THE OPEN UNIVERSITY OF SRI LANKA
B.Sc. DEGREE PROGRAMME: LEVEL 03
DEPARTMENT OF COMPUTER SCIENCE
FINAL EXAMINATION: 2016/2017
CPU1141 : INTRODUCTION TO COMPUTER PROGRAMMING
DURATION: TWO HOURS (2 HOURS)

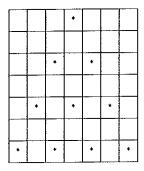Date: 05th August 2017   Time: 1.00 p.m. – 3.00 p.m.

Instructions

- Answer FOUR questions ONLY.
- Each Question carries equal marks.

C Programming

Q1).

(a) Answer **any five** of the followings in short.

     i.   What is the difference between a *variable* and a *constant*?

     ii.   If a = 5, then determine the value of m and a of the following expression
                m = ++ a * 5;

     iii.   State the output produced by the following `printf` statement

```
printf ("%d \t %4.2f",1234, 456);
```

     iv.   Explain the use of `putchar ()` function to output the string "Hello World".

     v.   What is the difference between `break` and `continue` statements?

     vi.   What do you mean by relational expression? Give an example.

     vii.   Explain different types of errors in programming.

(b) Write a C program using nested for loops to print the tree top pattern given below. Hint: Use
`printf(" ");`   `printf("* ");` in your program.

Q2).

(a) Find errors if any, of the following codes. Otherwise write the output. Give reasons for your answer.

i.
```c
int main() {

    int m = 1;

    if(m == 1){
        printf("Colombo");

        if(m == 2)
            printf("Kandy");

        else
            print("Matara");
    }

    else;
        printf("End");

    return 0;
}
```

ii.
```c
int main() {

    int a = 5, b, c;
    b = a++ + ++a + a++;
    c = ++a + a++ + a- -;
    printf("\n a = %d, b = %d, c = %d", a, b, c);
    return 0;
}
```

iii.
```c
void main() {

    int x = 'i';

    switch (x) {
        case 'i' : putchar('i');
        case 'j' : putchar('j');
        case 'k' : putchar('k'); break;
        case 'l' : putchar('l');
        default      : putchar('a');
    }
}
```

(b) Write a C program to check whether a given number is even or odd.

Q3).

(a) Answer **any five** of the followings in short.

   i.   Explain one dimensional array.

   ii.   What is a multidimensional array? Give an example.

   iii.   State four (04) names of string manipulation functions and write the purpose of each.

   iv.   What is a pointer? Give an example.

   v.   Explain *value operator* and *address operator* in pointers.

   vi.   What is a structure? Explain with an example. State how to declare a structure variable.

   vii.   Explain the four types of memory allocation functions in C.

(b) Write a function called `RectangleProperties` that computes the area and perimeter of the rectangle based on the height and width of the rectangle. The function is not supposed to display anything on the screen. Instead, it should return the computed area and perimeter via the parameters.

Q4).

(a) Find the errors if any, of the following code segments. Otherwise write the output. Give reasons for your answer.

   i.
```
char s1 [] ="Colombo 7";
char s2[] = "Jaffna"
strcpy(s1, s2, 3);
printf("%s", s1);
```

   ii.
```
int i; int x[100];
for(i=0;i<100;i++)
    x[i] = i;
printf("%d", i);
```

(b) Declare a structure named `player` with fields: `playerNo, name, no_of_innings, totalRuns,` and `average.` Write a C program to read records of 24 players into an array of structure `player.` Your program should print the name of the player with the highest average.

Pascal Programming

Q5).

(a)

    i. Write variable declaration in Pascal to declare two variables `total` and `average` as type `real`, the variable `star` as type `char` and the variable `number` as type `integer`.

    ii. Write a Pascal statement to assign the 10th component of an array variable `letter` to its 5th component.

(b) Write down the output of each of the following code segments.

(i)
```
sum :=0;
x := 1;
while x <= 5 do
begin
    sum := sum + x;
    x := x + 1;
end;
write (sum);
```

(ii)
```
a := 1;
b := 7;
for i := b - a to b + a do
    write (i*i);
```

(c) Write a Pascal program to read three integer numbers and output the smallest of them.

Q6).

(a) Explain the term "user defined data types" in Pascal.

(b) State three (03) user defined data types in Pascal? Briefly explain each type.

(c) Using an appropriate user defined data type technique, write a Pascal program to read the number of items sold on each day of the month of December. If the number of and print these values of each day. The total number of items should also be printed.