**ASSIGNMENT 2**

**QUESTION 1**

//binary search of a sorted array

#include<bits/stdc++.h>

using namespace std;

int main(){

    int n;

    cout<<"enter no of elements in an array: ";

    cin>>n;

    int arr[n];

    cout<<"enter the elements of array:";

    for(int i=0;i<n;i++){

        cin>>arr[i];

    }

    int target;

    cout<<"element to be found: ";

    cin>>target;

    //binary search

    int low=0;

    int high=n-1;

    int mid;

    while(low<=high){

        mid=(low+high)/2;

        if(arr[mid]==target){

            cout<<"element found at position : "<<mid+1<<endl;

            break;

        }

        else if(arr[mid]>target){

            high=mid-1;

        }

        else low=mid+1;

    }

    return 0;

}

//linear search

#include<bits/stdc++.h>

using namespace std;

int main(){

    int n;

    cout<<"enter no of elements in an array: ";

    cin>>n;

    int arr[n];

    cout<<"enter the elements of array:";

    for(int i=0;i<n;i++){

        cin>>arr[i];

    }

    int target;

    cout<<"element to be found: ";

    cin>>target;

    //linear search

    for(int i=0;i<n;i++){

        if(arr[i]==target) {

            cout<<"element found at position : "<<i+1<<endl;

            break;

        }

    }

    return -1;

}

**QUESTION 2**

#include<bits/stdc++.h>

using namespace std;

int main(){

    int n;

    cout<<"enter no of elements in an array: ";

    cin>>n;

    int arr[n];

    cout<<"enter the elements of array:";

    for(int i=0;i<n;i++){

        cin>>arr[i];

    }

    for(int i=0;i<n;i++){

        for(int j=1;j<n;j++){

        if(arr[j]<arr[j-1]){

            int temp=arr[j];

             arr[j]=arr[j-1];

            arr[j-1]=temp;

        }

        }

    }

    cout<<"the sorted array is ";

    for(int i=0;i<n;i++){

        cout<<arr[i]<<endl;

    }

    return 0;

}

**QUESTION 3**

#include<bits/stdc++.h>

using namespace std;

int missingnumber( vector<int> &arr, int n){

    for(int i=1;i<n;i++){

        if((arr[i]-arr[i-1])!=1){

            return i+1;

        }

    }

    return -1;

}

int main(){

    int n;

    cout<<"enter no of elements in an array: ";

    cin>>n;

    vector<int> arr(n);

    cout<<"enter elements of the array: ";

    for(int i=0;i<n;i++){

        cin>>arr[i];

    }

   int ans= missingnumber( arr, n);

    if(ans==-1) cout<<"no missing number found";

    else cout<<"the missing number is:"<<ans;

    return 0;

}

**QUESTION 4(a)**

#include<bits/stdc++.h>

using namespace std;

int main(){

    char str1[100], str2[100];

    cout<<"enter the first string: ";

    cin.getline(str1,100);

     cout<<"enter the second string: ";

    cin.getline(str2,100);

    int i=0;

    while(str1[i]!='\0'){

        i++;

    }

    int j=0;

    while(str2[j]!='\0'){

        str1[i]=str2[j];

        i++;

        j++;

    }

    str1[i] = '\0';

    cout << "Concatenated string: " << str1 << endl;

    return 0;

}

**4(b)**

#include<bits/stdc++.h>

using namespace std;

int main(){

    char str[100];

    cout<<"enter the first string: ";

    cin.getline(str,100);

    int low=0;

    int high=strlen(str)-1;

    while(low<=high){

        int temp=str[low];

        str[low]=str[high];

        str[high]=temp;

        low++;

        high--;

    }

    cout<<"the reverse string is: ";

    cout<<str<<endl;

    return 0;

}

**4(c)**

#include <iostream>

using namespace std;

int main() {

    string str;

    cout << "Enter a string: ";

    getline(cin, str);

    string result;

    for(char ch : str) {

        char lower = tolower(ch);

        if(lower != 'a' && lower != 'e' && lower != 'i' && lower != 'o' && lower != 'u') {

            result += ch;

        }

    }

    cout << "String after removing vowels: " << result << endl;

    return 0;

}

**4(d)**

#include <iostream>

using namespace std;

int main() {

    char ch;

    cout << "Enter a character: ";

    cin >> ch;

    if(ch >= 'A' && ch <= 'Z') {

        ch = ch + 32;

    }

    cout << "Lowercase character: " << ch << endl;

    return 0;

}

**QUESTION 5(a)**

//converting matrix to diagonal matrix

#include<iostream>

using namespace std;

int main(){

    int n;

    cout<<"enter the size of matrix: ";

    cin>>n;

    int arr[n];

    cout<<"enter diagonal elements: ";

    for(int i=0;i<n;i++){

        cin>>arr[i];

    }

    for(int i=0;i<n;i++){

        for(int j=0;j<n;j++){

            if(i==j) cout<<arr[i]<<" ";

            else cout<<"0"<<endl;

        }

        cout<<endl;

    }

    return 0;

}

**5(B)**

#include <iostream>

using namespace std;

int main() {

int n;

cout << "Enter size of tri-diagonal matrix: ";

cin >> n;

int arr[3\*n - 2];

cout << "Enter elements of tri-diagonal matrix: ";

int k = 0;

for (int i = 0; i < n; i++) {

for (int j = 0; j < n; j++) {

if (i - j <= 1 && j - i <= 1) {

cin >> arr[k++];

} else {

int temp;

cin >> temp;

}

}

}

k = 0;

cout << "Matrix form: ";

for (int i = 0; i < n; i++) {

for (int j = 0; j < n; j++) {

if (i - j <= 1 && j - i <= 1)

cout << arr[k++] << " ";

else

cout << "0 ";

}

cout << endl;

}

return 0;

}

**5(c)**

#include <iostream>

using namespace std;

int main() {

int n;

cout << "Enter size of lower triangular matrix: ";

cin >> n;

int arr[n\*(n+1)/2];

cout << "Enter elements row-wise: ";

int k = 0;

for(int i = 0; i < n; i++)

for(int j = 0; j <= i; j++)

cin >> arr[k++];

k = 0;

for(int i = 0; i < n; i++){

for(int j = 0; j < n; j++){

if(j <= i)

cout << arr[k++] << " ";

else

cout << "0 ";

}

cout << endl;

}

return 0;

}

**5(d)**

#include <iostream>

using namespace std;

int main() {

int n;

cout << "Enter size of upper triangular matrix: ";

cin >> n;

int arr[n\*(n+1)/2];

cout << "Enter elements row-wise: ";

int k = 0;

for(int i = 0; i < n; i++)

for(int j = i; j < n; j++)

cin >> arr[k++];

k = 0;

for(int i = 0; i < n; i++){

for(int j = 0; j < n; j++){

if(j >= i)

cout << arr[k++] << " ";

else

cout << "0 ";

}

cout << endl;

}

return 0;

}

**5(e)**

#include <iostream>

using namespace std;

int main() {

int n;

cout << "Enter size of symmetric matrix: ";

cin >> n;

int arr[n\*(n+1)/2];

cout << "Enter elements of lower triangular part row-wise: ";

int k = 0;

for(int i = 0; i < n; i++)

for(int j = 0; j <= i; j++)

cin >> arr[k++];

k = 0;

for(int i = 0; i < n; i++){

for(int j = 0; j < n; j++){

if(j <= i)

cout << arr[i\*(i+1)/2 + j] << " ";

else

cout << arr[j\*(j+1)/2 + i] << " ";

}

cout << endl;

}

return 0;

}

**QUESTION 8**

#include<bits/stdc++.h>

using namespace std;

int distinctElements( vector<int> &arr, int n){

    set<int> st;

    for(int i=0;i<n;i++){

        st.insert(arr[i]);

    }

    cout<<"the no of distinct elements are: ";

    return st.size();

}

int main(){

int n;

cout<<"enter the no of elements: ";

cin>>n;

vector<int> arr(n);

cout<<"enter the elemetns: ";

for(int i=0;i<n;i++){

    cin>>arr[i];

}

cout<<distinctElements( arr, n);

return 0;

}