International University - VNUHCM
School of industrial Engineering and Management

Midterm Examination

Date: 5/11/2021; Duration: 90 minutes
Open book; **Online.**

SUBJECT: INTRODUCTION TO COMPUTING (ID:IS086IU)	
Approval by the School of Industrial Engineering and Management Signature Full name: Nguyễn Văn Hợp	Lecturer: Signature Full name: Tôn Thất Long
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Proctor 1 Signature Full name: Tôn Thất Long	Proctor 2 Signature Full name:

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STUDENT INFO
Student name:
Student ID:

INSTRUCTIONS: the total of point is 100 (equivalent to 30% of the course)

1. *Purpose:*
   - Apply knowledge of mathematics, science and engineering (CLO1)
   - Design and conduct experiments, as well as to analyze and interpret data (CLO2)
   - Use the techniques, skills, and modern engineering tools necessary for engineering practice (CLO3)
2. *Requirement:*
   - Read carefully each question and answer it following the requirement.
   - In each question, the script/function and screenshots of your result must be attached in the word file and submit in Blackboard
   - Discussion and material transfer are strictly prohibited
   - Any violation will be considered as cheating and will receive ZERO of this course.

QUESTIONS

Q1. (20 marks)

The following table record the data showing the distance traveled along five truck routes and the time

required to transverse each route.

	1	2	3	4	5
Distance (km)	560	440	490	530	370
Time (hr)	10.3	8.2	9.1	10.1	7.5

Write a script file (*yourfirstname_Q1.m*) to compute the average speed required to drive each route.

Then, find the route that has the highest average speed.

Q2. (30 marks)

Q2.1.(2 marks) Write a MATLAB script file (*yourfirstname_Q2.m*) to create the following matrix A:

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$$A = \begin{bmatrix} 1.1 & -3.2 & 3.4 & 0.6 \\ 0.6 & 1.1 & -0.6 & 3.1 \\ 1.3 & 0.6 & 5.5 & 0 \end{bmatrix}$$

Q2.2 (6 marks)

Write a MATLAB code to find the maximum and minimum values in each column of Matrix A.

Q2.3 (6 marks)

Write a MATLAB code to find the maximum and minimum values in each row of Matrix A.

Q2.4 (4 marks)

Write a MATLAB code to sum all of values in each row of Matrix A.

Q2.5 (4 marks)

Write a MATLAB code to sum all of values in Matrix A.

Q2.6 (4 marks)

Write a MATLAB code to obtain the subset C taken directly from Matrix A where

$$C = \begin{bmatrix} -3.2 \\ 0.6 \end{bmatrix}$$

Q2.7 (4 marks)

Write a MATLAB code to obtain the maximum value from all rows and columns of Matrix A

Q3. (20 marks)

Write a script (***yourfirstname_P3.m***) that will prompt the user and read in values for a, b, c of a quadratic polynomial: $a x^2 + b x + c = 0$, and solving this equation in 3 cases (no real root, on root, two real roots)

>> *yourname - ID*

Enter a: …

Enter b: …

Enter c: …..

There are no real roots:

Or *There is one real root: x=…..*

Or *There are two real roots: x1=…., x2=…..*

"Run the example of each case and take screenshots all of results."

Q4. (30 marks)

Create a script with the name as ***yourfirstname_Q4.m***. In this script, write a MATLAB code to

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demonstrate the calculation of height and speed of a projectile. Given that it is launched with an initial speed of v_0 at an angle θ to the horizontal, the height and speed are calculated as follows:

$$h(t) = v_0 t \sin\theta - 0.5 g t^2$$

$$v(t) = \sqrt{v_0^2 - 2 v_0 g t \sin\theta + g^2 t^2}$$

where g is the acceleration due to gravity ($g = 9.81 \, m/s^2$). The time for the projectile to return to the ground is given by

$$t_0 = 2(v_0/g)\sin\theta$$

Suppose that $\theta = 40^0, v_0 = 20 \, m/s$, determine the time when the height is no less than 6m and the speed is simultaneously no greater than 16m/s. Test with value of t as $t = 0:1:t_0$.

- END –

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