PROGRAM – 1 Sequential Search

```
#include <stdio.h>
int SequentialSrch(int [], int, int );
main()
{
    printf("Program for sequential search using
            brute force Approach \n");
    printf("Author : Bhavya Lalchandani \n");
    printf("Experiment Date : 31-01-2022 \n");
    printf("Submission date :                \n");
```

```
int A[50], key, n, i, pos;
printf ("Enter the array size : ");
scanf ("%d", &n);
printf ("Enter the array elements: \n");
for (i=0 ; i<=n-1 ; i++)
{
    printf ("Enter the %d element : ", i+1);
    scanf ("%d", &A[i]);
}
printf ("Enter the key to be searched : ");
scanf ("%d", &key);
pos = SequentialSrch (A, key, n);
if (pos >=0 && pos <= n-1)
{
    printf ("The key is found in array at location
                %d ", pos+1);
}
else
{
    printf ("The key is not found in array");
}
}

int SequentialSrch (int A[], int key, int n)
{
    int i=0
    while (i<n && A[i] != key)
    {
        i= i+1;
    }
    if (i<n)
    {
```

PROBLEMS DEBUG CONSOLE TERMINAL

TERMINAL

```
Program for Sequential Search using Brute Force Approach
Author : Bhavya Lalchandani
Experiment Date: 28-01-2022
Submission Date: 27-03-2022

Enter the array size: 5
Enter the array elements:
Enter the 1 element:2
Enter the 2 element:3
Enter the 3 element:4
Enter the 4 element:5
Enter the 5 element:6
Enter the key to be searched: 4
The key found in the array at location 3
PS C:\Users\Bhavya\Desktop\vs code\lab.c\Module1.c>
```

(2) PROGRAM - 2 Factorial Rec.C

```
#include <stdio.h>
int factorial (int);
main ()
{
    printf(" Program for factorial of a non-negative
            integer with Recursive function \n ");
    printf (" Submitted : Bhavya Lalchandani \n ");
    printf (" Experiment date : 02-02-2022 " );
    printf (" Submission date : 26-03-2022 \n ") ;

    int num , fac ;
    printf (" Enter the number " ) ;
    scanf (" %d " , &num) ;
    fac = factorial (num) ;
    printf (" \n The factorial of %d is %d , num, fac);
}

int factorial (int n) {
if (n<=>0)
    if (n==0)
    return 1 ;
    else
    return n* factoria (n-1) ;
}
```

PROBLEMS DEBUG CONSOLE TERMINAL

TERMINAL

```
Program for Factorial of a non negative integer with Recursive function
Submitted by : Bhavya Lalchandani
Experiment Date: 31-01-2022
Submission Date : 26-03-2022

Enter the number 5

The factorial of 5 is 120

PS C:\Users\Bhavya\Desktop\vs code\lab.c\Module1.c>
```

(3) PROGRAM - 3 Factorial NonRec.c

```
#Include <stdio.h>
int NonRecfactorial (int);

main()
  {
    printf(" program for Factorial of a non-negative
          integers with Non Recursive function \n");
    printf(" Submitted by : Bhavya Kalchandani \n");
    printf(" Experiment date : 02-02-2022 \n ");
    printf(" Submission date : 26-03-2022 \n\n");

    int num, fac;
    printf(" Enter the number: ");
    scanf (" %d", &num);
    fac = NonRecfactorial (num);
    printf(" \n The factorial of %d is %d \n", num, fac);
  }
  int NonRecfactorial (int n)
  {
    int i, fact = 1;
    for (i = 1; i <= n ; i++)
    {
       fact = fact * i ;
    }
    return fact;
  }
```

PROBLEMS DEBUG CONSOLE TERMINAL

TERMINAL

```
Program for Factorial of a non negative integer with Non recursive (Iterative) function
Submitted by : Bhavya Lalchandani
Experiment Date: 02-02-2022
Submission Date : 26-03-2022

Enter the number: 5

The factorial of 5 is 120
PS C:\Users\Bhavya\Desktop\vs code\lab.c\Module1.c>
```

(4) PROGRAM-4 Tower of Hanoi.C

```
#include <stdio.h>
void Tower_of_Hanoi(int, char, char, char);
int pow(int, int);

main()
{
    int n;
    printf("Program to find moves for TOH puzzle \n");
    printf("Submitted by: Bhavya Lalchandani \n");
    printf("Experiment date: 02-02-2022 \n");
    printf("Enter the number of disks: ");
    scanf("%d", &n); //input for no of disks
    Tower_of_Hanoi(n, 'S', 'A', 'D');
    printf("Total no. of disks moves := %d", pow(2, n-1));
}

// This function prints the required moves of disks

Void Tower_of_Hanoi(int n, char S, char A, char D)
{
    if(n==1)
    {
        printf("Move disk from %c to %c \n", S, D);
        return;
    }
    else
    {
      To Tower_of_Hanoi(n-1, S, D, A);
        printf("Move disk from %c to %c \n", S, D);
    }
}
```

```
int pow(int x, int y)
{
    int res = 1;
    for(int i=1; i<=y; i++)
    {
        res = res* x;
    }
    return res;
}
```

PROBLEMS DEBUG CONSOLE TERMINAL

TERMINAL

```
Program to find moves for Tower of Hanoi puzzle using recursion
Subitted by: Bhavya Lalchandani
Experiment Date: 02-02-2022
Submission Date: 26-03-2022
Enter the number of disks: 3
Move disk from S to D
Move disk from S to A
Move disk from D to A
Move disk from S to D
Move disk from A to S
Move disk from A to D
Move disk from S to D
Total no of disks moves:= 7
PS C:\Users\Bhavya\Desktop\vs code\lab.c\Module1.c>
```

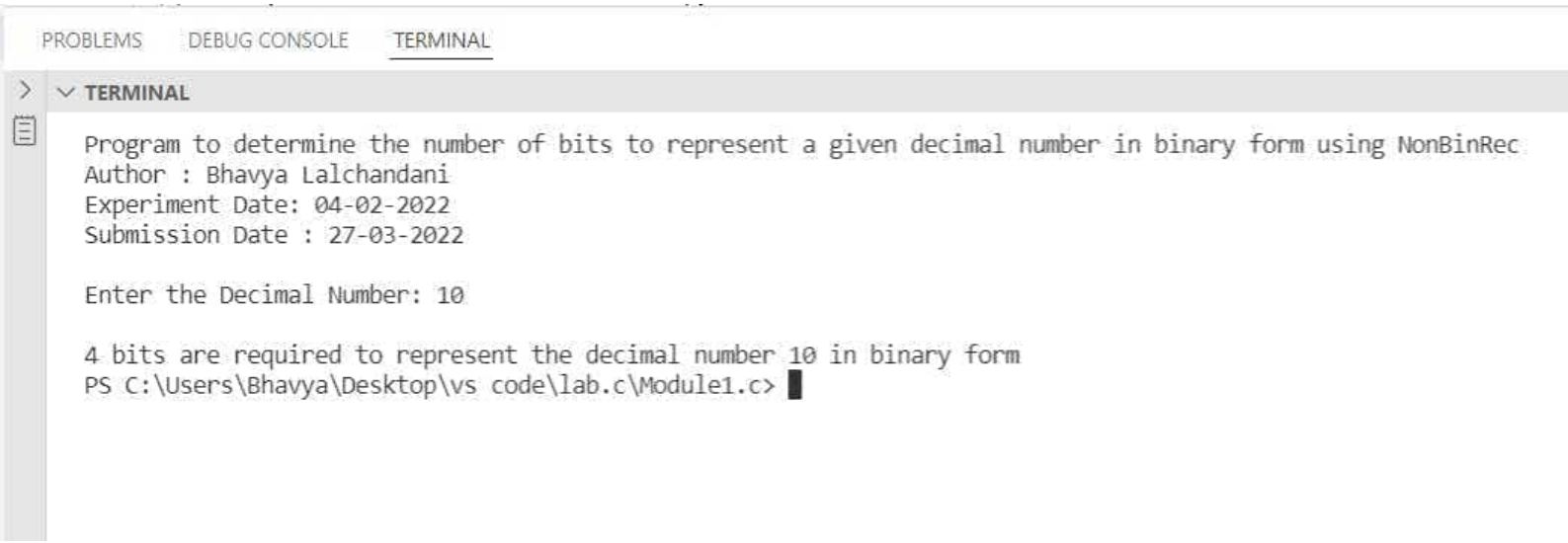
⑤ BinNonRec.c

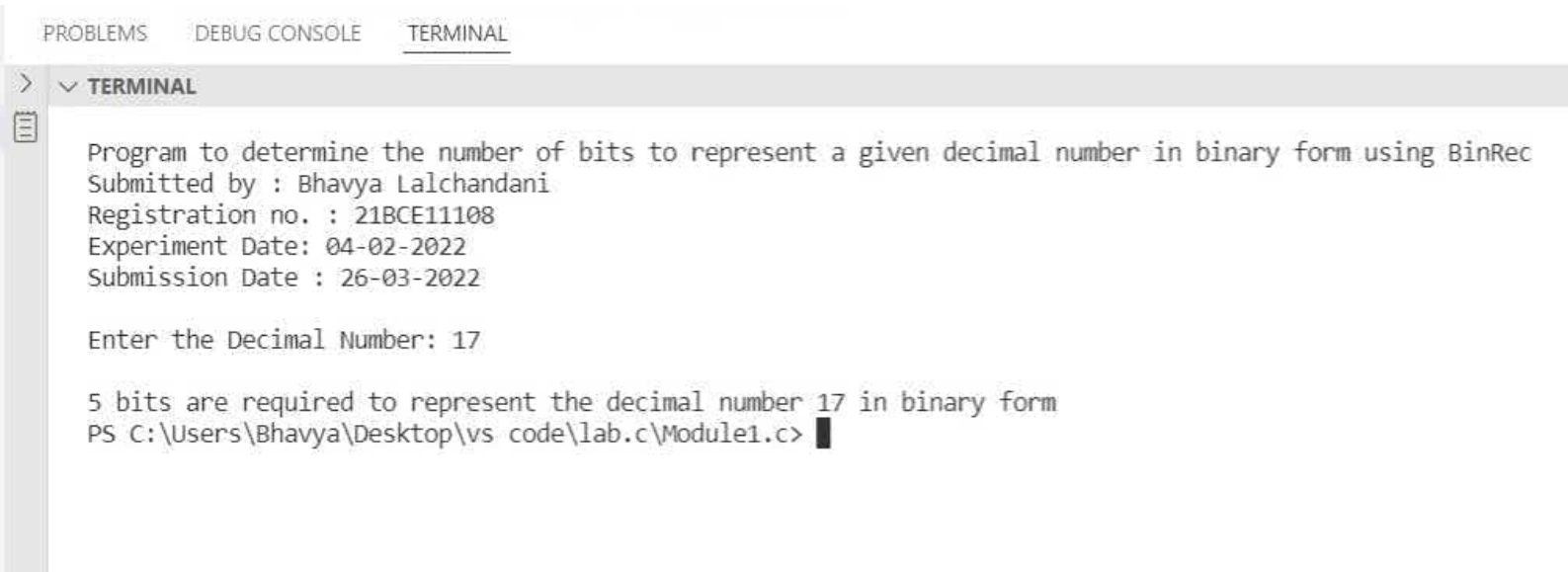
```
#include <stdio.h>

int NonBinRec(int);

main()
{
    printf("Program to determine no. of bits to
            represent a given decimal no. in
            binary form using NonBinRec\n");

    printf("Author : Dr Paras Jain \n");

    printf("Experiment date : 04-02-2022 \n");

    printf("Submission date : 26-03-2022 \n");

    int n, bits;
    printf("Enter the decimal number : ");
    scanf("%d", &n);
    bits = NonBinRec(n);
    printf("\n %d bits are required to represent
            the decimal number %d in binary
            form", bits, n);

int NonBinRec(int n)
```

```
{
int count=1;
while (n>1)
{
count= count+1;
n= n/2
}
return count;
}
```

(6) PROGRAM - 6 BinRec.C

```
#include <stdio.h>
int BinRec(int);
main();
{
printf("Program to determine the number of bits
to represent a given decimal in binary form");
printf("Submitted by: Bhavya Balchandani");
printf("Experiment date : 04-02-2022");
printf("submission date : 26-03-2022");
int n, bits;
printf("Enter the decimal Number");
scanf("%d", &n)
bits = BinRec(n);
printf("\n %d bits required to represent decimal
no. %d in binary form", bits, n);
}
int BinRec(int n)
{
if(n==1 || n==0)
{
return 1;
}
```


PROBLEMS
DEBUG CONSOLE
TERMINAL
TERMINAL
Program to determine the number of bits to represent a given decimal number in binary form using NonBinRec
Author : Bhavya Lalchandani
Experiment Date: 04-02-2022
Submission Date : 27-03-2022
Enter the Decimal Number: 10
4 bits are required to represent the decimal number 10 in binary form
PS C:\Users\Bhavya\Desktop\vs code\lab.c\Module1.c>


PROBLEMS
DEBUG CONSOLE
TERMINAL
TERMINAL
Program to determine the number of bits to represent a given decimal number in binary form using BinRec
Submitted by : Bhavya Lalchandani
Registration no. : 21BCE11108
Experiment Date: 04-02-2022
Submission Date : 26-03-2022
Enter the Decimal Number: 17
5 bits are required to represent the decimal number 17 in binary form
PS C:\Users\Bhavya\Desktop\vs code\lab.c\Module1.c>

(7) PROGRAM - 7 Rec Max Element.c

```
#include <stdio.h>
int RecMaxElement (int [], int );
int max(int, int);

main()
{
    printf(" Program to find largest Element \n");
    printf(" submitted by: Bhavya Malchandani \n");
    printf(" Experiment date: 04-02-2022 \n ");
    printf(" Submission date : 26-03-2022 \n\n");

    int A[50], n, i, maxVal;
    printf(" Enter the Array Size: ");
    scanf(" %d ", &n)
    printf(" Enter the Array elements: ");
```

```
for (i=0; i<=n-1; i++)
{
    printf("Enter the element numbered:", i+1);
    scanf("%d", &[A][i]);
}
printf("\n The elements entered for Array: \n");
printf("[");
for (i=0; i<=n-1; i++)
{
    printf("Enter %d", A[i]);
}
printf("]")
maxval = RecMaxElement(A, n);
printf("\n\n The largest element in Array is %d" maxval);
}
```

// The function RecMaxElement finds largest element in a given input Array of n size by Recursion

```
int RecMaxElement(int A[], int n)
{
    if(n==1)
    {
        return A[0];
    }
    else
    {
        re return max(RecMaxElement(A, n-1), A[n-1]);
    }
}
```

PROBLEMS DEBUG CONSOLE TERMINAL

TERMINAL

```
Program to find Largest element in the given Array using Recusrsion
Submitted by : Bhavya Lalchandani
Experiment Date: 04-02-2022
Submission Date: 26-03-2022

Enter the Array Size: 5

Enter the Array Elements:
Enter element number 1: 3
Enter element number 2: 5
Enter element number 3: 7
Enter element number 4: 9
Enter element number 5: 1

The elements entered for the array are:
[ 3 5 7 9 1 ]
```

(8) PROGRAM - 8 MaxElement.C

```
#include <stdio.h>
int MaxElement (int [], int);
main ()
{
    printf (" Program to find largest element in array \n");
    printf (" Project by : Bhavya Lalchandani \n");
    printf (" Experiment date : 04-02-2022");
    printf (" Submission date : 26-03-2022");
    int A[50], n, i, maxval;

    printf ("Enter the Array Size");
    scanf ("%d", &n);
    printf ("Enter Array Elements : \n");
    for (i=0; i<=n-1; i++)
    {
        printf (" Enter the element number %d : ", i+1);
        scanf ("%d", &A[i]);
    }
    printf ("\n The elements entered for the array are \n");
    printf (" [ ");
    for (i=0, i<=n-1; i++)
    {
        printf ("%d", A[i]);
    }
    printf (" ] ");
    max val = MaxElement (A, n);
    printf ("\n\n The largest element in Array is %d "
                                        , maxval);
}
```

```
int MaxElement(int A[], int n)
{
    int maxval, i;
    maxval = A[0];
    for(i = 1; i<= n-1; i++)
    {
        ~~int max~~
        if(A[i] >= maxval
        {
            maxval = A[i];
        }
    }
    return maxval;
}
```

PROBLEMS DEBUG CONSOLE TERMINAL

TERMINAL

```
Program to find Largest element in the given Array
Submitted by : Bhavya Lalchandani
Experiment Date: 04-02-2022
Submission Date : 27-03-22

Enter the Array Size: 5

Enter the Array Elements:
Enter element number 1: 21
Enter element number 2: 2
Enter element number 3: 35
Enter element number 4: 4
Enter element number 5: 17

The elements entered for the array are:
[ 21 2 35 4 17 ]

 The largest element in the given Array is 35
PS C:\Users\Bhavya\Desktop\vs code\lab.c\Module1.c>
```

* PROGRAM - 9 Unique Elements.c

```
#include <stdio.h>
int UniqueElements(int [], int);

main()
{
    printf("Program to find if elements are unique \n");
    printf("Submitted by: Bhavya Lalchandani"\n);
    printf("Experiment date: 04-02-2022 \n\n");
    int A[50], n, i, flag;

    printf("Enter the Array size: ");
    scanf("%d", &n);
    printf("\n Enter the array elements: \n");
    for (i=0; i<=n-1; i++)
    {
        printf("Enter the element no. %d: ", i+1);
        scanf("%d", &A[i]);
    }
```

```
printf("\n The elements entered in the array are: \n");
printf("[");
for(i=0; i<=n-1; i++)
{
    printf("%d", A[i]);
}
printf("]\n")
flag = UniqueElements(A,n);
if(flag == 1)
printf("\n The elements in array are unique");
else
printf("\n The elements in array arent unique");
}

int UniqueElements(int A[], int n)
{
    int i,j;
    for(i=0; i<=n-2; i++)
    {
        for(j=0; j<=n-1; j++)
        {
            if(A[i] == A[j])
            return 0;
        }
    }
    return 1;
}
```

PROBLEMS DEBUG CONSOLE TERMINAL

TERMINAL

```
Program to find Largest element in the given Array
Submitted by: Bhavya Lalchandani
Experiment Date: 04-02-2022
Submission Date: 26-03-2022

Enter the Array Size: 4

Enter the Array Elements:
Enter element number 1: 1
Enter element number 2: 2
Enter element number 3: 3
Enter element number 4: 4

The elements entered for the array are:
[ 1 2 3 4 ]

The elements in given array are unique
PS C:\Users\Bhavya\Desktop\vs code\lab.c\Module1.c>
```

10 PROGRAM - 10 MatrixMul.c

```c
#include <stdio.h>
void  MatrixMul (int [ ][20] , int[][20], int);
void  printArray(int A[][20] , int n) ;

main()
 {
    int A [20][20] , B[20][20], n, i, j;
    printf(" Program for multiplication of 2 matrices \n");
    printf(" Submitted by : Bhavya Lalchandani \n");
    printf(" Experiment date : 04-02-2022);
    printf(" Submission date : 26-03-2022 );
    printf(" - - - - - - - - - - - - - - - - ");
    printf(" \n Enter the Matrix dimension :  ");
    scanf(" %d" , &n) ;
    printf(" /n /n);
    for (i=0, i<=n-1 ; i++)
    {
        for (j=0 ; j<=n-1 ; j++)
        {
            printf("Enter the input for A[%d][%d]: ",i,j);
            scanf(" %d", &A[i][j]);
        }
    }
    print f(" \n");
    print f(" The input Matrix A of  %d * %d is : \n",n,n);
    printArray (A, n) ;
    printf (" \n");

    printf("\n The input Matrix B of  %d* %d is : \n", n, n);
    printArray (B, n);
    printf (" \n");
    Matrix Mul (A, B, n);
}
```

```
// This function computes multiplication of input
   matrices A and B
void MatrixMul (int A[][20], int B[][20], int n)
{
    int C[20][20], i, j, k;
    for (i=0; i<=n-1; i++)
    {
        for (j=0; j<=n-1; j++)
        {
            C[i][j] = 0;
            for (k=0; k<=n-1; k++)
            {
                C[i][j] = C[i][j] + A[i][j] * B[i][j];
            }
        }
    }
    printf (" The output C = A * B is as follows: \n")
    print Array (C, n);
}

// This function prints element in Matrix
   void printArray (int A[][20], int n)
{
    int i, j;
    for (i=0; i<=n-1; i++)
    {
        for (j=0; j<=n-1; j++)
        {
            printf ("%d ", A[i][j]);
            print f (" ");
        }
    }
}
```

PROBLEMS DEBUG CONSOLE TERMINAL

TERMINAL

```
Program for multiplication of two matrices A and B with dimnesions n*n
Submitted by : Bhavya Lalchandani
Experiment Date : 04-02-2022
Submission Date : 27-02-2022
-----------------------------------------------------------------------------------------------------------
Enter the matrix dimension : 2


Enter the input for A[0][0]: 1
Enter the input for A[0][1]: 2
Enter the input for A[1][0]: 3
Enter the input for A[1][1]: 4

Enter the input for B[0][0]: 4
Enter the input for B[0][1]: 3
Enter the input for B[1][0]: 2
Enter the input for B[1][1]: 1

The input matrix A of 2 * 2 dimensions is as follows:
1 2
3 4


The input matrix B of 2 * 2 dimensions is as follows:
4 3
2 1


The output matrix C = A * B is as follows:
8 5
20 13
PS C:\Users\Bhavya\Desktop\vs code\lab.c\Module1.c>
```