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RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. in Information Technology
First Year - Semester I Examination – March 2021

ICT 1402 – PRINCIPLES OF PROGRAM DESIGN AND PROGRAMMING

Time: Three (03) hours

Answer **ALL** the questions.

1.

a) Write a pseudo-code to specify the algorithm for an ATM bank machine. The bank machine has four options: 1) Show current balance 2) Deposit money 3) Withdraw money 4) Quit. After an option has been selected, the ATM will continue displaying the four options to the person until he selects the option to quit the ATM. (06 marks)

b) Draw a flowchart to take three (03) numbers and output the maximum of those numbers. (05 marks)

c) State the advantages of using Integrated Development Environment (IDE) for programming. (04 marks)

d) What are the two (02) types of programming errors? Distinguish between the two (02) types of programming errors. (05 marks)

2.

a) Consider the scenario given below and write a C program.

A student has done the subjects of mathematics, chemistry and physics for a semester. Take the marks for 3 subjects and calculate the average. If the average is greater than 70 , marks for mathematics is greater than 80 and marks for chemistry is greater than 60, print his Grade as "D". If the average is greater than 50 and marks for mathematics is greater than 50 or marks for physics greater than 60, print his Grade as "C". If the average is greater than 40 and marks for mathematics is greater than 30, print his Grade as "E". Else print his Grade as "F". (06 marks)

b) Compare and contrast while and do while loop. Draw sample flow charts for them. (05 marks)

c) Differentiate between break and continue statements. (05 marks)

d) Assume you have been given two (02) variables as follows,

```
char str1[10] = "Hello"

char str2[10]= "World"
```

Write the output of strcat(str1,str2) (04 marks)

3.

a) Write the output of following program. Distinguish between implicit and explicit type conversion. (05 marks)

```
int main(){

        double x = 1.2;

        int sum = (int)sum + x;

        printf("sum  = %d", sum);

        return 0;

}
```

b) Write the output of following program. Assume the memory address of the 0^{th} location of array is 28ff44. (05 marks)

```
int main(){

        char charArray[4];

        int i;

        for(i=0;i<4;i++)

        {

                printf("address of charArray[%d] = %u\n", i, &charArray[i]);

        }

        return 0;

}
```

c) Write a function to swap two (02) numbers which are stored in two (02) variables. The function should take two references as arguments. Write a program code to demonstrate the function operation. (06 marks)

d) Compare and contrast malloc() and calloc() functions. (04 marks)

4.

a) Write the functions of the following file operation modes. (05 marks)

I. a
II. w+
III. r+

b) What is the operation of return statement of a function? (04 marks)

c) Distinguish in between Global variables, Local variables and Formal parameters. (06 marks)

d) Write a recursive function to get Fibonacci series of a given number.

Example for fibonaci sries 1,1,2,3,5,8….. (05 marks)

5.

a) Create an array of structure to store x, y coordinates of a line. Write a program to display the coordinates of the line. (06 marks)

b) Explain the use of "." Operator and "->" to access the member variables of a structure. (04 marks)

c) Following program code segment fails in compilation. Do you agree? Justify the answer. (06 marks)

```
struct complex{

        r = 2;

        i = 5;

}
```

d) Write the advantages of using functions in programming. (04 marks)