

UNIVERSITY OF RUHUNA  
BACHELOR OF COMPUTER SCIENCE (GENERAL) DEGREE LEVEL I (SEMESTER I)  
EXAMINATION – JUNE/JULY 2015

COURSE UNIT : CSC1113 - Programming Techniques

TIME: 2 Hours

*Answer all four(4) questions*

1.

a.

- i. What is meant by the scope of a variable?
- ii. Using a suitable example, briefly explain the difference between a global variable and a local variable.

b. Write a C program segment to check whether a number entered by user is prime number or not.

Note: Use a function with arguments and without return value

c. Explain how you change the program written for the *1) b* to show prime numbers between two positive integers entered by user.

Assume that the user enters smaller number first.

d. Write a C program segment to find sum of first  $n$  natural numbers using recursion.

Note: Positive integers are known as natural number i.e. 1, 2, 3.... $n$

2.

a. Write a simple C program segment to demonstrate the ++ operator as *postfix* and *prefix*.

b. Write the output of the following code. Justify your answer.

```
int main ()
{
    /* local variable definition */
    char grade = 'B';

    switch(grade)
    {
    case 'A' :
        printf("Excellent!\n" );
    case 'B' :
    case 'C' :
        printf("Well done\n" );
    case 'D' :
        printf("You passed\n" );
    }
    printf("Your grade is %c\n", grade );

    return 0;
}
```

c.

- i. Write a C program segment to find the minimum value and maximum value of 10 integer numbers which are read at run time, to an array.
- ii. Extend the program segment written in 2.c)i) to display the values in descending order.

3.

a. Write C program statements for the followings.

- i. Declare a pointer to an array of 10 integers
- ii. Declare an array of 10 pointers to integers

b. "C function can be called by reference". Explain the statement using a suitable example.

c.

- i. Write function *EvenCount(ptr)* to count even numbers from the given array in order to complete the following program.
- ii. Write the functionality of the numbered lines in the code segment given below.

```
#include <stdio.h>
int EvenCount(int *ptr); ← 1
int num_array[] = {3, 6, 2, 4, 7, 8, 3, 5, 8, 10};
int count;
int main(){
    int *ptr = num_array; ← 2
    int even;
    even = EvenCount(ptr);
    printf("The count of even numbers is : %d\n", even);
}
```

d. Write the output of following programs and justify your answer.

i.

```
#include <stdio.h>
int main()
{
    int i=3, *j, k;
    j = &i;
    printf("%d\n", i**j*i+j);
    return 0;
}
```

ii.

```
#include<stdio.h>

int main()
{
    int x=30, *y, *z;
    y=&x; /* Assume address of x is 500 and integer is 4 byte size */
    z=y;
    *y+=*z++;
    x++;
    printf("x=%d, y=%d, z=%d\n", x, y, z);
    return 0;}

```

iii.

```
#include <stdio.h>

int main(void)
{
    char ch = 'c';
    char *chptr = &ch;

    float f = 1.20000;
    float *fptr = &f;

    char *ptr = "I am a string";

    printf("\n [%c], [%f], [%c], [%s]\n", *chptr, *fptr, *ptr, ptr);

    return 0;
}

```

iv.

```
#include <stdio.h>

int main(void)
{
    char **ptr = NULL;

    char *p = NULL;

    char c = 'd';

    p = &c;
    ptr = &p;

    printf("\n c = [%c]\n",c);
    printf("\n *p = [%c]\n",*p);
    printf("\n **ptr = [%c]\n",**ptr);

    return 0;
}

```

4.

- a. Distinguish between an array and a structure.
- b. What is the purpose of using 'typedef' feature in C? Using an example, illustrate how this feature is used in structure declaration.
- c. Suppose XYZ Company plans to store details of their employees who work in different departments. The company needs to record the following details. Employee Number, Employee Name, Date he joined the company, Department to which he belongs to, Designation and Basic salary.
  - i. Define a structure in C to store the above information. Assume Employee Number and Salary as integers and Employee Name, Department and the Designation contain at most 20, 10 and 12 characters respectively. Declare date joined as a structure containing date, month and year.
  - ii. Write a function that takes no arguments but reads employee details from the keyboard and return an employee structure.
  - iii. Write a function that takes employee structure as an input argument and display Employee Number, Employee Name and the Department.
  - iv. Write a C code segment to display the names of employees who have 5 years or more working experience to 1st of January 2015, assuming XYZ Company employs 100 employees,
  - v. Write a C code segment to search an employee named 'Perera' and display his department, assuming identical names do not exist.

\*\*\*\*\*