

Assignment 1: Computers

Date Due: January 28, 2015

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/>). Look at the Museum timeline and briefly answer the following questions:

- a) In a sentence or two explain who was Augusta Ada King and what is the relevance of her achievements in computer science.
- b) In two lines describe the SWAC computer and name its chief designer.
- c) Who used the SWAC computer?
- d) In 1977 Radio Shack introduced the Tandy TRS-80 personal computer. Name three attributes of this personal computer system.
- e) Back in 1994, I started my first web page for this class using Mosaic - a newly developed browser. Name the developer of Mosaic and the organization that produced and maintained the browser.
- f) Name two contributions of the Xerox Palo Alto Research Center (PARC).
- g) In 1993 Simon became the first portable phone. Explain some of the attributes of this device that could have contributed to its failure.
- h) We take computer aided design and drafting for granted today. However, it took good amount of computational power in the 1960-1980s to do simple computer graphics. Name two of the earlier computer systems developed specifically to do computer graphic analysis.

Problem 2

For your own personal computer find the following:

- a) Number and model of CPU processor used
- b) CPU clock speed
- c) Computer memory size
- d) Graphics processing unit (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 the most complex algorithm that you have developed using Excel, Access, or an engineering tool (like Matlab or Mathematica) or any programming language.
- b) Back in 1988, I bought an Apple Mac II computer for \$2,400 (true story). The computer had two floppy drives and no hard drive. This system had 1,024 KB of RAM. What kind of personal computer can you buy for the same price today (get some quotes from sites like Apple or Dell)? Contrast the price and power of older and new computers using my example.
- c) Explain two advantages of having a 64 bit operating system in a personal computer compared to older 32 bit operating systems.

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 following values of car weight. For this exercise use IF statements in each cell to determine the class for each vehicle.
 - a. Class A if the vehicle weight is less than 2400 lb.
 - b. Class B if the vehicle weight is between 2401 and 2800 lb.
 - c. Class C if the vehicle weight is between 2801 and 3200 lb.
 - d. Class D if the vehicle weight is greater than 3201 lb.
- c) Count how many cars belong to each 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.

Problem 5

Use the Airports data file (in Excel format) posted on Week 2 of our syllabus web page to answer the following questions.

Airport ID	Name	State	Large Air Carrier Passengers	Commuter Air Carrier Pa	Latitude (seconds)	Longitude (seconds)
00V	MEADOW LAKE	CO	0	0	140204.6960N	376451.6160W
01G	PERRY-WARSAW	NY	0	0	153868.8480N	280987.4900W
02A	GRAGG-WADE FIELD	AL	0	0	118261.7400N	311801.1700W
02C	CAPITOL	WI	0	0	155115.0360N	317440.3290W
02G	COLUMBIANA COUNTY	OH	0	0	146423.9260N	290309.0630W
04Y	HAWLEY MUNI	MN	0	0	168781.7550N	346860.9350W
05C	GRIFFITH-MERRILLVILLE	IN	0	0	149471.4276N	314638.2287W
05U	EUREKA	NV	0	0	142575.0000N	417618.2150W
06A	MOTON FIELD MUNI	AL	0	0	116857.6980N	308448.1300W
06C	SCHAUMBURG REGIONAL	IL	0	0	151161.6270N	317164.4740W
06D	ROLLA MUNI	ND	0	0	175983.6280N	358635.1570W

- a) Estimate the total number of passengers that board airplanes at the airport (save the result in a new column).
- b) Using the number calculated in part (a), determine the type of airport based on the following classification adopted by the Federal Aviation Administration.
 - a. **Large Hub Airport** if the airport processes $\geq 1\%$ of the total passengers in the system (annual).
 - b. **Medium Airport** if the airport processes $< 1\%$ and $\geq 0.25\%$ of the total passengers in the system (annual).
 - c. **Small Hub Airport** if the airport processes $< 0.25\%$ and $\geq 0.05\%$ of the total passengers in the system (annual).
 - d. **Non-hub** if the airport processes $< 0.05\%$ of the total passengers in the system (annual).
- c) Perform the analysis using Count how many airports belong to each category. Comment.