**ASSIGNMENT 2**

Q1 #include <iostream>

using namespace std;

int main()

{

int n;

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

cin>>n;

int arr[n];

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

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

cin>>arr[i];

}

cout<<endl;

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

cout<< " "<<arr[i];

}

int start=0;

int end=n-1;

int ele;

cout<<endl<<"enter the element you want to search";

cin>>ele;

int found=0;

while(start <= end) {

int middle = (start + end) / 2;

if(arr[middle] == ele) {

cout << "\nFound the element!";

cout << "\nIndex = " << middle;

found=1;

break;

}

else if(arr[middle] < ele) {

start = middle + 1;

}

else {

end = middle - 1;

}

}

if(!found){

cout<<"element not found"}

return 0;

}

Q2 #include <iostream>

using namespace std;

int main()

{

int arr[7]={ 64,34,25,12,22,11,90};

for (int i=0;i<6;i++){

bool flag=true;

for(int j=0;j<6-i;j++){

if(arr[j]>arr[j+1]){

int temp=arr[j];

arr[j]=arr[j+1];

arr[j+1]=temp;

flag =false;

}

}

if(flag==true) break;

}

for(int i=0;i<7;i++){

cout<<" "<<arr[i];

}

return 0;

}

Q3 (a) #include <iostream>

using namespace std;

int main()

{

int n;

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

cin>>n;

int arr[n];

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

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

cin>>arr[i];

}

cout<<endl;

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

cout<< " "<<arr[i];

}

for(int i=1;i<n;i++){

bool flag=0;

for(int j=0;j<n-1;j++){

if(arr[j]==i){

flag=1;

break;

}

}

if(flag==0){

cout<<endl;

cout<<"missing no is:"<<i;

}

}

return 0;

}

(b) #include <iostream>

using namespace std;

int main()

{

int n;

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

cin>>n;

int arr[n];

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

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

cin>>arr[i];

}

cout<<endl;

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

cout<< " "<<arr[i];

}

int start=0;

int end=n-2;

while(start<=end){

int middle=(start+end)/2;

if(arr[middle]==middle+1){

start=middle+1;}

if(arr[middle]!=middle+1){

end=middle-1;

}

}

cout<< endl<<start+1;

return 0;

}

Q4 (a)

#include <iostream>

using namespace std;

int main()

{

char str1[100],str2[50];

cout << "Enter first string: ";

cin.getline(str1, 100);

cout << "Enter second string: ";

cin.getline(str2, 50);

int i=0;

while( str1[i] !='\0'){

i++;

}

int j=0;

while (str2[j]!='\0'){

str1[i]=str2[j];

i++;

j++;

}

str1[i]='\0';

int k=0;

while(str1[k]!='\0'){

cout<<str1[k];

k++;

}

return 0;

}

(b)

#include <iostream>

using namespace std;

int main()

{

char str1[100];

cout << "Enter first string: ";

cin.getline(str1, 100);

int len=0;

while(str1[len]!='\0'){

len++;

}

for(int i=0,k=len-1;i<=k;i++,k--){

char temp=str1[i];

str1[i]=str1[k];

str1[k]=temp;

}

int j=0;

while(str1[j]!='\0'){

cout<<str1[j];

j++;

}

return 0;}

(c)

#include <iostream>

#include <cctype>

using namespace std;

int main() {

char str1[100];

cout << "Enter string: ";

cin.getline(str1, 100);

int i = 0;

for (int j = 0; str1[j] != '\0'; j++) {

char ch = tolower(str1[j]);

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

str1[i] = str1[j];

i++;

}

}

str1[i] = '\0';

cout << "String without vowels: " << str1 << endl;

return 0;

}

(d)

#include <iostream>

#include<cstring>

using namespace std;

int main() {

char str1[100];

cout << "Enter string: ";

cin.getline(str1, 100);

int len=strlen(str1);

for(int i=0; i<len-1; i++) {

for(int j=0; j<len-1-i; j++) {

if(str1[j] > str1[j+1]) {

char temp = str1[j];

str1[j] = str1[j+1];

str1[j+1] = temp;

}

}

}

cout << "String: " << str1 << endl;

return 0;

}

(e)

#include <iostream>

using namespace std;

int main() {

char str1[100];

cout << "Enter string: ";

cin.getline(str1, 100);

for(int j=0; str1[j]!='\0';j++){

if(str1[j]>='A'&& str1[j]<='Z'){

str1[j]=str1[j]+32;

}

}

cout << "String without vowels: " << str1 << endl;

return 0;

}

Q5

(a)

#include <iostream>

using namespace std;

int main()

{

int arr[]={3,5,7};

int n=3, i, j;

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

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

if(i==j){

cout<<arr[i]<<" ";

}

else {

cout<<"0 ";

}

}

cout<<endl;

}

return 0;

}

(b)

#include <iostream>

using namespace std;

int main()

{

int arr[]={5,6,7,1,2,3,4,8,9,10};

int n=4;

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

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

if(i==j){

cout<<arr[n-1+i];

}

else

if( j==i+1){

cout<<arr[j];

}

else

if( i==j+1){

cout<<arr[2\*n-1+1];

}

else

cout<<"0";

}

cout<<endl;

}

return 0;

}

©

#include <iostream>

using namespace std;

int main()

{

int arr[]={5,6,7,1,2,3,4,8,9,10};

int n=4;

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

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

int sum=(i\*(i+1))/2;

if(i>=j){

cout<<arr[sum+j];

}

else

cout<<"0";

}

cout<<endl;

}

return 0;

}

(d)

#include <iostream>

using namespace std;

int main()

{

int arr[]={1,2,3,4,5,6,7,8,9,10};

int n=4;

int m=4;

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

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

int sum=(i)\*(2\*m-i+1)/2;

if(i<=j){

cout<<arr[sum+(j-i)];

}

else

cout<<"0";

}

cout<<endl;

}

return 0;

}

(e)

#include <iostream>

using namespace std;

int main()

{

int arr[]={1,2,3,4,5,6,7,8,9,10};

int n=4;

int m=4;

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

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

int sum=(i\*(i+1))/2;

if(i<=j){

cout<<arr[sum+j];

}

else{

int s1=(j\*(j+1))/2;

cout<<arr[s1+i];}

}

cout<<endl;

}

return 0;

}

Q6

(a)

#include <iostream>

using namespace std;

int main()

{

int s[10][3] = {

{3, 3, 4},

{0, 0, 1},

{0, 2, 2},

{1, 1, 3},

{2, 2, 4}

};

int trans [100][3];

int k=1;

for(int i=0;i<s[0][1];i++){

for(int j=1;j<=s[0][2];j++){

if(s[j][1]==i){

trans[k][0]=s[j][1];

trans[k][1]=s[j][0];

trans[k][2]=s[j][2];

k++;

}

}

}

trans[0][0]=5;

trans[0][1]=3;

trans[0][2]=k-1;

cout<<trans[0][0]<<" ";

cout<<trans[0][1]<<" ";

cout<<trans[0][2]<<" ";

cout<<endl;

for(int i=1;i<k-1;i++){

for(int j=0;j<3;j++){

cout<<trans[i][j]<<" ";

}

cout<<endl;

}

return 0;

}

(b)

#include <iostream>

using namespace std;

int main() {

int A[10][3] = {

{3, 3, 4},

{0, 0, 1},

{0, 2, 2},

{1, 1, 3},

{2, 2, 4}

};

int B[10][3] = {

{3, 3, 3},

{0, 0, 5},

{1, 2, 6},

{2, 2, 7}

};

int C[20][3];

int i=1, j=1, k=1;

C[0][0] = A[0][0];

C[0][1] = A[0][1];

while(i <= A[0][2] && j <= B[0][2]) {

if(A[i][0] < B[j][0] || (A[i][0] == B[j][0] && A[i][1] < B[j][1])) {

// Copy A element

C[k][0] = A[i][0];

C[k][1] = A[i][1];

C[k][2] = A[i][2];

i++; k++;

}

else if(B[j][0] < A[i][0] || (B[j][0] == A[i][0] && B[j][1] < A[i][1])) {

// Copy B element

C[k][0] = B[j][0];

C[k][1] = B[j][1];

C[k][2] = B[j][2];

j++; k++;

}

else {

// Same row & col -> add values

C[k][0] = A[i][0];

C[k][1] = A[i][1];

C[k][2] = A[i][2] + B[j][2];

i++; j++; k++;

}

}

while(i <= A[0][2]) {

C[k][0] = A[i][0];

C[k][1] = A[i][1];

C[k][2] = A[i][2];

i++; k++;

}

while(j <= B[0][2]) {

C[k][0] = B[j][0];

C[k][1] = B[j][1];

C[k][2] = B[j][2];

j++; k++;

}

C[0][2] = k-1;

cout << "Resultant Sparse Matrix (triplet form):\n";

for(int x=0; x<=C[0][2]; x++) {

cout << C[x][0] << " " << C[x][1] << " " << C[x][2] << endl;

}

return 0;

}

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#include <iostream>

using namespace std;

void multiply\_sparse(int a[20][3], int b[20][3], int c[40][3]) {

if (a[0][1] != b[0][0]) {

cout << "Multiplication not possible!\n";

c[0][2] = 0;

return;

}

c[0][0] = a[0][0];

c[0][1] = b[0][1];

int p = 1;

for (int i = 1; i <= a[0][2]; i++) {

// For each non-zero in B

for (int j = 1; j <= b[0][2]; j++) {

if (a[i][1] == b[j][0]) { // col of A = row of B

int row = a[i][0];

int col = b[j][1];

int val = a[i][2] \* b[j][2];

int flag = 0;

for (int k = 1; k < p; k++) {

if (c[k][0] == row && c[k][1] == col) {

c[k][2] += val;

flag = 1;

break;

}

}

if (!flag) {

c[p][0] = row;

c[p][1] = col;

c[p][2] = val;

p++;

}

}

}

}

c[0][2] = p - 1; // number of non-zero entries

}

void print\_triplet(int m[40][3]) {

cout << "\nTriplet Representation:\n";

for (int i = 0; i <= m[0][2]; i++) {

cout << m[i][0] << " " << m[i][1] << " " << m[i][2] << endl;

}

}

int main() {

// Example input

int a[20][3] = {

{2, 3, 3},

{0, 1, 2},

{1, 0, 3},

{1, 2, 4}

};

int b[20][3] = {

{3, 2, 3},

{0, 0, 1},

{1, 1, 5},

{2, 0, 6}

};

int c[40][3]; // result

cout << "Matrix A:";

print\_triplet(a);

cout << "Matrix B:";

print\_triplet(b);

multiply\_sparse(a, b, c);

cout << "Resultant Matrix C = A x B:";

print\_triplet(c);

return 0;

}

Q7

#include <iostream>

using namespace std;

int main()

{

int n;

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

cin>>n;

int arr[n];

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

cin>>arr[i];

}

cout<<endl;

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

cout<<arr[i]<<endl;

}

int count=0;

for(int i=0;i<n-1;i++){

for(int j=i+1;j<n;j++){

if(arr[j]<arr[i])

{

count++;

}

}

}

cout<<endl<<"no of inversions:" <<count;

return 0;

}

Q8

#include <iostream>

#include<cstring>

using namespace std;

int main() {

int n;

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

cin>>n;

int arr[n];

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

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

cin>>arr[i];

}

cout<<endl;

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

cout<< " "<<arr[i];

}

int i=0;

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

if(arr[j] != arr[i]){

arr[i+1]=arr[j];

i++;

}

}

cout<<endl<<"no of distinct elements:"<<i+1;

return 0;

}