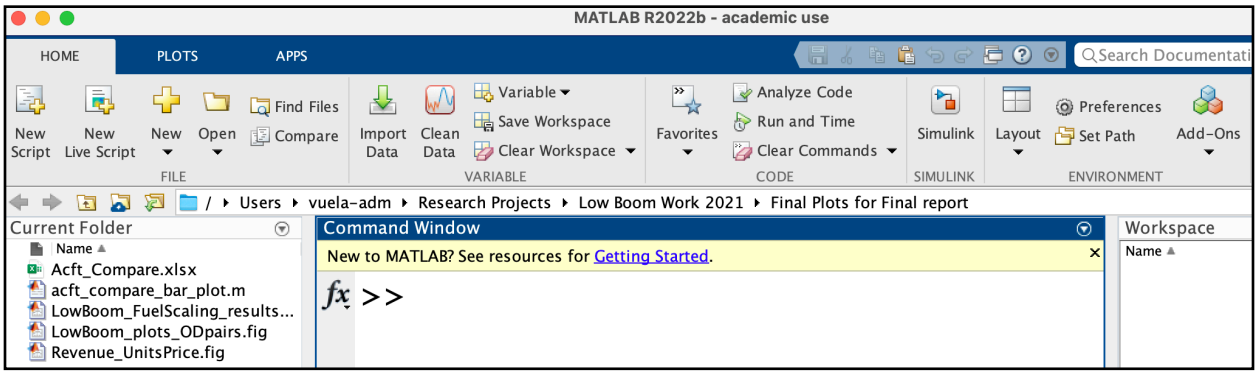
Assignment 1: Computer Applications in CEE

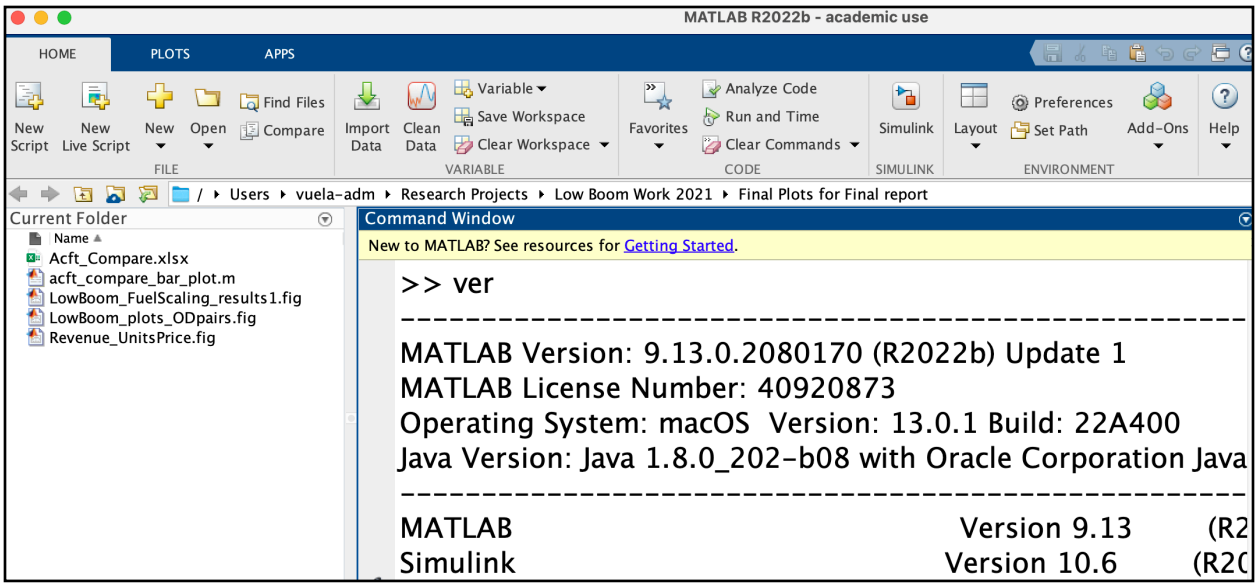
Date Due: January 29, 2026 Instructor: Trani

Problem 1

Install Matlab in your computer and provide a screen capture of the version installed. Matlab can be obtained at: https://itpals.vt.edu/softwarelicensingcenter/studentsoftware/studentswproductlist.html. If you have Matlab installed, show me the screen captures of the items below.

a) Provide a screen capture of the version installed. Use the Command "ver" in the Command Window to show the version of Matlab installed.





b) Detect the computer system architecture used in your computer in Matlab. S**how me a screen capture the computer architecture.** Use the following command at the Command Window.

```
archstr = computer('arch')
```

```
>> archstr = computer('arch')

archstr =

    'maci64'
```

c) Detect the number of logical cores in your computer using Matlab. S**how me a screen capture** of the number of cores detected. The following command can be issued at the Command Window to detect the number of cores in your computer.

```
numcores = feature('numcores')
```

```
>> numcores = feature('numcores')

numcores =

     8
```

Problem 2

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 1990 Microsoft releases Windows 3.0. Name two innovations of the new release.

b) In a sentence explain what is "Moore's Law".

c) Year when Atari introduces their models 400 game console.

d) In a sentence explain one achievement of Margaret Hamilton.

e) In 1971, the ILLIAC IV supercomputer is introduced. Name the company that build the computer and how processors and bytes of memory could be stored in each processor.

f) DAC-1 was a successful computer aided design software. Name the company that developed the program.

g) Name the fastest supercomputer today and the number of CPU cores.

h) Name of the company that introduced the CompactFlash memory in 1994.

i) In 2015, the Federal Communication Commission (FCC) issues a Net Neutrality decision. In two sentences explain what is Net Neutrality and why the decision is important.

j) Javascript is one of the most popular languages today. Name the company and the developer of this important language.

Problem 3

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 4

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

a) Create a new column in the spreadsheet to assign a weight **category** for each car according to the parameters shown in the table below. Use Excel to classify the car weight according to the following table. In your answer, show me an example of the Excel formula(s).

b) Concatenate the car model and the weight category created in part (a) separated by "_". Place the concatenated result into a new column.

c) Count how many cars belong to each of the new weight classes using the Excel COUNT commands.

d) Use Excel conditional formatting to color code the values based on car new weight category. Assign purple to Heavy, Blue to Category Medium, and Green to Light.

e) Make a plot in Excel of car weight (in the y-axis) versus Horsepower_hp (in x-axis). Create the best curve-fit to the data using R-square as the metric that indicates correlation. Make sure you add labels for the axes and units. Comment on the relationship between car weight and engine horsepower.

Weight Category	Weight Range (lbs)
Light	<2999
Medium	3000 to < 3899
Heavy	> 3900

Problem 5

A construction company requests a 5 year loan to purchase five Caterpillar PM-822 Cold Planers (see Figure 1). The new equipment costs $875,000 per unit.

a) The bank offers loan at 5.8% per year. Find the monthly payments to pay back the total loan.

b) Estimate the amount of the load paid as interest to the bank.

c) If a loan is obtained at 10 years instead, explain the new annual payments needed. What is the drawback of the new loan? Explain.

Figure 1. Caterpillar Cold Planner.