THE OPEN UNIVERSITY OF SRI LANKA
B.Sc DEGREE PROGRAMME: LEVEL 03
FINAL EXAMINATION: 2013/2014
CPU1141: INTRODUCTION TO COMPUTER PROGRAMMING

DURATION: **TWO HOUR (2 HOURS)**

Date: **27th JUNE 2014** Time: **01.30pm – 03.30pm**

Answer FOUR questions ONLY, selecting one question from part A and three questions from part B. Each question carries equal marks.

PART -A

Q1.

i. Briefly describe the three major segments of a Pascal program.

ii. Write the output value of A, B, C, D and E of the Pascal assignment statements given below, if X=5, Y=8 and Z=2.

```
A := X mod Z * Y / Z;
B := Y / 2 + (Y div Z – Y mod X);
C := Z * X mod Y + Y div X * Z;
D :=( X *(Y - Z)*(X – Z)*(Y – X));
```

iii. Write the output of the Pascal program given below.

```
PROGRAM example(INPUT,OUTPUT);
        VAR
                x, y : Integer;
        BEGIN
                FOR y := 1 TO 10 DO   BEGIN
                        FOR x := 1 TO 10 DO  BEGIN
                                IF x < y THEN  BEGIN
                                        Write(' ');
                                    END
                                ELSE   BEGIN
                                        Write('*');
                                    END
                                END;
                WRITELN;
END;
        END.
```

iv. Convert the above Pascal program into C program.

Q2.

i. Write Pascal assignment statements to evaluate the following expressions.

a. $A = \frac{1}{2}.\,H\,.\,L$

b. $S = \frac{-b+\sqrt{b^2-4ac}}{2a}$

c. $V = \frac{4}{3}\pi r^3$

ii. Write four **advantages** of using **subprograms** in Pascal programming languages.

iii. Write a complete Pascal program using **function/procedure** to calculate the factorial of a given number. Factorial of a number **n** is defined as

Hint: n! = n* (n-1)!
= n* (n-1)* (n-2)!
= n* (n-1)* (n-2) * (n-3). . .1

Eg: If you enter number "4", output must be 24// (4*3*2*1)

PART – B

Q3.

i. Write the outputs of the programs given below.

a.

```
#include<stdio.h>
int main()
{
  int x = 256;
  float y = 256.0;
  if(x == y)
    printf("x and y are equal");
  else
    printf("x and y are not equal");
  return 0;
 }
```

b.

```
#include<stdio.h>
int main()
{
  int a = 5, b = 1, c;
  if(!a >= 4)
       b = 3;
        c = 2;
  printf("b = %d c = %d\n", b, c);
  return 0;
 }
```

ii. Determine whether the following statements are **true** or **false**.

a. `#include<stdio.h>`
`int main()`
`{`
`char p[] = "%c\n";`
`printf(p, 65);`
`return 0;`
`}`
 	
The output of above program is A.
	b. `#include<stdio.h>`
	`#include<string.h>`
	`int main()`
	`{`
	`printf("%d\n", strlen("123456"));`
	`return 0;`
	`}`
	
	The output of above program is 7.

c.	d.

#include<stdio.h>
int main()
{
int i=0;
for(; i<=5; i++)
printf("%d", i);
return 0;
}
 	
The output of above program is 012345
	int f1(int a, int b)
	{
	return (f2(20));
	}
	int f2(int a)
	{
	return (a*a);
	}
	
	The above functions are working.

iii. Briefly explain the **Global variables** and **Local variables** in Programming languages.

iv. Write a complete C program to read two numbers, **swap** (interchange) them and print the numbers. Your program should use a function to interchange two variables using **pass by** address method.

Q4.

i. Briefly describe the behavior of the **conditional statements** and **repetition statements** in C language.

ii. Briefly explain the **conditional operators** in C language, giving an example.

iii. Write a complete C program using **switch** statements to print the day of the week when theuser enters the first character of the day.
Instructions: If the character is 's' or 't' your program should read the second character as well. If the character is 'm' then prints "Day is Monday". If the user enters 's', print "Enter the second character of day". Then if 'a' is entered, print "Day is Saturday". if 'u' is entered, print "Day is Sunday". If another character, print "Day is No Such Day". (**Cannot use if or if-else statements**).

Enter the first character of day
'm' : Day is Monday
'w' : Day is Wednesday
'f' : Day is Friday
's' : Enter the second character of day
'a' : Day is Saturday
'u' : Day is Sunday
't' : Enter the second character of day
'u' : Day is Tuesday
'h' : Day is Thursday

Q5.

i. Determine whether the following statements are **true** or **false**, in the context of C programming.

a. The expression *ptr++ and ++*ptr are same.
b. Functions can be called either by value or reference.
c. In a call to **printf()** function the format modifier %b can be used to print binary equivalent of an integer.
d. The *break* is used to take control out of *switch* and *continue* is used to take control of to the beginning of the *switch*.
e. If two strings are found to be unequal then *strcmp* returns none zero value.

ii. Write a complete C program to **read five marks** a player has scored in five consecutive matches and **display thelowest score, highest score, total of marks and average of marks** out of the five marks.

Consider these instructions

a. Define an **array** called "marks" of size 5 of type integer and other relevant variables.
b. Read 5 different values of marks using **for loop/s**and store these marks into array.
c. Sort the array.
d. Display the highest mark and lowest mark.
e. Calculate the total and average of marks.

Q6.

i. Write a difference between **Structure** and **Array** in C programming language.

ii. Determine whether the following statements are **true** or **false**, in the context of C programming.

a. A structure can contain similar or dissimilar elements.
b. A union cannot be nested inside another union.
c. Unlike a structure, the members of a union share the same storage area.

iii. Write a complete program in C to store details about given number of items that the customer purchased, according to the following guidelines.

Define an appropriate **User defined data type** to store ItemCode, ItemName and Price of an item. ItemCode **must** be generated automatically. The program should read details of **given number of items** using appropriate **control structure/s**.

The program should **print the details** about those Items in the following format.

ItemCode:	**ItemName:**	**Price:**
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