Module 1 Arrays Matrices

1. Program to display array elements in reverse order  
#include<iostream.h>  
void main()  
{  
int i, a[5]={10, 20, 30, 40, 50};  
clrscr();  
for(i=5;i>0;i--)  
cout<<”a[“<<i<<”]=”<<a[i]<<endl;  
}

2. Program on how to create array, store elements into array and display elements from array  
#include<iostream.h>  
#include<conio.h>  
# define max 5  
main()  
{  
int arr[max],i;  
clrscr();  
cout<<"Enter elements into array (maximum 5)";  
for(i=0;i<max;i++)  
cin>>arr[i];  
cout<<"Your one dimensional array is"<<endl;  
for(i=0;i<max;i++)  
cout<<"arr["<<i<<"]="<<arr[i]<<endl);  
getch();  
}

3. Program to store and calculate the sum of 5 numbers entered by the user using arrays #include <iostream> using namespace std; int main() { int numbers[5], sum = 0; cout << "Enter 5 numbers: "; for (int i = 0; i < 5; ++i) { cin >> numbers[i]; sum += numbers[i]; } cout << "Sum = " << sum << endl; return 0; }

4. Program on how to create Two Dimensional Array  
#include<iostream.h>  
#include<conio.h>  
#define row 3  
#define col 3  
main()  
{  
int arr[row][col],i,j;  
clrscr();  
cout<<"Enter values in two dimensional arrays(3 rows, 3 columns) "<<endl;  
for(i=0;i<row;i++)  
for(j=0;j<col;j++)  
cin>>arr[i][j]);  
cout<<"your two dimensional array is<<endl;  
for(i=0;i<row;i++)  
for(j=0;j<col;j++)  
cout<<arr[i][j]<<"\t";  
cout<<endl;  
}  
return 0;  
getch();  
}

5. Program to display all elements of an initialised two dimensional array #include <iostream> using namespace std; int main() { int test[3][2] = { {2, -5}, {4, 0}, {9, 1} }; for(int i = 0; i < 3; ++i) for(int j = 0; j < 2; ++j) cout<< "test[" << i << "][" << j << "] = " << test[i][j] << endl; return 0; }

6. Program to Calculate Average of Numbers Using Arrays #include <iostream> using namespace std; int main() { int n, i; float num[100], sum=0.0, average; cout << "Enter the numbers of data: ";  
cin >> n; while (n > 100 || n <= 0) { cout << "Error! number should in range of (1 to 100)." << endl; cout << "Enter the number again: "; cin >> n; } for(i = 0; i < n; ++i) { cout << i + 1 << ". Enter number: "; cin >> num[i]; sum += num[i]; } average = sum / n; cout << "Average = " << average; return 0; }

7. Program to Display Largest Element of an array #include <iostream> using namespace std; int main() {  
int i, n; float arr[100]; cout << "Enter total number of elements(1 to 100): "; cin >> n; cout << endl; for(i = 0; i < n; ++i) { cout << "Enter Number " << i + 1 << " : "; cin >> arr[i]; } for(i = 1;i < n; ++i) { if(arr[0] < arr[i]) arr[0] = arr[i]; } cout << "Largest element = " << arr[0]; return 0; }

8. Program to Find Transpose of a Matrix #include <iostream> using namespace std; int main() { int a[10][10], trans[10][10], r, c, i, j; cout << "Enter rows and columns of matrix: "; cin >> r >> c; cout << endl << "Enter elements of matrix: " << endl;  
for(i = 0; i < r; ++i) for(j = 0; j < c; ++j) { cout << "Enter elements a" << i + 1 << j + 1 << ": "; cin >> a[i][j]; } cout << endl << "Entered Matrix: " << endl; for(i = 0; i < r; ++i) for(j = 0; j < c; ++j) { cout << " " << a[i][j]; if(j == c - 1) cout << endl << endl; } for(i = 0; i < r; ++i) for(j = 0; j < c; ++j) { trans[j][i]=a[i][j]; } cout << endl << "Transpose of Matrix: " << endl; for(i = 0; i < c; ++i) for(j = 0; j < r; ++j) { cout << " " << trans[i][j]; if(j == r - 1) cout << endl << endl; } return 0; }

9. Program to store temperature of two different cities for a week and display it #include <iostream> using namespace std; const int CITY = 2; const int WEEK = 7; int main() { int temperature[CITY][WEEK]; cout << "Enter all temperature for a week of first city and then second city. \n"; for (int i = 0; i < CITY; ++i) { for(int j = 0; j < WEEK; ++j) { cout <<"City"<< i + 1 << ", Day " << j + 1 << " : "; cin >> temperature[i][j]; } } cout << "\n\nDisplaying Values:\n"; for (int i = 0; i < CITY; ++i)  
for(int j = 0; j < WEEK; ++j) cout << "City " << i + 1 << ", Day " << j + 1 << " = " << temperature[i][j] << endl; return 0; }

10. Program to Store value entered by user in three dimensional array and display it #include <iostream> using namespace std; int main() { int test[2][3][2]; cout << "Enter 12 values: \n"; for(int i = 0; i < 2; ++i) for (int j = 0; j < 3; ++j) for(int k = 0; k < 2; ++k ) cin >> test[i][j][k];  
cout<<"\nDisplaying Value stored:"<<endl; for(int i = 0; i < 2; ++i) for (int j = 0; j < 3; ++j) for(int k = 0; k < 2; ++k) cout << "test[" << i << "][" << j << "][" << k << "] = " << test[i][j][k] << endl; return 0; }

11. Program to reverse the element of an integer 1-D array  
#include<iostream.h> #include<conio.h> void main() { int arr[50], size, i, j, temp; cout<<"Enter array size : "; cin>>size; cout<<"Enter array elements : "; for(i=0; i<size; i++) cin>>arr[i]; j=i-1;  
i=0;  
while(i<j) { temp=arr[i]; arr[i]=arr[j]; arr[j]=temp; i++; j--; } cout<<"Now the Reverse of the Array is : \n"; for(i=0; i<size; i++)  
cout<<arr[i]<<" "; getch(); }

12. Program to Subtract Two Matrices #include<iostream.h> #include<conio.h> void main() { int arr1[3][3], arr2[3][3], arr3[3][3], sub, i, j; cout<<"Enter 3\*3 Array 1 Elements : "; for(i=0; i<3; i++) for(j=0; j<3; j++) cin>>arr1[i][j]; cout<<"Enter 3\*3 Array 2 Elements : "; for(i=0; i<3; i++) for(j=0; j<3; j++) cin>>arr2[i][j]; cout<<"Subtracting array (array1-array2) ... \n"; for(i=0; i<3; i++) for(j=0; j<3; j++) arr3[i][j]=arr1[i][j]-arr2[i][j]; cout<<"Result of Array1 - Array2 is :\n"; for(i=0; i<3; i++) for(j=0; j<3; j++) cout<<arr3[i][j]<<" "; cout<<"\n"; getch(); }

13. Program to Insert Element in Array #include<iostream.h> #include<conio.h> void main() { int arr[50], size, insert, i, pos; cout<<"Enter Array Size : "; cin>>size; cout<<"Enter array elements : "; for(i=0; i<size; i++) cin>>arr[i]; cout<<"Enter element to be insert : "; cin>>insert; cout<<"At which position (Enter index number) ? "; cin>>pos; for(i=size; i>pos; i--) arr[i]=arr[i-1]; arr[pos]=insert; cout<<"Element inserted successfully..!!\n"; cout<<"Now the new array is : \n"; for(i=0; i<size+1; i++)  
cout<<arr[i]<<" "; getch(); }

14. Program to Delete Element from Array #include<iostream.h> #include<conio.h> void main() { int arr[50], size, i, del, count=0; cout<<"Enter array size : "; cin>>size; cout<<"Enter array elements : "; for(i=0; i<size; i++) cin>>arr[i]; cout<<"Enter element to be delete : "; cin>>del; for(i=0; i<size; i++) { if(arr[i]==del) { for(int j=i; j<(size-1); j++) arr[j]=arr[j+1]; count++; break; } } if(count==0) cout<<"Element not found..!!"; else { cout<<"Element deleted successfully..!!\n"; cout<<"Now the new array is :\n"; for(i=0; i<(size-1); i++) cout<<arr[i]<<" "; } getch(); }

15. Program to Merge Two Arrays #include<iostream.h> #include<conio.h> void main() { int arr1[50], arr2[50], size1, size2, size, i, j, k, merge[100]; cout<<"Enter Array 1 Size : "; cin>>size1; cout<<"Enter Array 1 Elements : "; for(i=0; i<size1; i++) cin>>arr1[i]; cout<<"Enter Array 2 Size : ";  
cin>>size2; cout<<"Enter Array 2 Elements : "; for(i=0; i<size2; i++) cin>>arr2[i]; for(i=0; i<size1; i++) merge[i]=arr1[i]; size=size1+size2; for(i=0, k=size1; k<size && i<size2; i++, k++) merge[k]=arr2[i]; cout<<"Now the new array after merging is :\n"; for(i=0; i<size; i++) cout<<merge[i]<<" "; getch(); }

16. Program to swap first and last element of an integer 1-d array #include<iostream> using namespace std; int main() { int Arr[100],n,i,temp; cout<<"Enter number of elements you want to insert "; cin>>n; for(i=0;i<n;i++) { cout<<"Enter element "<<i+1<<":"; cin>>Arr[i]; } temp=Arr[0]; Arr[0]=Arr[n-1]; Arr[n-1]=temp; cout<<"\nArray after swapping"<<endl; for(i=0;i<n;i++) cout<<Arr[i]<<" "; return 0; }

17. Program to find the largest and smallest element of an array #include<iostream> using namespace std; int main() { int Arr[100],n,i,small,large; cout<<"Enter number of elements you want to insert "; cin>>n; for(i=0;i<n;i++) { cout<<"Enter element "<<i+1<<":";  
cin>>Arr[i]; } small=Arr[0]; large=Arr[0]; for(i=1;i<n;i++) { if(Arr[i]<small) small=Arr[i]; if(Arr[i]>large) large=Arr[i]; } cout<<"\nLargest element is :"<<large; cout<<"\nSmallest element is :"<<small; return 0; }

18. Program to Add Two Matrices using Multidimensional Arrays #include <iostream> using namespace std; int main() { int r, c, a[100][100], b[100][100], sum[100][100], i, j; cout << "Enter number of rows (between 1 and 100): "; cin >> r; cout << "Enter number of columns (between 1 and 100): "; cin >> c; cout << endl << "Enter elements of 1st matrix: " << endl; for(i = 0; i < r; ++i) for(j = 0; j < c; ++j) { cout << "Enter element a" << i + 1 << j + 1 << " : "; cin >> a[i][j]; } cout << endl << "Enter elements of 2nd matrix: " << endl; for(i = 0; i < r; ++i) for(j = 0; j < c; ++j) { cout << "Enter element b" << i + 1 << j + 1 << " : "; cin >> b[i][j]; } for(i = 0; i < r; ++i) for(j = 0; j < c; ++j) sum[i][j] = a[i][j] + b[i][j]; cout << endl << "Sum of two matrix is: " << endl; for(i = 0; i < r; ++i) for(j = 0; j < c; ++j) { cout << sum[i][j] << " "; if(j == c - 1) cout << endl;  
} return 0; }

19. Program to Multiply two matrices without using functions #include <iostream> using namespace std; int main() { int a[10][10], b[10][10], mult[10][10], r1, c1, r2, c2, i, j, k; cout << "Enter rows and columns for first matrix: "; cin >> r1 >> c1; cout << "Enter rows and columns for second matrix: "; cin >> r2 >> c2; while (c1!=r2) { cout << "Error! column of first matrix not equal to row of second.";  
cout << "Enter rows and columns for first matrix: "; cin >> r1 >> c1;  
cout << "Enter rows and columns for second matrix: "; cin >> r2 >> c2; } cout << endl << "Enter elements of matrix 1:" << endl; for(i = 0; i < r1; ++i)  
for(j = 0; j < c1; ++j) { cout << "Enter element a" << i + 1 << j + 1 << " : "; cin >> a[i][j]; } cout << endl << "Enter elements of matrix 2:" << endl; for(i = 0; i < r2; ++i) for(j = 0; j < c2; ++j) { cout << "Enter element b" << i + 1 << j + 1 << " : "; cin >> b[i][j]; } for(i = 0; i < r1; ++i) for(j = 0; j < c2; ++j) mult[i][j]=0; for(i = 0; i < r1; ++i) for(j = 0; j < c2; ++j) for(k = 0; k < c1; ++k)  
mult[i][j] += a[i][k] \* b[k][j]; cout << endl << "Output Matrix: " << endl; for(i = 0; i < r1; ++i) for(j = 0; j < c2; ++j) { cout << " " << mult[i][j]; if(j == c2-1) cout << endl; }  
return 0; }

20. Program for addition of two polynomials #include<iostream.h> #include<iomanip.h> #include<conio.h> struct poly { int coeff; int pow; poly \*next; }; class add2poly { poly \*poly1, \*poly2, \*poly3; public: add2poly(){poly1=poly2=poly3=NULL;} void addpoly(); void display(); }; void add2poly :: addpoly() { int i,p; poly \*newl=NULL,\*end=NULL; cout<<"Enter highest power for x\n";  
cin>>p; //Read first poly cout<<"\nFirst Polynomial\n"; for(i=p;i>=0;i--)  
{ newl=new poly; newl->pow=p; cout<<"Enter Co-efficient for degree"<<i<<":: cin>>newl->coeff; newl->next=NULL; if(poly1==NULL) poly1=newl; else end->next=newl; end=newl; } //Read Second poly cout<<"\n\nSecond Polynomial\n"; end=NULL; for(i=p;i>=0;i--) { newl=new poly; newl->pow=p; cout<<"Enter Co-efficient for degree"<<i<<"::  
cin>>newl->coeff; newl->next=NULL; if(poly2==NULL) poly2=newl; else end->next=newl; end=newl;  
} //Addition Logic poly \*p1=poly1,\*p2=poly2; end=NULL; while(p1 !=NULL && p2!=NULL) { if(p1->pow == p2->pow) { newl=new poly; newl->pow=p--; newl->coeff=p1->coeff + p2->coeff; newl->next=NULL; if(poly3==NULL) poly3=newl; else end->next=newl; end=newl; } p1=p1->next; p2=p2->next; } } void add2poly :: display() {  
poly \*t=poly3; cout<<"\n\nAnswer after addition is : "; while(t!=NULL) {  
cout.setf(ios::showpos); cout<<t->coeff; cout.unsetf(ios::showpos); cout<<"X"<<t->pow; t=t->next; }  
} void main() {  
clrscr(); add2poly obj; obj.addpoly(); obj.display(); getch(); }