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RAJARATA UNIVERSITY OF SRI LANKA

FACULTY OF APPLIED SCIENCES

B.Sc. (General) Degree

First Year Semester I Examination- May/June, 2016

COM 1401 - Programming Concepts with C

Answer all Questions **Time Allocated: 3 hours**

Q1.

i. List the steps of the software development Process. (5 Marks)

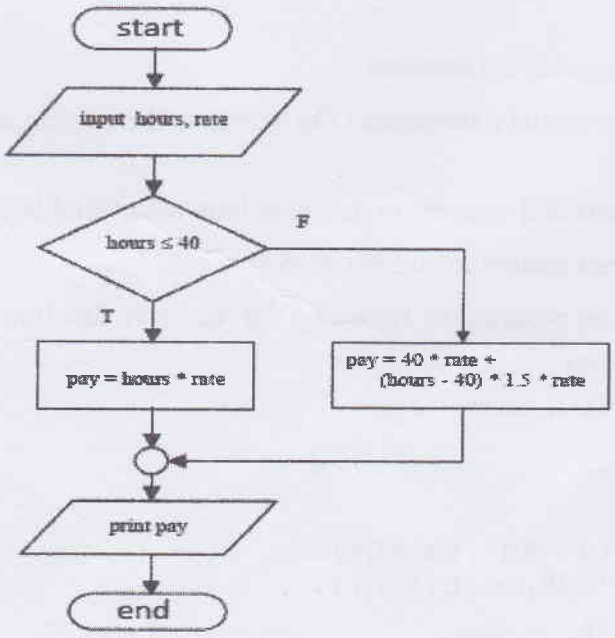
ii. In which phase is the algorithm developed? In which phase do you identify the problem inputs and outputs? (3 Marks)

iii. Draw a Flow chart to represent the following pseudo code:

```
Begin
  i = 0
  sum = 0
  while i < 10
    input x
    sum = sum + x
    ++i
  end while
  avg = sum / 10.0
  print avg
End
```

(6 Marks)

iv. Write a pseudo code to represent the following flow chart:



(6 Marks)

Q2.

i. State the logical operators supported by C Programming language. (2 Marks)

ii. Name and describe the three basic data types in C with the suitable examples. (2 Marks)

iii. What is the output of following program segment if entered data are 5 and 7?

```
printf("Enter two integers> ");
scanf("%d%d", &m, &n);
m = m + 5;
n = 3 * n;
printf("m = %d\nn = %d\n", m, n);
```

(3 Marks)

iv. Show how the value −3.6175 would be printed using the formats %8.4f, %8.3f, %8.2f (3 Marks)

v. If the variables a, b, and c are 504, 302.558, and −12.31, respectively, write a statement that will display the following line. (For clarity, a △ denotes a blank space.)

△△504△△△△△302.56△△△△-12.3 (3 Marks)

vi. Correct the syntax errors in the following program, and rewrite the program. What does each statement of your corrected program do? What output does it display?

```
/*
* Calculate and display the difference of two input values
*)
#include <stdio.h>
int
main(void) {int X, /* first input value */ x, /* second
input value */
   sum; /* sum of inputs */
   scanf("%i%i"; X; x); X + x = sum;
   printf("%d + %d = %d\n"; X; x; sum);
   return (0);
}
```

(7 Marks)

Q3.

i. Discuss the advantages of C functions (2 Marks)

ii. What are formal and actual parameters? Differentiate them using an example. (2 Marks)

iii. Describe how to write and trace recursive functions with suitable example. (3 Marks)

iv. Compare and contrast recursion and iteration. (2 Marks)

v. Rewrite the following program by replacing the recursive function with iteration:

```
#include<stdio.h>
int mult(int , int );
int main()
{
   int a,b;
   scanf("%d  %d",&a,&b);
   printf("%d",mult(a,b));
   return 0;
  }
```

```
int mult(int a, int b)
{
  if (a==0)
   {
    return 0;
}
else
    return b +mult(b,a-1);
}
```

(4 Marks)

v. Write a function named '**powerof(x, y)**' which accepts two parameters of integer type (first argument is the base and second argument is the power), computes the **x** to the power **y** and returns it. Write a main function that reads two integer values from the standard input and pass them to the function **powerof** and print the result.

(5 Marks)

Q4.

i. Write a C function to read marks of **N** students into an array called '**marks**'?

(4 Marks)

ii. Write a function to process '**marks**' array, then to store marks greater 50 in '**pass**' array and to store other marks in '**fail**' array. (6 Marks)

iii. Write a function to find the average mark of the pass students (5 Marks)

iv. Write a function to display the pass percentage. (5 Marks)

Q5.

i. What is a user define structure in C. (2 Marks)

ii. Define a data structure to store the following student data: name, index number, marks, semester, and address (consisting of street address, city, and postal code). (4 Marks)

iii. Write a function to read data into a structure variable defined in ii. above and return. (4 Marks)

iv. Write a function to display data stored in a structure variable declared in above ii. (3 Marks)

v. Declare an array of structures to store 10 student records. (3 Marks)

vi. Write a function to print names of all students stored in the array declared in above v. whose semester 1 marks is greater than 50. (4 Marks)