Computer Programming

End Semester Exam

Set - 4

Date: 26-03-2022

Max Marks: 24

- Answer all questions.
- Write your roll number and set number on top of each page.
- Save your scanned file with the name Setnumber_Rollnumber.pdf

(eg: Set4_S2021XXXXX.pdf)

1.

(a) What is tail recursion? Give an example of tail recursion. **(3 Marks)**

(b) Write a C program that computes $f(m,n) = \frac{m-n}{n!(m-n)!}$, where m and n are positive integers and m greater than n. You may write two user defined functions, one for f and another for factorial. **(5 Marks)**

2. [4+4 Marks]

(a) Write a program to display the following pattern.

```
    1
   232
  34543
 4567654
567898765
```

(b) Discuss various error handling functions in detail with suitable examples.

3. A. Fill in the blanks (a and b) by a suitable code so that the output of the program is 15. [1-mark]

```c
#include <stdio.h>
int f(int [a], int n)
{
if(n<=0) return 0;
else
if(*a%3==0) return *a + f(a+1, n-1);
else
return *a - [b]
}

int main() {

    int a[]={12, 7, 13, 4, 11, 6, 10};


    printf("%d", f(a,7));

    return 0;
}
```

B. What is the output of the below program? [1-mark]

```c
#include<stdio.h>
int main()
{
    char *ptr;
    char string[] = "learn C from dennis ritchie book";
    ptr = string;
    ptr += 3;
    ptr--;
    printf("%s",--ptr);
    return 0;
}
```

C. What is the output of the below program? [2-mark]

```c
#include<stdio.h>
int main(){
 char *cities[] = {"UAE", "Spain", "America"};
 int **i = &cities[0];
 int **j = &cities[1];
 int **k = &cities[2];
 printf("%c%c%c\n", **i+4,**j-4,**k+4);
 return 0;
}
```

D. What is the output of the below program? [1-mark]

```c
#include <stdio.h>

int main() {
    // Write C code here
  struct s1
  {
   char *z;
   int i;
   struct s1 *p;
  };

  struct s1 a[]={{"Nagpur",1, a+1},{"Delhi",2, a+2},{"Chennai",3, a}};

  struct s1 *ptr=a;

  printf("%s %s %s", a[0].z, ptr->z, a[2].p->z);


    return 0;
}
```

E. What is the output of the below program? [1-mark]

```c
#include <stdio.h>
int main() {
  struct s
  {
   char *z;
   int i;
   struct s *p;
  };

  struct s a[]={{"IIIT Sri City",1, a+2},{"IIIT Lucknow",2, a+1}
      ,{"IIIT Raipur",3, a}};

  struct s *ptr=a+2;
  printf("%s\n", ++(ptr->z));
  printf("%s\n", a[(--ptr)->i].z);
  printf("%s", a[--ptr->p->i].z);
    return 0;
}
```

F. What is the output of the below program? [2-mark]

```c
#include<stdio.h>
struct test
{
int i;
char *c;
};
struct test str[]={ 8, "abms", 8, "adsa", 7,"computer programming",3, "maths"
    4, "dbms"};

main()
{
 struct test *p=str;
 p++;

 printf("%s ", ++(p++->c));

 printf("%c ", *++p->c);

 printf("%d ", p[0].i);

 printf("%s ", p->c);
}
```

*****