COM1001 Summer School First Midterm 19.08.2021

Duration 120 minutes

THE EXAMINERS MUST BE LEFT IN NO DOUBT AS TO WHICH PARTS OF ANY SUBMISSION ARE YOUR OWN ORIGINAL WORK AND WHICH ARE NOT.

The scope of plagiarism
Plagiarism may be due to

- **Copying** (using another person's code, language and/or ideas as though they were your own)
- **Collusion** (unauthorised collaboration)

Methods include

- **quoting verbatim** another person's work without due acknowledgment of the source
- **paraphrasing** another person's work without due acknowledgment
- **using ideas** taken from someone else without reference to the originator
- cutting and pasting from the Internet
- **submitting someone else's work** as part of your own without identifying clearly who did the work
- **colluding** with another person, including another candidate, other than as might be permitted as indicated below

QUESTIONS

1. a. Write a function to delete an element in an array of n integer. Your function has a prototype as **void delete_element (int A[ ], int position).** Position is the index number of element you want to delete in array.
   b. Discuss the situation of array boundary mechanism in C.
   Propose a way about the correct size of array after deleting process.

2. Square root of a can be calculated by using the formula,

$$x = x + 0.5*(a - x*x) / x$$

Write a C program to calculate the square root of a number.
Note: For the accuracy of the calculated value propose a way and explain it.

3. Answer the items below in a few sentences.

   a. What is an array variable? How does it differ from an ordinary variable?
   b. How is information passed to a function from the main scope?
   c. Explain the difference between 'x' and "x" when used as constants in C.
   Describe the memory representation of both values.
   d. Write a single line for loop (means with an empty body) with a loop continuation condition which allows to get characters from user to an array element until it is not a newline character. In another way your empty and just a single line for loop gets character, assign them into an array and count the number of elements.

4. if i=8, j=15 and k=4 what is the result of equation 2 * ((i% 5) * (4 * (j - 3) / (k + 2)))
Show at each time step of which part is calculated on computer. Write as a separate lines. Each line will correspond to each time step for calculation.

5. After declarations
int i,j;
long ix;
short s;
float x;
double dx;
char c
What are the data type of following expressions

a. i+c
b. x + c
c. dx + x
d. (int)dx + ix
e. i + x
f. s+j
g. ix + j
h. s + c

6. If you have 3 individuals and have a connectivity matrix ([ ] [ ]) between them like

0 1 1
1 0 0
1 0 0 means

1 and 2 is connected
1 and 3 is connected
2 and 1 is connected
3 and 1 is connected

This matrix is symmetric so if one individual is connected with another it is also connected with it.

Assume you have class with 10 students. You will make a link between them by considering the process which is;

- define a probability value (p) between 0 and 1 (constant)
- chose two individuals from the class randomly
- compare this random number and p value
- if random number is grater than p make a link between two individual

repeat this process 10 times

To end ;count the individuals who has 1 connection, 2 connections, etc.
Print result to screen and draw a histogram by using star symbol. For example

# of connection	# of individual	
0	0	
1	1	*
2	2	* *
3	3	* * *
4	5	* * * * *
6	6	* * * * * *
7	6	* * * * * *
8	2	* *
9	2	* *

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means 1 individual have 1 connection, 2 individuals has 2 connection, 3 individuals have 3 connection.

Q1 20 point
Q2 10 point
Q3 20 point
Q4 10 point
Q5 10 point
Q6 30 point