1. Write a program to add, multiply, transpose two NXM matrices.

```
#include<stdio.h>
#include<conio.h>
void main()
{ int p,q,r,s,a[20][20],b[20][20],i,j,sum[20][20],tr[20][20],ch;
 clrscr();
printf("Note : For Addition or Multiplication , no. of rows and columns should be
same and for transpose of matrices , your first matrices entered should be the
desired matrices .\n");
printf("Enter the no. of rows for first matrices: \n");
scanf("%d",&p);
printf("Enter the no. of columns for first matrices: ");
scanf("%d",&q);
printf("Enter the Data Elements of first matrices\n");
for(i=0;i<p;i++)
{ for(j=0;j<q;j++)
 { scanf("%d",&a[i][j]); } }
printf("Enter the no. of rows for second matrices: \n");
scanf("%d",&r);
printf("Enter the no. of columns for second matrices: ");
scanf("%d",&s);
printf("Enter the Data Elements of second matrices\n");
for(i=0;i<r;i++)
{ for(j=0;j<s;j++)
 { scanf("%d",&b[i][j]); } }
do
{ if(p==r&&q==s)
  { printf("Enter 1 for addtion or subtraction of matrices\n");
   if(q==r){printf("Enter 2 for multiplication of matrices\n");}
   printf("Enter 3 for transpose of first matrices\n"); }
 else if(p!=q&&q==r)
  { printf("Enter 2 for multiplication of matrices\n");
    printf("Enter 3 for transpose of first matrices\n"); }
else
   { printf("Enter 3 for transpose of first matrices\n"); }
scanf("%d",&ch);
switch(ch)
{
case 1 :
  for(i=0;i<p;i++)
  { for(j=0;j<q;j++)
  { sum[i][j]=a[i][j]+b[i][j];} }
  printf("The resultant matrices is :\n");
  for(i=0;i<p;i++)
  {for(j=0;j<q;j++)
  {printf("%3d",sum[i][j]); }
  printf("\n"); }
  break;
case 2 :

  printf("The resultant matrices is : \n");
  int k;
  for(i=0;i<p;i++)
  { for(j=0;j<s;j++)
  { sum[i][j]=0;
  for(k=0;k<p;k++)
  { sum[i][j]+=a[i][k]*b[k][j]; }
  printf("%d\t",sum[i][j]); }
  printf("\n"); }
  break;
case 3 :
```

```
 for(i=0;i<p;i++)
 { for(j=0;j<q;j++)
 { tr[j][i]=a[i][j]; } }
 printf("The resultant matrices is :\n");
 for(i=0;i<q;i++)
 { for(j=0;j<p;j++)
 { printf("%3d",tr[i][j]); }
 printf("\n"); }
 break; }}
while(ch>0);
getch();
}
```

2. Write a program to store & transpose a sparse matrices.

```
#include<stdio.h>
#include<conio.h>
// transpose for the sparse matrix
void main()
{
clrscr();
int a[10][10],b[10][10];
int m,n,p,q,t,col;
int i,j;
printf("enter the no of row and columns :\n");
scanf("%d %d",&m,&n);
for(i=1;i<=m;i++)
{
for(j=1;j<=n;j++)
{
printf("a[%d][%d]= ",i,j);
scanf("%d",&a[i][j]);
}
}
printf("\n\n");
printf("\n\nThe matrix is :\n\n");
for(i=1;i<=m;i++)
{
for(j=1;j<=n;j++)
{
printf("%d",a[i][j]);
}
printf("\n");
}
t=0;
printf("\n\nthe non zero value matrix are :\n\n");
for(i=1;i<=m;i++)
{
for(j=1;j<=n;j++)
{
if(a[i][j]!=0)
{
t=t+1;
b[t][1]=i;
b[t][2]=j;
b[t][3]=a[i][j];
} }
}
printf("\n");
printf("a[0 %d %d %d\n",m,n,t);
```

```
for(i=1;i<=t;i++)
{
printf(“a[%d %d %d %d \n”,i,b[i][1],b[i][2],b[i][3]);
}
b[0][1]=n; b[0][2]=m; b[0][3]=t;
q=1;
printf(“\n\nthe transpose of the matrix :\n “);
if(t>0)
{
for(i=1;i<=n;i++)
{
for(j=1;j<=t;j++)
{
if(b[j][2]==i)
{
a[q][1]=b[j][2]; a[q][2]=b[j][1];
a[q][3]=b[j][3]; q=q+1;
} }
} }
printf(“\n\n”);
printf(“a[0 %d %d %d\n”,b[0][1],b[0][2],b[0][3]);
for(i=1;i<=t;i++)
{
printf(“a[%d %d %d %d\n”,i,a[i][1],a[i][2],a[i][3]);
}
getch();
}
```

3. Write a program to find the position of a substring within another string.

```
#include<stdio.h>
#include<string.h>
void main()
{char str[20] , pat[20] ;
 int i=0,j,k=0 ;
 printf("Enter the first string :");
 gets(str);
 printf("\n Enter the 2nd string : ");
 gets(pat);
 while(str[i]!='\0')
 { if(str[i]==pat[0])
   { j=1;
     while(pat[j]!='\0' && str[j+i]!='\0' && pat[j]== str[j+i])
     { j++;
      k=1; }
    if(pat[j]=='\0')
    printf("pattern string found at %d position " , i+1);
    }
   i++;
   if(k==0)
   { if(str[j+i]=='\0')
   printf("pattern not found ");
    }
    }
getch();
}
```

4. Write a program for string matching.

```
#include "stdio.h"
#include "conio.h"
#include "string.h"
void main()
{ void match(char str1[],char str2[]);     //function declaration
char str1[50],str2[50];
int s;
clrscr();
printf("Enter string 1 and string 2\n");
scanf("%s%s",&str1,&str2);
s=match(str1,str2);
if(s==-1)
printf("\nNo match found");
else
printf("\nThe location where the first match occured is %d",s);
getch();
}

void match(char str1[],char str2[])
{ int i,j;
for(i=0;i<strlen(str2);i++)
{ for(j=0;j<strlen(str1);j++)
 { if(str2[i]==str1[j])
  { return j+1; } } }
 }
```

5. Write a program to reverse a string and check whether string is palindrome or not.

```
#include<stdio.h>
#include<conio.h>
void main()
{ int i, j, k;
char str[100];
char rev[100];
printf("Enter a string\t");
scanf("%s",&str);
for(i = 0; str[i]!= '\0'; i++);
{ k = i-1; }
for(j = 0; j <= i-1; j++)
{ rev[j] = str[k];
 k--; }
if(rev==str)
printf("String is Palindrome");
else printf("String is not Palindrome");
getch();
}
```

6. Write a program to insert, delete & update any string at particular position.

```
#include<stdio.h>
#include<conio.h>
#include<stdlib.h>
#include<string.h>
```

```
int a[20],b[20],c[40];
int m,n,p,val,i,j,key,pos,temp;
char str[100],str1[50],str2[50];
clrscr();

void insert()
{ printf("\nEnter the position for the new element:\t");
  scanf("%d",&pos);
  printf("\nEnter the element to be inserted :\t");
  scanf("%d",&val);
  for(i=n-1;i>=pos;i--)
  { a[i+1]=a[i]; }
  a[pos]=val;
  n=n+1;
}

void del()
{printf("\nEnter the position of the element to be deleted:\t");
 scanf("%d",&pos);
 val=a[pos];
 for(i=pos;i<n-1;i++)
 { a[i]=a[i+1]; }
 n=n-1;
 printf("\nThe deleted element is =%d",val);
}

char *update_str(char *str, char *orig, char *rep)
{
static char buffer[4096];
char *p;
if(!(p = strstr(str, orig)))
return str;
strncpy(buffer, str, p-str);
buffer[p-str] = '\0';
sprintf(buffer+(p-str), "%s%s", rep, p+strlen(orig));
return buffer;
}

void main()
{
do{
printf("\n\n--------Menu----------\n");
printf("1.Insert\n");
printf("2.Delete\n");
printf("3. Update \n");
printf("4.Exit\n");
printf("----------------------");
printf("\nEnter your choice:\t");
scanf("%d",&choice);
switch(choice)
{
case 1: insert();
              break;
case 2: del();
              break;
case 3: printf("Enter a one line string..\n");
              gets(str);
              printf("Enter the sub string to be replaced...\n");
              gets(str1);
              printf("Enter the replacing string....\n");
              gets(str2);
              puts(update_str(str, str1, str2));
              break;
```

```
case 4: exit(0);
              break;
default: printf("\nInvalid choice:\n");
               break;
}
}while(choice!=4);
getch();
}
```

7. Write a menu driven program to perform uppercase, lowercase, length,copy & concatenation in string by using string.h.

```
#include<stdio.h>
#include<conio.h>
#include<string.h>

void main()
{char str[20],str1[20];
 int ch,i,j;
 clrscr();
 do
 {
  printf("\n*****MENU*****");
  printf("\n1.Find Uppercase");
  printf("\n2.Find Lowercase");
  printf("\n3.Find Length");
  printf("\n4.Copy the Strings");
  printf("\n5.Concatenate the Strings");
  printf("\n6.Exit");
  printf("\nEnter your choice: ");
  scanf("%d",&ch);
  switch(ch)
  {
 case1:
 {printf("\nEnter the string: ");
  scanf("%s",&str);
  printf("The Upper Case of String is : %s",strupr(str));
  break;
 }
 case2:
 {printf("\nEnter the string: ");
  scanf("%s",&str);
  printf("The Lower Case of String is : %s",strlwr(str));
  break;
 }
 case 3:
 {printf("\nEnter the string: ");
  scanf("%s",&str);
  i=strlen(str);
  printf("\nThe Length of given string is: %d",i);
  break;
 }
 case 4:
 {printf("\nEnter the first string: ");
  scanf("%s",&str);
  printf("\nEnter the second string: ");
  scanf("%s",&str1);
  strcpy(str,str1);
  printf("\nThe Copied string is: %s",str);
```

```
  break;
 }
 case 5:
 {printf("\nEnter the first string: ");
  scanf("%s",&str);
  printf("\nEnter the second string: ");
  scanf("%s",&str1);
  strcat(str,str1);
  printf("\nThe Concatenated string is: %s",str);
  break;
 }
 case 6:
 {exit(0);
  break;
 }
 default:
 {printf("\n Invalid option."); }
 }
}while(ch!=6);
getch();
}
```

9. Write recursive functions to calculate factorial, n raised by power of p & fibonacii series.

```
#include<stdio.h>
#include<conio.h>

int fact(int n)
{if(n==1)
 return 1;
 else
 return(n*fact(n-1));
}

int power(int base,int exp)
{if ( exp!=1 )
 return (base*power(base,exp-1));
}

void printFibonacci(int n)
{static long int first=0,second=1,sum;
 if(n>0)
 {sum = first + second;
  first = second;
  second = sum;
  printf("%ld ",sum);
  printFibonacci(n-1); }
}

void main()
{int num,f,base,exp,k,n,ch;
 long int i=0,j=1,f;
 clrscr();
 printf("*****MENU*****");
 printf("\n 1.Factorial ");
 printf("\n 2.Power of base x ");
 printf("\n 3.Fibonacci Series ");
```

```
 printf("\n 4.EXIT ");
 printf("\n Enter your choice ");
 scanf("%d",&ch);
 switch(ch)
 {
 case 1: {printf("Enter a number: ");
               scanf("%d",&num);
               f=fact(num);
               printf("\nFactorial of %d is: %d",num,f);
               break;
               }
case 2: {printf("Enter base number: ");
              scanf("%d",&base);
              printf("Enter power number(positive integer): ");
              scanf("%d",&exp);
              printf("%d^%d = %d", base, exp, power(base, exp));
              break;
               }
case 3: {printf("Enter the range of the Fibonacci series: ");
              scanf("%d",&n);
              printf("Fibonacci Series: ");
              printf("%d %d ",0,1);
              printFibonacci(n);
              break;
              }
case 4: {exit(0);
              break;
               }
   }
getch();
}
```