

Question 01

Use loops to create a 4×6 matrix in which the value of each element is two times its row number minus three times its column number. For example, the value of element (2,5) is $2 \times 2 - 3 \times 5 = -11$.

Question 02

Write a program that asks the user to input a vector of integers of arbitrary length. Then, using a for-end loop the program examines each element of the vector. If the element is positive, its value is doubled. If the element is negative, its value is tripled. The program displays the vector that was entered and the modified vector. Execute the program, and when the program ask the user to input a vector type `randi([-10 20], 1, 19)`. This creates a 19-element vector with random integers between -10 and 20.

Question 03

The daily high temperature (°F) in New York City and Denver, Colorado, during the month of January 2014 is given in the vectors below (data from the U.S. National Oceanic and Atmospheric Administration).

NYC = [33 33 18 29 40 55 19 22 32 37 58 54 51 52 45 41 45 39 36 45 33 18 19 19 28 34 44 21 23 30 39]

DEN = [39 48 61 39 14 37 43 38 46 39 55 46 46 39 54 45 52 52 62 45 62 40 25 57 60 57 20 32 50 48 28]

where the elements in the vectors are in the order of the days in the month. Write a program in a script file that determines and displays the following information:

- (a) The average temperature for the month in each city (rounded to the nearest degree).
- (b) The number of days that the temperature was above the average in each city.
- (c) The number of days that the temperature in Denver was higher than the temperature in New York.

Question 04

Fibonacci numbers are the numbers in a sequence in which the first three elements are 0, 1, and 1, and the value of each subsequent element is the sum of the previous three elements:

0, 1, 1, 2, 4, 7, 13, 24, ...

Write a MATLAB program in a script file that determines and displays the first 25 Fibonacci numbers.

Question 05

A vector is given by $x = [9 \ -1.5 \ 13.4 \ 13.3 \ -2.1 \ 4.6 \ 1.1 \ 5 \ -6.1 \ 10 \ 0.2]$. Using conditional statements and loops, write a program that rearranges the elements of x in order from the smallest to the largest. Do not use MATLAB's built-in function `sort`.

Question 06

A list of exam scores (S) (in percent out of 100%) is given: 72, 81, 44, 68, 90, 53, 80, 75, 74, 65, 50, 92, 85, 69, 41, 73, 70, 86, 61, 65, 79, 94, 69.

Write a computer program that calculates the average (Av) and standard deviation (Sd) of the scores, which are rounded to the nearest integer. Then, the program determines the letter grade of each of the scores according to the following scheme:

<i>Score (%)</i>	$S \geq Av + 1.3Sd$	$Av + 0.5Sd \leq S < Av + 1.3Sd$
<i>Letter grade</i>	A	B
<i>Score (%)</i>	$Av - 0.5Sd \leq S < Av + 0.5Sd$	$Av - 1.3Sd \leq S < Av - 0.5Sd$
<i>Letter grade</i>	C	D
<i>Score (%)</i>	$S < Av - 1.3Sd$	
<i>Letter grade</i>	F	

The program displays the values of Av and Sd followed by a list that shows the scores and the corresponding letter grade (e.g., 72% Letter grade C).

Question 07

Write a MATLAB program in a script file that finds and displays all the numbers between 100 and 999 whose product of digits is 6 times the sum of the digits. [e.g. 347 since $3 \times 4 \times 7 = 6(3 + 4 + 7)$]. Use a for-end loop in the program. The loop should start from 100 and end at 999.

Question 08

Body mass index (*BMI*) is a measure of obesity. In standard units, it is calculated by the formula

$$BMI = 703 \frac{W}{H^2}$$

where W is weight in pounds, and H is height in inches. The obesity classification is:

<i>BMI</i>	Classification
Below 18.5	Underweight
18.5 to 24.9	Normal
25 to 29.9	Overweight
30 and above	Obese

Write a program in a script file that calculates the *BMI* of a person. The program asks the person to enter his or her weight (lb) and height (in.). The program displays the result in a sentence that reads: “Your BMI value is XXX, which classifies you as SSSS,” where XXX is the BMI value rounded to the nearest tenth, and SSSS is the corresponding classification. Use the program for determining the obesity of the following two individuals:

- (a) A person 6 ft 2 in. tall with a weight of 180 lb.
- (b) A person 5 ft 1 in. tall with a weight of 150 lb.

COMPUTER PROGRAMMING & APPLICATIONS (ME-214)
ASSIGNMENT QUESTIONS (CHAPTER # 06)

Question 09

Write a program in a script file that calculates the cost of renting a car according to the following price schedule:

Duration of rent	Sedan			SUV		
	Daily rate	Free miles (per day)	Cost of additional mile	Daily rate	Free miles (per day)	Cost of additional mile
1-6 days	\$79	80	\$0.69	\$84	80	\$0.74
7-29 days	\$69	100	\$0.59	\$74	100	\$0.64
30 or more days	\$59	120	\$0.49	\$64	120	\$0.54

The program asks the user to enter the type of car (sedan or SUV), the number of days, and the number of miles driven. The program then displays the cost (rounded to cents) for the rent. Run the program three times for the following cases:

- (a) Sedan, 10 days, 769 miles. (b) SUV, 32 days, 4,056 miles.
(c) Sedan, 3 days, 511 miles.

Question 10

Write a program in a script file that converts a measure of area given in units of either m^2 , cm^2 , in^2 , ft^2 , yd^2 , or acre to the equivalent quantity in different units specified by the user. The program asks the user to enter a numerical value for the size of an area, its current units, and the desired new units. The output is the size of the area in the new units. Use the program to:

- (a) Convert 55 in.^2 to cm^2 . (b) Convert 2400 ft^2 to m^2 .
(c) Convert 300 cm^2 to yd^2 .