County	Height	Max Storage	Normal Storage	Surface A	Drain Are	Hazard	State	Year
PATILLAS	PR00023	-66.021	18.021	PATILLAS	147	13797	11029	367	25 H		PR	1914
LOCO	PR00004	-66.8863	18.0446	YAUCO	74	2059	1039	69	8 H		PR	1951
CARITE	PR00021	-66.1066	18.0782	GUAYAMA	104	14992	8953	333	8 H		PR	1913
ANTONIO LUCCHETTI	PR00003	-66.865	18.0831	YAUCO	175	17595	11575	266	17 H		PR	1952
GUAYABAL	PR00013	-66.5033	18.0888	JUANA DIAZ	130	5933	4768	373	21 H		PR	1913
TOA VACA DAM	PR00014	-66.485	18.1033	VILLALBA	215	54875	50620	836	22 H		PR	1972

- Concatenate the Name of the dam and the County where the dam is located. Create a new column with the concatenated text.
- Create a new column in the spreadsheet to assign a size attribute for each dam according to the parameters shown in the table below. Use Excel to classify the dam normal storage according to the following table. In your answer, show me an example of the Excel formula(s).

New Size Category	Normal Storage (acre-foot)
Small	≤ 3500
Medium	3501 to ≤ 6000
Large	6001 to ≤ 16000
Extra Large	> 16000

- Count how many dams belong to each of the new size classes using the Excel COUNT or COUNTA commands.
- Use Excel conditional formatting to color code the values based on the dam size category. Assign red to Extra Large, Blue to Large, Yellow to Medium and Green to Small.

Problem 4

Your company requests a 12 year loan to purchase forty CAT 615C motor graders. The new equipment costs \$428,000 per vehicle.

- The bank offers loan at 7.5% per year over 12 years. Find the monthly payments to pay back the loan.
- Estimate the total amount to be paid to the bank including interest for all 12 vehicles.



Caterpillar 615C Motor Grader.