ASSIGNMENT 1:

NAME: Ujjwal Pant
ROLL NUMBER: 1024030370

QUE1: Develop a Menu driven program to demonstrate the following operations of Arrays

——MENU——-

1.CREATE   2.DISPLAY   3.INSERT   4.DELETE   5.LINEAR SEARCH   6.EXIT

```cpp
#include<bits/stdc++.h>
using namespace std;

void userinput(int arr[], int size){
    for ( int i =0 ; i<size; i++){
        cout <<"enter the "<< i+1 << "  element "<<endl;
            cin >> arr[i];
    }
}

void display(int arr[], int size ){
    int i =0;
    while ( i < size   ){
        cout << arr[i]<<" ";
        i++;
    }
    cout<<endl;
}

void insert(int arr[], int& size , int value , int index){
    size +=1;          // increasing size of array

    for ( int i = size-1 ; i>= index ; i-- ){
        arr[i+1] = arr[i];
    }
    arr[index]= value ;
}

void remove(int arr[], int& size , int index){
    for ( int i = index ; i< size ; i++ ){
        arr[i] = arr[i+1];
    }
    size -=1;
}

void  linearsearch(int arr[], int size , int value) {
    for (int i =0; i<size; i++){
        if(arr[i]==value){
            cout<<" element is present"<<endl;
            return;
        }
    }
    cout<<"element not present"<<endl;
}

int main(){
    int size = 0;
    int array[100];
    int choice;

    while(choice != 6){
        cout<<"\n---MENU---"<<endl;
```

```cpp
int main(){
    int size = 0;
    int array[100];
    int choice;

    while(choice != 6){
        cout<<"\n---MENU---"<<endl;
        cout<<"1.CREATE"<<endl;
        cout<<"2.DISPLAY"<<endl;
        cout<<"3.INSERT"<<endl;
        cout<<"4.DELETE"<<endl;
        cout<<"5.LINEAR SEARCH"<<endl;
        cout<<"6.EXIT"<<endl;
        cout<<"Enter your choice: ";
        cin >> choice;

        if(choice == 1){
            cout<<"enter the number of elements in array"<<endl;
            cin >> size;
            userinput ( array , size ) ;
            display ( array , size ) ;
        }
        else if(choice == 2){
            display ( array , size ) ;
        }
        else if(choice == 3){
            cout <<"enter the value to be insterted "<< endl;
            int value ;
            cin >> value ;
            cout <<"enter the index to be insterted "<< endl;
            int indexval;
            cin>> indexval;
            insert ( array , size , value , indexval);
            display ( array , size );
        }
        else if(choice == 4){
            cout <<"enter the index to be deleted "<< endl;
            int indexval;
            cin>> indexval;

            remove ( array , size ,   indexval);
            display ( array , size );
        }
        else if(choice == 5){
            cout <<"enter the value to be searched "<< endl;
            int value;
            cin>> value;
            linearsearch(array, size , value);
        }

    }
    return 0;
```

QUE2: Design the logic to remove the duplicate elements from an Array and after the
deletion the array should contain the unique elements.

```cpp
1    #include<bits/stdc++.h>
2    using namespace std;
3    void removeduplicate(int arr[], int size , int& res){
4
5        sort(arr,arr + size);
6        int i= 1;
7        while(i<size){
8            if(arr[i]!=arr[res-1]){
9                arr[res]=arr[i];
10               res++;
11           }
12           i++;
13       }
14   }
15   int main(){
16       int array[9]={1,1,2,3,3,4,4,6,6};
17       int res =1;
18       removeduplicate(array , 9, res);
19
20       for( int i =0; i<res; i++){
21           cout <<array[i]<<" ";
22       }
23       return 0;
24   }
```

QUE3: Predict the Output of the following program

```c
int main()
{
int i;
int arr[5] = {1};
for (i = 0; i < 5; i++)
printf("%d",arr[i]);
return 0;
}
```

SOL: {1,0,0,0,0}

QUE4: Implement the logic to
a. Reverse the elements of an array
b. Find the matrix multiplication
c. Find the Transpose of a Matrix

a)

```cpp
1   #include<bits/stdc++.h>
2   using namespace std;
3
4   void display (int arr[] , int size){
5       for (int i = 0; i<size ; i++){
6           cout << arr[i]<<" ";
7       }
8       cout<<endl;
9   }
10
11  void reverse(int arr[], int size){
12      int i =0;
13      int j = size -1;
14      while( i <= j){
15          swap(arr[i], arr[j]);
16          i++;
17          j--;
18
19      }
20  }
21
22
23
24  int main(){
25      cout <<"Array before reversing is "<< endl;
26      int arr[7] = { 1, 2 , 3 , 4, 5 ,6 , 7};
27      display(arr , 7);
28      cout <<"Array after reversing is "<< endl;
29      reverse(arr , 7);
30      display(arr , 7);
31      return 0;
32  }
```

b)

```cpp
#include <bits/stdc++.h>
using namespace std;

int main() {
    int m1[10][10], m2[10][10], m3[10][10];
    int r1, c1, r2, c2, i, j, k;
    cout << "Enter rows and cols of first: ";
    cin >> r1 >> c1;
    cout << "Enter rows and cols of second: ";
    cin >> r2 >> c2;
    if (c1 != r2) {
        cout << "Not possible!"<<endl;
        return 0;
    }
    cout << "Matrix1:"<<endl;
    for (i = 0; i < r1; i++) {
        for (j = 0; j < c1; j++) {
            cin >> m1[i][j];
        }
    }
    cout << "Matrix2:"<<endl;
    for (i = 0; i < r2; i++) {
        for (j = 0; j < c2; j++) {
            cin >> m2[i][j];
        }
    }
    for (i = 0; i < r1; i++) {
        for (j = 0; j < c2; j++) {
            m3[i][j] = 0;
            for (k = 0; k < c1; k++) {
                m3[i][j] += m1[i][k] * m2[k][j];
            }
        }
    }
    cout << "Result:"<<endl;
    for (i = 0; i < r1; i++) {
        for (j = 0; j < c2; j++) {
            cout << m3[i][j] << " ";
        }
        cout << "\n";
    }
    return 0;
}
```

c)

```cpp
#include <bits/stdc++.h>
using namespace std;

int main() {
    int x[10][10], y[10][10];
    int r, c, i, j;
    cout << "Enter rows and cols: ";
    cin >> r >> c;
    cout << "Matrix:"<<endl;
    for (i = 0; i < r; i++) {
        for (j = 0; j < c; j++) {
            cin >> x[i][j];
        }
    }
    for (i = 0; i < r; i++) {
        for (j = 0; j < c; j++) {
            y[j][i] = x[i][j];
        }
    }
    cout << "Transpose:"<<endl;
    for (i = 0; i < c; i++) {
        for (j = 0; j < r; j++) {
            cout << y[i][j] << " ";
        }
        cout << "\n";
    }
    return 0;
}
```

QUE5: Write a program to find sum of every row and every column in a two-dimensional Array.

```cpp
1   #include <bits/stdc++.h>
2   using namespace std;
3   int main() {
4       int arr[10][10];
5       int rows, cols;
6       int i, j;
7       int sumrow, sumcol;
8       cout << "Enter rows and columns: ";
9       cin >> rows >> cols;
10      cout << "Enter the elements:"<<endl;
11      for (i = 0; i < rows; i++) {
12          for (j = 0; j < cols; j++) {
13              cin >> arr[i][j];
14          }
15      }
16      for (i = 0; i < rows; i++) {
17          sumrow = 0; // reset for each row
18          for (j = 0; j < cols; j++) {
19              sumrow = sumrow + arr[i][j];
20          }
21          cout << "Sum of row " << i << " = " << sumrow << endl;
22      }
23
24      for (j = 0; j < cols; j++) {
25          sumcol = 0; // reset for each column
26          for (i = 0; i < rows; i++) {
27              sumcol = sumcol + arr[i][j];
28          }
29          cout << "Sum of column " << j << " = " << sumcol << endl;
30      }
31      return 0;}
32
```