Computer Programming

End Semester Exam

Set - 1

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: Set1_S2021XXXXX.pdf)

1. Consider the following recursive function. **(3+1+1+3 = 8 Marks)**

```
int rec( int n, int k )
{
        if (k > n)
                return 0;
        if ( (k == 1) || (k == n) )
                return 1;
        return rec(n-1,k-1) + k * rec(n-1,k);
}
```

Assume that both n,k are positive. Answer the following questions.

a) What is the value returned by rec(5,3)? Show your calculations.
b) How many times is rec() called to compute rec(5,3)?
c) How many multiplications are performed to compute the value of rec(5,3)?
d) Write a recursive function recMul() to count the number of multiplications in the call rec(n,k).

2. (a) Write a C program to print the sum of diagonal elements of a 2-D matrix. [4+4 Marks]

(b) Explain the following file handling functions with suitable examples:

a. fseek() b. ftell() c. rewind() d. feof()

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

```
#include <stdio.h>

int f(int *a  , int   )
{
    if(n<=0) return 0;
    else
    if(*a%2==0) return *a +
    else
    return *a  - f(a+1, n-1);
}
int main() {
    // Write C code here
   int a[]={12, 7, 13, 4,11, 6};

   printf("%d", f(a,6));

    return 0;
}
```


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

```
1  #include<stdio.h>
2  int main()
3  {
4      char *ptr;
5      char string[] = "learn C from dennis ritchie book";
6      ptr = string;
7      ptr += 6;
8      printf("%s",ptr);
9      return 0;
10 }
```

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+1,**j-1,**k+1);
  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[]={{"Delhi",1, a+1},{"Mumbai",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+1},{"IIIT Lucknow",2, a+2}
      ,{"IIIT Raipur",3, a}};

  struct s *ptr=a;
  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[]={3, "maths", 4, "dbms", 8, "abms", 8, "adsa", 7,"computer
    programming"};
main()
{
 struct test *p=str;
 p=p+1;

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

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

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

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

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