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External Examinations Branch

විද්‍යා පීඨය - **Faculty of Science**
විද්‍යාවේදී (සාමාන්‍ය) උපාධි ප්‍රථම පරීක්ෂණය (බාහිර) - 2008 හා 2009
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STCS E1025 - Introduction to Programming and Program Design

No. of Questions: **Eight (08)** No. of Pages: **Five (05)** Time: **Three (03) Hours**

Answer **Six (06)** Questions Only.

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1. (a) Write short notes on following types of programming languages.

(i) Machine language

(ii) High-level language

(b) Discuss the difference between *compiler* and *interpreter*.

(c) Some of the following identifiers written in C programming language contain errors. State whether each identifier is correct or incorrect. If incorrect, identify the error.

(i) _location2

(ii) 32foo

(iii) #students

(iv) Surface.Area

(v) @home

2. (a) Write a valid C declaration for each of the following:

(i) A character variable *grade.*

(ii) Two integer variables *x* and *y*, both variables initialized to value 5 in one declaration.

(iii) A character array named *color*, initialized to "RED".

(iv) A pointer to an integer object.

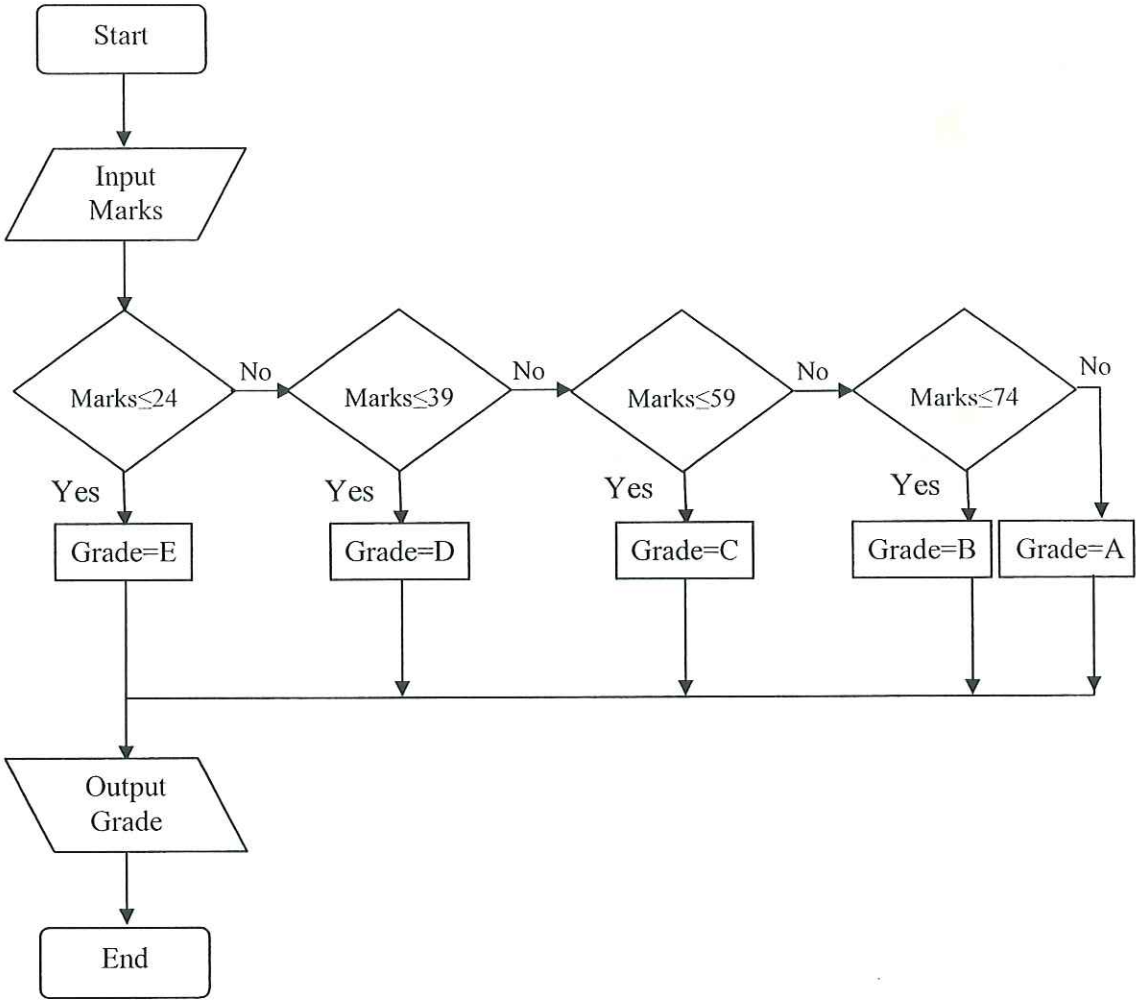
(b) Consider the following algorithm

```
main digit
local data
        digit: integer
        digit=0
```

```
begin
repeat
        display digit, print a new line
        digit=digit+1
until   digit>9
end
end digit
```

(i) Convert this algorithm to a valid C program.
(ii) Give the output of the above program.

3. (a) Convert the flowchart given below to a valid C program using *if-else* statements.



(b) Rewrite the following C conditional statement using if-else statement.

(marks>40) ? Grade='X' : grade='Y';

Continued...

4. (a) Consider the following block of code written in C.

```
switch(choice=getchar())
{
case 'r' :
case 'R' :
            printf("RED");
            break;
case 'g' :
case 'G' :
            printf("GREEN");
            break;
case 'B' :
            printf("BLUE");
            break;
default :
            printf("Not a primary color.");
}
```

(i) Give the output of the above code segment for each of the following case:
1) If choice='R'
2) If choice='b'
3) If choice='W'

(ii) What will be the answer for choice='B' if we remove the *break* statement in case 'B'?

(b) (i) *continue* statement can be included within a *while*, a *do-while* or a *for* statement. What is the effect of using *continue* statement?

(ii) Give the output of the following C code:

```
void main ()
{
int x;
x = 0;
while (x < 10)
        {
         ++x;
         if (x % 2 == 0)
                continue;
        printf ("%i is an odd number.\n", x);
        }
}
```


Continued...

5. (a) Write a valid C program to print this triangle:

```
*
**
***
****
*****
******
*******
********
*********
**********
```

(b) For a nonnegative integer n, the factorial of n, written $n!$, is defined by
$0!=1,\ n! = n\ .\ (n-1)....3\ .\ 2\ .\ 1 \qquad for\ n>0$

(i) Write a recursive function to find and return the factorial of a nonnegative integer.

(ii) Rewrite the above function using iterative version.

6. (a) (i) How many elements can the array `int a[5]` contain? How we can access each element of the array?

(ii) A student has written the following piece of code in C to assign the values 1,2,3,4,5 to the integer array *a[5]*. Identify the errors of the code and rewrite the code correctly.

```
int a[5];
for(i = 1; i <= 5; i = i + 1)
a[i] = i+1;
```

(iii) Consider the following two character array definitions,

```
char vowels[5] = "aeiou";
char vowels[] = "aeiou";
```

Which array definition is correct? Give reasons.

(iv) Consider the following array declarations:

```
int list[25];
char text[100];
```

Write a suitable statement or a group of statements for each of the following cases:

(1) Assign the value 9 to the 20th element of `list`.
(2) Copy the value of the 20th element from `list` into the fourth element of the same array.
(3) Assign all the elements of `text` the value '+'.
(4) Assign the value 'A' to the first and last elements of `text`.

Continued...

7. (a) Write a function *void ReadData(struct record A[100])*, which read some data of 100 individuals into a array A of type *struct record* defined as follows:

```
struct  record {
            char Name[50];          //Customer name
            int AccNo;              // Account number
            char AccType;           // Account type
            float Balance;          // Available balance
            };
```

(b) Write statements in C programming language to perform each of the following:

(i) To update the balance of the 3rd customer to 12,000.00.

(ii) To output the account type of the 82nd customer.

(iii) To output the customer names having the balance greater than 10,000.

8. (a) Briefly explain the difference between passing arguments by value and passing arguments by reference to a function.

(b) Consider the following C statement.

```
int x = 4;
```

(i) Define a pointer variable **px* for the integer *x*.

(ii) Assign the address of *x* to the pointer variable.

(iii) Write two C statements to print the value of *x* using the variable *x* and pointer variable.

(c) Consider the following structure declaration.

```
struct student{
            char Name[50];
            int Age;
            char Sex;
            int Weight;
            };
typedef  struct student Student;
```

(i) Define a pointer variable **ps* whose object is a structure variable of type *Student.*

(ii) Assign the values "Ann", 22, 'F' and 50 for Name, Age, Sex and Weight respectively and print them.

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