LAB ASSIGNMENT-3

```c
/*Lab Assignment-3 26-02-2021 Tathagata Ghosh*/

/*Q1. Write a C program to search a data-
item in the array, if it exists in the array, print the index.*/

#include<stdio.h>
#include<stdbool.h>

int main()
{
    int size ;//to store the size of the array
    printf("Enter the number of elements of the array : ");
    scanf("%d" , &size );
    int a[size];//array declaration
    printf("Enter the elements of the array : \n");
    for(int i = 0 ; i < size ; i++)
    {
        scanf("%d", &a[i]);//inputing elements one by one
    }

    int n ;//number to search in the array
    printf("Enter the number to search in the array : ");
    scanf("%d", &n);
    bool f = false ;
    for(int i= 0 ; i < size ; i++ )
    {
        if(n==a[i])//checking with each and every element
        {
            printf("%d is found at %d index.", n , i);//printing if found alon
g with the index
            f = true ;
            break;
        }
    }
    if(!f)
    {
        printf("%d is NOT in the given array.", n);
    }

    return 0;
}
```

OUYPUT :

```
Enter the number of elements of the array : 10
Enter the elements of the array :
1 2 3 4 5 6 7 8 9 0
Enter the number to search in the array : 6
6 is found at 5 index.
Enter the number of elements of the array : 5
Enter the elements of the array :
65 75 41 9 822
Enter the number to search in the array : 0
0 is NOT in the given array.
```

```c
/*Lab Assignment-3 26-02-2021 Tathagata Ghosh*/

/*Q2. Write a C programme that can print the binary equivalent of a decimal in
teger. Here
decimal integer is a user input.*/

#include<stdio.h>

int bit_count(int n)//function to find out the size of the array( maximum powe
r of 2) to store the binary equivalent of the integral part
{
    if(n==0)
    return 0;
    return 1 + bit_count(n/2);
}

int main()
{
    float n ;
    printf("Enter an decimal integer : ");
    scanf("%f", &n);

    int d = (int)n;
    float f = n - d ;
    int size = bit_count(d) ;
    int bin_d[size];

    for(int i = size-1 ; i>=0 ; i--)
    {
        bin_d[i] = d % 2 ;
        d /= 2;
    }

    for ( int i = 0; i < size ; i++ )
```

```
        {
            printf("%d", bin_d[i]);//printing the binary equivalent of the int
egral part
        }

    if( f==0 )
    {
        printf("\n");
    }
    else
    {
        int bin_f ;
        printf(".");
        for( int i = 0 ; ( i < 15 ) && ( f != 0.0 ) ; i++ )
        {
            bin_f = (int)( f * 2 );//extraction of the decimal part binary equ
ivalent
            printf("%d", bin_f );
            f = (f*2) - bin_f ;
        }
    }
    return 0;
}
```

OUTPUT :

Enter an decimal integer : 53

110101

Enter an decimal integer : 5

101

Enter an decimal integer : 69

1000101

```
/*Lab Assignment-3 26-02-2021 Tathagata Ghosh*/

/*Q3. Write a C program that first reads, row by row, a 2-
Dimensional array of size n × n, where
n is an input parameter. The program should then determine whether the array f
alls into
any of the following special cases:
a. Symmetric, Aij = Aji for all i, j.
b. Lower Triangular, Aij = 0 when i < j.
c. Diagonal, Aij = 0 when i ≠ j.
 Also find the sum of two diagonals. */

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

```c
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 ;
}
```

```
OUTPUT :

Enter the number of rows and columns of the square matrix : 3

1 2 3

2 4 5

3 5 6

The 2D array is as follows :

1       2       3

2       4       5

3       5       6

It is a Symmetric Matrix.

The sum of right diagonal = 11

The sum of left diagonal = 10

Enter the number of rows and columns of the square matrix : 3

Enter the elements of the array :

1 0 0

0 1 0

0 0 1
```

```
The 2D array is as follows :
1       0       0
0       1       0
0       0       1
It is a Symmetric Matrix.
It is a Lower Triangle Matrix.
It is a Diagonal Matrix.
The sum of right diagonal = 3
The sum of left diagonal = 1
```

```c
/*Lab Assignment-3 26-02-2021 Tathagata Ghosh*/

/*Q4. Write a C program that can add two matrices, X and Y and store the resul
t in another matrix,
Z. Display the result. */
#include<stdio.h>

int main()
{
    int xr , yr , xc , yc ;
    printf("Enter the number of rows of X and Y : \n");
    scanf("%d %d", &xr , &yr );

    if( xr != yr )
    {
        printf("Can't be added.");
        return 0;
    }

    printf("Enter the number of columns of X and Y : \n");
    scanf("%d %d", &xc , &yc );

    if( xc != yc )
    {
        printf("Can't be added.");
        return 0;
    }

    int x[xr][xc];
    printf("Enter the elements of X : \n");

    for( int i = 0 ; i < xr ; i++ )
    {
        for( int j = 0 ; j < xc ; j++ )
```

```
        {
            scanf("%d", &x[i][j] );
        }
    }

    int y[yr][yc];
    printf("Enter the elements of Y : \n");

    for( int i = 0 ; i < yr ; i++ )
    {
        for( int j = 0 ; j < yc ; j++ )
        {
            scanf("%d", &y[i][j] );
        }
    }

    int z[xc][yr];
    for( int i = 0 ; i < xr ; i++ )
    {
        for( int j = 0 ; j < yc ; j++ )
        {
            z[i][j] = x[i][j] + y[i][j] ;
        }
    }

    printf("The matrix X is : \n");
    for( int i = 0 ; i < xr ; i++ )
    {
        for( int j = 0 ; j < xc ; j++ )
        {
            printf("%d\t", x[i][j] );
        }
        printf("\n");
    }

    printf("The matrix Y is : \n");
    for( int i = 0 ; i < yr ; i++ )
    {
        for( int j = 0 ; j < yc ; j++ )
        {
            printf("%d\t", y[i][j] );
        }
        printf("\n");
    }

    printf("The matrix Z sum of X and Y is : \n");
    for( int i = 0 ; i < xr ; i++ )
    {
```

```
        for( int j = 0 ; j < yc ; j++ )
        {
            printf("%d\t", z[i][j] );
        }
        printf("\n");
    }

    return 0;
}
```

OUTPUT :

Enter the number of rows of X and Y :

3 3

Enter the number of columns of X and Y :

2 2

Enter the elements of X :

1 2 3 4 5 6

Enter the elements of Y :

9 8 7 6 5 4

The matrix X is :

3 4

5 6

The matrix Y is :

9 8

7 6

5 4

The matrix Z sum of X and Y is :

10 10

10 10

10 10

Enter the number of rows of X and Y :

3 4

Can't be added.

```
/*Lab Assignment-3 26-02-2021 Tathagata Ghosh*/

/*Q5. Write a C program that takes a string as input and then prints the numbe
r of occurrence(s)
```

```c
of each vowel of the English alphabets in the string. */

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

int main()
{
    char str[ 100 ] ;

    printf("Enter the string : \n");
    gets(str);

    printf("The string is : \n");
    puts(str);

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

    for( int c = 0 ; c < 100 ; c++ )
    {
        if((str[c]=='a')||(str[c]=='A'))
        {
            a++;
        }
        if((str[c]=='e')||(str[c]=='E'))
        {
            e++;
        }
        if((str[c]=='i')||(str[c]=='I'))
        {
            i++;
        }
        if((str[c]=='o')||(str[c]=='O'))
        {
            o++;
        }
        if((str[c]=='u')||(str[c]=='U'))
        {
            u++;
        }
    }

    printf("The frequency of 'a' is %d\n", a );
    printf("The frequency of 'e' is %d\n", e );
    printf("The frequency of 'i' is %d\n", i );
    printf("The frequency of 'o' is %d\n", o );
    printf("The frequency of 'u' is %d\n", u );
```

```
    return 0 ;

}
```

OUTPUT :

```
Enter the string :

Hi how are you?

The string is :

Hi how are you?

The frequency of 'a' is 1

The frequency of 'e' is 1

The frequency of 'i' is 1

The frequency of 'o' is 2

The frequency of 'u' is 2
```

```
Enter the string :

I am Tathagata Ghosh

The string is :

I am Tathagata Ghosh

The frequency of 'a' is 5

The frequency of 'e' is 0

The frequency of 'i' is 1

The frequency of 'o' is 1
```

```
The frequency of 'u' is 0
```

```c
/*Lab Assignment-3 26-02-2021 Tathagata Ghosh*/

/*Q6. Write a C program to convert string in upper case and lower case.*/

#include<stdio.h>

int main()
{
    char str[100];
    printf("Enter the string : ");
    gets(str);

    printf("The original string : \n");
    puts(str);

    char strU[100];
    char strL[100];
    for(int i = 0 ; i < 100 ; i++ )
    {

        if(str[i] >= 'a' && str[i] <= 'z')
        {
            strU[i] = (char)(str[i] + (char)('A'-'a')) ;
            strL[i] = str[i];
        }

        else if ( str[i] >= 'A' && str[i] <= 'Z' )
        {
            strU[i] = str[i] ;
            strL[i] = (char)(str[i] + (char)('a'-'A'));
        }

        else
        {
            strL[i] = strU[i] = str[i] ;
        }

    }

    printf("The Upper case string : \n");
    puts(strU);

    printf("The Lower case string : \n");
    puts(strL);

    return 0 ;
```

```
}
```

OUTPUT :

```
Enter the string : Information Technology Rocks
The original string :
Information Technology Rocks
The Upper case string :
INFORMATION TECHNOLOGY ROCKS
The Lower case string :
information technology rocks
Enter the string : If life was a lie!
The original string :
If life was a lie!
The Upper case string :
IF LIFE WAS A LIE!
The Lower case string :
if life was a lie!
```

```c
/*Lab Assignment-3 26-02-2021 Tathagata Ghosh*/

/*Q7. Write a C program to check whether an input string is palindrome or not.
*/

#include<stdio.h>
#include<stdbool.h>

int main()
{
    char str[100];
    printf("Enter the string : ");
    gets(str);

    int j = 0 ;
    while(str[j]!='\0')
    {
        j++;
    }

    bool f = true ;
    j--;
    for(int i = 0  ; i <= j ; i++ , j-- )
    {
```

```
        if(str[i] != str[j])
        {
            f = false ;
            break;
        }
    }

    puts(str);
    if(f)
    {
        printf("Palindrome Word");
    }
    else
    {
        printf("Non-palindrome word");
    }
    return 0 ;
}
```

OUTPUT :

Enter the string : Pikachu

Pikachu

Non-palindrome word

Enter the string : MadaM

MadaM

Palindrome Word

```
/*Lab Assignment-3 26-02-2021 Tathagata Ghosh*/

/*Q8. 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 f
or string
operations).*/

#include<stdio.h>

int main()
{
    char str1[100] , str2[100] ;
    printf("Enter two strings (seperated by line feed) : \n");
    gets(str1);
    gets(str2);

    int n1 = 0 ;
    while(str1[n1]!='\0')
```

```
    {
        n1++;
    }

    int n2 = 0 ;
    while(str2[n2]!='\0')
    {
        n2++;
    }

    char str[200];
    int k = 0 , c = 0 ;
    while(c < n1)
    {
        str[k++] = str1[c++];
    }

    c=0;
    while(c < n2)
    {
        str[k++] = str2[c++];
    }

    printf("The concatenated string is : \n");
    puts(str);
    return 0 ;
}
```

OUTPUT :

Enter two strings (seperated by line feed) :

What programming are you learning?

I think you should start with C language.

The concatenated string is :

What programming are you learning?I think you should start with C language.

GitHub repository : https://github.com/Tathagata-Ghosh-Developer/Lab-Assignments