UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING
07 FEB 2020
EXAMINATION & REGISTRATION

UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

Second Year Examination – Semester II – 2019

SCS2111– Laboratory II (R1)

TWO (2) HOURS

(Part A)

To be completed by the candidate

Examination Index No: .....

Important Instructions to candidates:

1. The medium of instruction and questions is **English**.
2. Note that questions appear on both sides of the paper. If a page or a part of the question paper is not printed, please inform the supervisor immediately.
3. Write your index number on each and every page of the question paper.
4. Students are required to answer both **Part A** and **Part B** in **two hours**.
5. **Part A** of this paper has multiple choice questions in 09 pages. **Circle your answers**
6. Answer **ALL** questions. All questions carry equal marks (**25** marks).
7. Any electronic device capable of storing and retrieving text including electronic dictionaries and mobile phones are **not allowed**.
8. **Non-Programmable** calculators are **allowed**.

For examiner's use only	
Question No	**Marks**
1	
2	
3	
4	
Total	

Index No: .....

1. Circle your answer

[25 Marks]

a) ***City of birth*** is an example of

(i) interval data
(ii) ratio data
(iii) nominal data
(iv) ordinal data

b) Arithmetic operations are inappropriate for

(i) the nominal scale
(ii) both the ratio and interval scales
(iii) the ratio scale
(iv) the interval scale

c) Identify the scale of measurement for the following:

Military title -- ***Lieutenant, Captain, Major.***

(i) interval data
(ii) ratio data
(iii) nominal data
(iv) ordinal data

d) Identify the scale of measurement for the following:

Heat measured in degrees centigrade.

(i) interval data
(ii) ratio data
(iii) nominal data
(iv) ordinal data

e) The variance of a sample of 100 observations is 49. The **standard deviation** of the sample is

(i) 9

(ii) 8

(iii) 7

(iv) 2401

f) 35% of the students in a school of Computing are majoring in Software Engineering, 50% in Computer Science and 15% in Information Systems. The graphical device(s) which can be used to present this data is

(i) a line graph

(ii) only a bar graph

(iii) both line graph and a pie chart

(iv) both a bar graph and a pie chart

g) The **interquartile range** is

(i) the 50th percentile

(ii) another name for the variance

(iii) the difference between the largest and smallest values

(iv) the difference between the third quartile and the first quartile

h) Identify the **incorrect statement** from the following

(i) R is a complete programming language

(ii) R provides and environment to perform statistical analysis and produce graphics

(iii) R is not an interactive programming language

(iv) the elementary data types in R are all vectors

i) The most frequently occurring value of a data set is called the

(i) range

(ii) mode

(iii) mean

(iv) median

j) The median of a sample will always equal the

(i) mode

(ii) mean

(iii) 50th percentile

(iv) all of the above answers are correct

k) The **mean** of the sample

(i) is always smaller than the mean of the population from which the sample was taken

(ii) can never be zero

(iii) can never be negative

(iv) none of these alternatives is correct.

l) During a cold winter, the temperature stayed below zero for ten days (ranging from -20 to -5). The variance of the temperatures of the ten day period

(i) must be at least zero

(ii) cannot be computed since all the numbers are negative

(iii) can be either negative or positive

(iv) is negative since all the numbers are negative

m) A researcher is gathering data from four geographical areas designated: South = 1; North = 2; East = 3; West = 4. The designated geographical regions represent

(i) qualitative data

(ii) quantitative data

(iii) label data

(iv) either quantitative or qualitative data

2. Circle your answer. The following questions and the given coding/output relates to Matlab/GNU Octave.

[25 Marks]

a) Which of the following matrices is created by the following code?

```
>> a = [7 ; 9];
>> b = [2 ; 4];
>> c = [2 3 ; 8 10];
>> d = [b c]
>> e = [a a]
>> f = [d e ; [4 2 3 5 0]]
```

(i) >> f =

7	7	2	2	3
9	9	4	8	10
4	2	3	5	0

(ii) >> f =

7	9	4
7	9	2
2	4	3
2	8	5
3	10	0

(iii) >> f =

7	9	10
7	9	2
2	8	3
3	10	5
5	0	8

(iv) >> f =

2	2	3	7	7
4	8	10	9	9
4	2	3	5	0

b) Which of the following code creates the matrix `[-12 , 6 ; 15 , -3]` ?

(i) `[2 , 1; -1 , 4] .* [-7 , 3 ; 2 , 0]`

(ii) `[2 , 1; -1 , 4] * [-7 , 3 ; 2 , 0]`

(iii) `[2 , 1; 1 , 3] * [-6 , 6 ; 15 , -1]`

(iv) none of the above

c) What is the output of the following code segment?

```
>> A = [7 , 3 , 2 ; 1 , 3 , 3]
>> B = [1 , 2 ; 2 , 1; 7 , 9]
>> C = A .* B
```

(i) `[28 , 32; 35 , 27]`

(ii) `[27 , 35; 28 , 32]`

(iii) gives an error message

(iv) none of the above

d) Examine the following code. What is the value of B at the end of executing this code?

```
>> A = 2
>> for j = 0 : 2 : 4
>> A = [A*j ; A]
>> end
>> B = A
```

(i) `2 0 4 0 8 0 16 0`

(ii) `0 2 0 4 0 8 0 16`

(iii) `2 4 8 16 32 64 128 256`

(iv) none of the above

e) What is the output of the following code segments?

```
>> c = [3 , 7 , 10 ; 2 , 4 , 9; 1 , 0 , 4];
>> c (: , 2) = [5 ; 8 ; 3]
```

(i)
```
>>c =   3    7    10
       2    4    9
       1    0    4
```

(ii)
```
>>c =   3    7    10
       5    8    3
       1    0    4
```

(iii)
```
>>c =   3    5    10
       2    8    9
       1    3    4
```

(iv) none of the above

f) What is the output of the following code segment?

```
>> A = [3, 7, 10; 9 , 1 , 0 ; 21 , 2 , 8]
>> Find(A<5)
```

(i) 3 1 0 2

(ii) 1 2 6 8

(iii) 7 10 9 21

(iv) none of the above

g) Which of the following code segments gives the maximum value and its index of the matrix defined by a = [3 , 8 , 5 ; 4 , 7 , 10 ; 45 , 3 , 9]

(i) `[minVal] = min(vec)`

(ii) `[maxVal, maxInd] = max(vec)`

(iii) `[minVal, minInd] = min(vec)`

(iv) `[maxVal] = max(vec)`

h) Determine the polynomial represented by the vector of co-efficient P = [3 0 1 -2].

(i) $3x^2 - x - 2$

(ii) $-2x^3 + 3x + 1$

(iii) $3x^3 + x - 2$

(iv) None of the above

i) Which command below generates a two-dimensional representation of a three dimensional surface

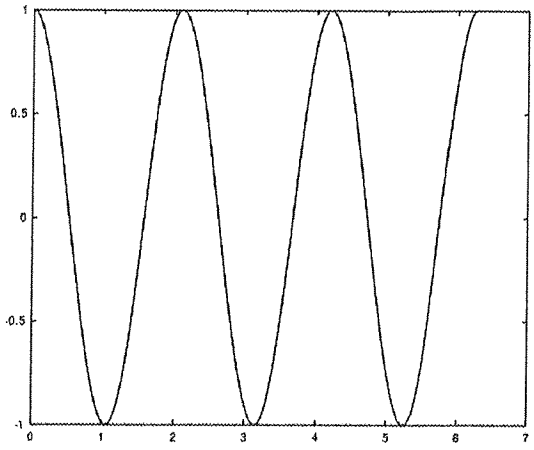
(i) `figure()`

(ii) `surface()`

(iii) `meshgrid()`

(iv) None of the above

j) Which of the following code would create the plot given below



(i) `x = linspace(0,2*pi, 1000) ; plot(x, cos(2*x),'k')`

(ii) `x = linspace(0,2*pi, 1000) ; plot(x, sin(3*x),'k')`

(iii) `x = linspace(0,2*pi, 1000) ; plot(x, cos(3*x),'k')`

(iv) `x = linspace(0,pi, 1000) ; plot(x, sin(2*x),'k')`

k) Which command generates the solution to the system of equations A.x = b

(i) `>> x = A / b`

(ii) `>> x = sum(A.*b)`

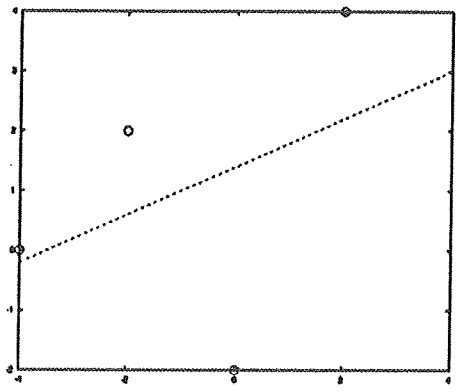
(iii) `>> x = inv(A).b`

(iv) `>> x = b*A^-1`

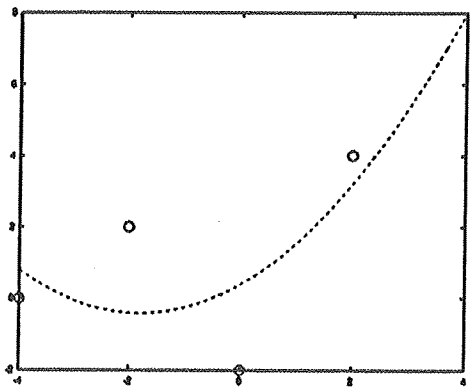
l) Consider the data points given by (-4 , 0), (-2 , 2), (0 , -2) and (2 , 4). What would be the output if we run the following code?

```
X = [-4 , -2 , 0 , 2];
Y = [0 , 2 , -2 , 4];
plot(X,Y,'o','MarkerSize',10);
hold on;
p1 = polyfit(X, Y, 1);
x = -4:.01:4;
plot(x, polyval(p1,x),'b--')
```

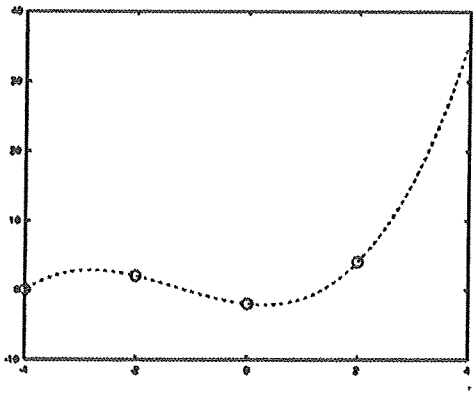
(i)



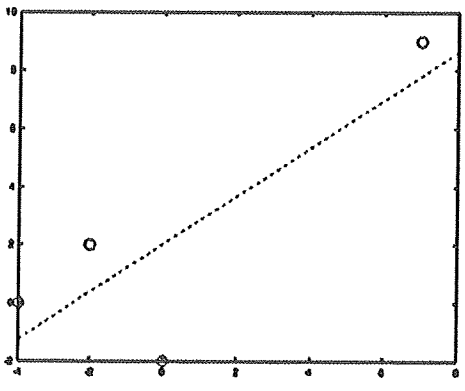
(ii)



(iii)



(iv)



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