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UNIVERSITY REGULAR EXAMINATIONS

2013 /2014 ACADEMIC YEAR

1ST YEAR 2ND SEMESTER EXAMINATIONS

(MAIN EXAMINATION)

BACHELOR OF SCIENCE

IN INFORMATION TECHNOLOGY

COURSE CODE: 058

COURSE TITLE: INTRODUCTION TO PROGRAMMING

INSTRUCTIONS TO CANDIDATES.

Attempt question **ONE (1)** and **ANY TWO (2)** other questions from section B

SECTION ONE (COMPULSORY)

Question #1 [24 Marks]

a) Define each of the following as used in computer programming; [2 Marks]
   i. Variable
   ii. Constant

b) Fill the following table by describing what each of the escape characters will do [3 Marks]

Escape Character	Description
\n	
\t	
\a	

c) Write the function divideBy(s,t) which returns the result of dividing s by t (Warning; division by 0 illegal) [3 Marks]

d) A variable can be any sequence of characters that may include: a-z, A-Z, 0-9 and _ additionally a variable name must be unique within its scope and is case sensitive. State three other rules that a variable must follow. [3 Marks]

e) Given the code below,

```
1: #include <stdio.h>
2:
3:int Main()
4:{
5:
6:      for(int i=0;i<5;i++)
7:      {
8:              printf("Hello, World!\n");
9:
10:     }
11:      return 0;
12:}
```

i. Identify the line(s) and state the type of error which may result when the program is compiled and executed. [1 Marks]

ii. What is the use of #include statement? [1 Marks]

iii. What will be the output of the program if the error is corrected? [2 Marks]

f) How many * does the following program segment print [3 Marks]

```
for(x=0;x<10;x++)
{
        for(y=5;y>0;y--)
        {
                Printf("*");
        }
}
```

g) Using an example show how you can declare a variable that stores a constant. [2 Marks]

h) Give an outline for the general form of a programmer defined functions in C. [4 Marks]

SECTION TWO (ANSWER ANY TWO QUESTIONS)

Question #2 [18 Marks]

a) Many programmers plan their programs using a sequence of steps, referred to as the program development cycle. Explain the step-by-step process which will enable you to use your time efficiently and help you design error-free programs that produce the desired output. [4 Marks]

b) An array is declared with the following statement

char grapes[2][3];

i) What is the name of the array? [1 Marks]

ii) How many elements does the array have? [1 Marks]

iii) What data type does the array hold? [1 Marks]

iv) Modify the above array to hold three records but with the same number of elements as the original array. [2 Marks]

c) Write a C program that will be able to produce the following result shown below. The program should accept only numbers between 1 and 10. [6 Marks]

Output of the program will appear as:

This program prompts you to enter 5 numbers
Each number should be from 1 to 10
Enter number 1 of 5:3
Enter number 2 of 5:6
Enter number 3 of 5:3
Enter number 4 of 5:9
Enter number 5 of 5:2

Value 1 is 3
Value 2 is 6
Value 3 is 3
Value 4 is 9
Value 5 is 2

d) The following matrix represents the scores of 3 students(rows) in 5 tests (Columns)

34	45	43	89	34
89	56	98	34	55
67	87	45	43	95

Declare an array called marks to store the above scores. [3 Marks]

Question #3[18 Marks]

a) The area of a rectangle is the product of the length and the width. Write a program that reads the length and the width of the rectangle from the keyboard, computes the area of the rectangle and displays the area on the standard output (screen monitor). [6 Marks]

b) Rewrite the following while loops as for loops: [6 Marks]

i.
```
int i=1;
while(i<=10)
{
   if(i<5 && i!=2)
         printf("*");
   i++;
}
```

ii.
```
int j=100;
do
{
   printf("*");
   j=j+200;
}
while(j<1000);
```

c) Write code using an if statement that assigns letter grades based on this 10 point scheme. [6 Marks]

if the numeric_grade is not less than 90, the letter_grade is an A,
if the numeric_grade is not less than 80, the letter_grade is an B,
if the numeric_grade is not less than 70, the letter_grade is an C,
if the numeric_grade is not less than 60, the letter_grade is an D,
if the numeric_grade is not less than 0, the letter_grade is an F,
otherwise the letter_grade is an X.

Question #4[18 Marks]

a) Suppose you have the following function prototypes:

double answer(double data1, double data2);
double answer(double time,int count);

which function would be used in the following function call and why ? (x and y are of type double)

x=answer(y,6.0); [2 Marks]

b) Outline any two looping and two conditional structure and explain how they are implemented in C. Illustrate each using a flow chart. [6 Marks]

c) Write a C Statement that outputs the word *passed* provided the value of the variable exam is greater than or equal to 60 and also the value of the variable programs_done is greater than or equal to 10. Otherwise, the statement output the word *Failed*. The variables exam and programs_done are both of type int. [6 Marks]

d) Transform the following ***for*** statement into a ***while*** statement. [4 Marks]

```
for(int counter=1;counter<=10;counter++)
{
      printf("%d\n",counter);
}
```

Question #5[18 Marks]

a) Write code segment to create a file named **temp.txt** if it does not exist. [3 Marks]

b) Given the following program, show the values of the array in the following figure: [4 Marks]

```
#include<stdio.h>
int main()
{
    int values[5];
    for(int i=1;i<5;i++)
    {
            values[i]=i;
    }
    values[0]=values[1] + values[4];
    return 0;

}
```

After the array is created

0	
1	
2	
3	
4	

After the first iteration in the loop is done

0	
1	
2	
3	
4	

After the loop is completed

0	
1	
2	
3	
4	

After the last statement in the main method is executed

0	
1	
2	
3	
4	

c) How is function recursion different from looping? [2 Marks]

d)

i. Declare (give a prototype for) a function named *average_grade*. This function returns a double and has four double arguments, test1, test2, test3 and test4. The return value should be the average or arithmetic mean of the four arguments. [3 Marks]

ii. Define the above prototyped function and include a comment that tells *briefly* what the function does. [6 Marks]