Raunak Gayen
2020EEB066

1. Write a C program to search a data-item in the array, if it exists in the array, print the index.

```c
#include<stdio.h>
int main()
{
    int n,ele,i,flag=0;
    printf("enter array size and number you want to search\n");
    scanf("%d%d",&n,&ele);
    int arr[n];
    printf("now enter the array elements\n");
    for(i=0;i<n;i++)
    {
        scanf("%d",&arr[i]);
    }
    for(i=0;i<n;i++)
    {
        if(arr[i]==ele)
        {
            printf("element found in position %d\n",i+1);
            flag=1;
        }
    }
    if(flag==0)
        printf("Not found\n");
    return 0;
}
```

```
enter array size and number you want to search
6 3
now enter the array elements
1 2 3 4 5 6
element found in position 3
```

2. Write a C programme that can print the binary equivalent of a decimal integer. Here decimal integer is a user input.

```c
#include<stdio.h>
#include<math.h>
int main()
{
    int dec_num,bin_num=0,i,c=0;
    printf("enter the decimal number\n");
    scanf("%d",&dec_num);
    static int arr[1000];
    // conversion starts now
    for(i=0;i<100;i++)
    {
        if(dec_num==0)
            break;
        arr[i]=dec_num%2;
        dec_num=dec_num/2;
        c++;
    }
    for(i=c;i>=0;i--)
    {
        bin_num = bin_num + arr[i]*pow(10,i);
    }
    printf("the binary equivalent = %d",bin_num);
    return 0;
}
```

```
enter the decimal number
101
the binary equivalent = 1100101
```

3. Write a C program that first reads, row by row, a 2-Dimensional array of size $n \times n$, where n is an input parameter. The program should then determine whether the array falls into any of the following special cases:
    a. Symmetric, $A_{ij} = A_{ji}$ for all i, j.
    b. Lower Triangular, $A_{ij} = 0$ when $i < j$.
    c. Diagonal, $A_{ij} = 0$ when $i \neq j$.

```c
#include<stdio.h>
#include<stdbool.h>
int main()
{
    int n ;
    printf("Enter the number of rows and columns of the square matrix : ");
    scanf("%d", &n );
    int arr[n][n];
    printf("Enter the elements of the array :\n");
    for(int i = 0 ; i < n ; i++ )
    {
        for(int j = 0 ; j < n ; j++ )
            scanf("%d" , &arr[i][j] );
    }
    printf("The 2D array is as follows : \n");
    for(int i = 0 ; i < n ; i++ )
    {
        for(int j = 0 ; j < n ; j++ )
            printf("%d\t" , arr[i][j] );
        printf("\n");
    }
    bool a = true , b = true , c = true ;
    int ld = 0 , rd = 0 ;
    for(int i = 0 ; i < n ; i++ )
    {
        rd += arr[i][i];
        ld += arr[n-i-1][i];
        for(int j = 0 ; j < n ; j++ )
        {
            if(arr[i][j] != arr[j][i])
            {
                a = false ;
            }
            if( (arr[i][j] != 0) && ( i < j ) )
            {
                b = false ;
            }
            if( (arr[i][j] != 0) && (i != j) )
            {
                c = false ;
            }
        }
    }
    if(a)
        printf("It is a Symmetric Matrix.\n");
    if(b)
        printf("It is a Lower Triangle Matrix.\n");
    if(c)
        printf("It is a Diagonal Matrix.\n");
    printf("The sum of right diagonal = %d\n", rd);
    printf("The sum of left diagonal = %d\n", ld);

    return 0 ;
}
```

```
D:\compAssignment\assignment 3>a.exe
Enter the number of rows and columns of the square matrix : 3
Enter the elements of the array :
0
1
1
1
0
1
1
1
0
The 2D array is as follows :
0       1       1
1       0       1
1       1       0
It is a Symmetric Matrix.
The sum of right diagonal = 0
The sum of left diagonal = 2
```

4. Write a C program that can add two matrices, *X* and *Y* and store the result in another matrix, *Z*. Display the result.

```c
#include<stdio.h>
int main()
{
    int r1,r2,c1,c2;
    printf("enter number of rows and columns for 1st matrix\n");
    scanf("%d%d",&r1,&c1);
    printf("enter number of rows and columns for 2nd matrix\n");
    scanf("%d%d",&r2,&c2);
    if(r1!=r2)
        printf("can't be added\n");
    else if(c1!=c2)
        printf("can't be added\n");
    else
    {
        int m1[r1][c1],m2[r2][c2],m3[r2][c2]; // r1 and c1 can also be taken
        printf("enter the elements of the first matrix \n\n");
        for(int i=0;i<r1;i++)
        {
            for(int j=0;j<c1;j++)
            {
                scanf("%d",&m1[i][j]);
            }
        }
        printf("enter the elements of the second matrix \n\n");
        for(int i=0;i<r2;i++)
        {
            for(int j=0;j<c2;j++)
            {
                scanf("%d",&m2[i][j]);
            }
        }
        for(int i=0;i<r2;i++)
        {
            for(int j=0;j<c2;j++)
            {
                m3[i][j]=m1[i][j]+m2[i][j];
            }
        }
        printf("the third matrix-----> \n\n");
        for(int i=0;i<r2;i++)
        {
            for(int j=0;j<c2;j++)
            {
                printf("%d ",m3[i][j]);
            }
            printf("\n");
        }

    }
    return 0;
}
```

```
D:\compAssignment\assignment 3>a.exe
enter number of rows and columns for 1st matrix
3 3
enter number of rows and columns for 2nd matrix
3 3
enter the elements of the first matrix

1 2 3
4 5 6
7 8 9
enter the elements of the second matrix

0 1 2
3 4 5
6 7 8
the third matrix----->

1 3 5
7 9 11
13 15 17
```

5. Write a C program that takes a string as input and then prints the number of occurrence(s) of each vowel of the English alphabets in the string.

```c
#include<stdio.h>
#include<string.h>
int main()
{
    static char s[100];
    printf("enter the string\n");
    gets(s);

    int a=0,e=0,i=0,o=0,u=0;

    for(int j=0;j<100;j++)
    {
        if(s[j]=='a' || s[j]=='A')
            a++;
        else if(s[j]=='e' || s[j]=='E')
            e++;
        else if(s[j]=='i' || s[j]=='I')
            i++;
        else if(s[j]=='o' || s[j]=='O')
            o++;
        else if(s[j]=='u' || s[j]=='U')
            u++;
        else
            continue;
    }
    printf("\n\n a--->%d time(s)\n e--->%d time(s)\n i--->%d time(s)\n o--->%d time(s)\n u--->%d time(s)\n",a,e,i,o,u);
    return 0;
}
```

```
D:\compAssignment\assignment 3>a.exe
enter the string
Engineering


 a--->0 time(s)
 e--->3 time(s)
 i--->2 time(s)
 o--->0 time(s)
 u--->0 time(s)
```

6. Write a C program to convert string in upper case and lower case.

```c
#include<stdio.h>
#include<string.h>
int main()
{
    static char s[100],s_upper[100],s_lower[100];
    printf("enter the string\n");
    gets(s);

    for(int i=0;i<100;i++)
    {
       if(s[i]>='a' && s[i]<='z')
        {
            s_upper[i]=s[i]-32;
            s_lower[i]=s[i];
        }
        else
        {
            s_upper[i]=s[i];
            s_lower[i]=s[i]+32;
        }

    }

    printf("\n\n string in uppercase--> %s \n",s_upper);
    printf("\n string in lowercase--> %s \n",s_lower);
    return 0;
}
```

```
D:\compAssignment\assignment 3>a.exe
enter the string
kOlKaTa


 string in uppercase--> KOLKATA

 string in lowercase--> kolkata
```

7. Write a C program to check whether an input string is palindrome or not.

```c
#include<stdio.h>
#include<string.h>
int main()
{
    static char s[100];
    printf("enter the string\n");
    gets(s);
    int i=0;
    int len=strlen(s)-1;
    while(len>1)
    {
        if(s[i++]!=s[len--])
        {
            printf("Not a Palindrome\n");
            return 0;
        }
    }
    printf("The given string is a Palindrome\n");
    return 0;
}
```

```
D:\compAssignment\assignment 3>a.exe
enter the string
madam
The given string is a Palindrome

D:\compAssignment\assignment 3>a.exe
enter the string
coding
Not a Palindrome
```

8. Write a C program that can take two strings as input, concatenate these and store it in another character array and display it (do not use standard library function for string operations).

```c
#include<stdio.h>
#include<string.h>
int main()
{
    char s1[100];
    char s2[100];

    printf(" enter string 1\n");
    gets(s1);
    printf(" enter string 2\n");
    gets(s2);
    int len1=0,len2=0;
    int i=0;
    while(s1[i]!='\0')
    {
        len1++;
        i++;
    }
    i=0;
    while(s2[i]!='\0')
    {
        len2++;
        i++;
    }
    len1--;
    len2--;
    static char s3[200];

    for(int j=0;j<=len1;j++)
        s3[j]=s1[j];
    for(int j=0;j<=len2;j++)
        s3[j+len1+1]=s2[j];

    printf("\n The concatenated string is--->\n");
    puts(s3);
    return 0;
}
```

```
D:\compAssignment\assignment 3>a.exe
 enter string 1
News
 enter string 2
paper

 The concatenated string is--->
Newspaper
```