**Program : 10**

#include <iostream>

using namespace std;

void MaxHeapify(int a[], int i, int n)

{

int j, temp;

temp = a[i];

j = 2\*i;

while (j <= n)

{

if (j < n && a[j+1] > a[j])

j = j+1;

if (temp > a[j])

break;

else if (temp <= a[j])

{

a[j/2] = a[j];

j = 2\*j;

}

}

a[j/2] = temp;

return;

}

void MinHeapify(int a[], int i, int n)

{

int j, temp;

temp = a[i];

j = 2\*i;

while (j <= n)

{

if (j < n && a[j+1] < a[j])

j = j+1;

if (temp < a[j])

break;

else if (temp >= a[j])

{

a[j/2] = a[j];

j = 2\*j;

}

}

a[j/2] = temp;

return;

}

void MaxHeapSort(int a[], int n)

{

int i, temp;

for (i = n; i >= 2; i--)

{

temp = a[i];

a[i] = a[1];

a[1] = temp;

MaxHeapify(a, 1, i - 1);

}

}

void MinHeapSort(int a[], int n)

{

int i, temp;

for (i = n; i >= 2; i--)

{

temp = a[i];

a[i] = a[1];

a[1] = temp;

MinHeapify(a, 1, i - 1);

}

}

void Build\_MaxHeap(int a[], int n)

{

int i;

for(i = n/2; i >= 1; i--)

MaxHeapify(a, i, n);

}

void Build\_MinHeap(int a[], int n)

{

int i;

for(i = n/2; i >= 1; i--)

MinHeapify(a, i, n);

}

int main()

{

int n, i;

cout<<"\nEnter the number of Students : ";

cin>>n;

n++;

int arr[n];

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

{

cout<<"Enter the marks : "<<i<<": ";

cin>>arr[i];

}

Build\_MaxHeap(arr, n-1);

MaxHeapSort(arr, n-1);

int max,min;

cout<<"\nSorted Data : ASCENDING : ";

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

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

min=arr[1];

Build\_MinHeap(arr, n-1);

MinHeapSort(arr, n-1);

cout<<"\nSorted Data : DESCENDING: ";

max=arr[1];

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

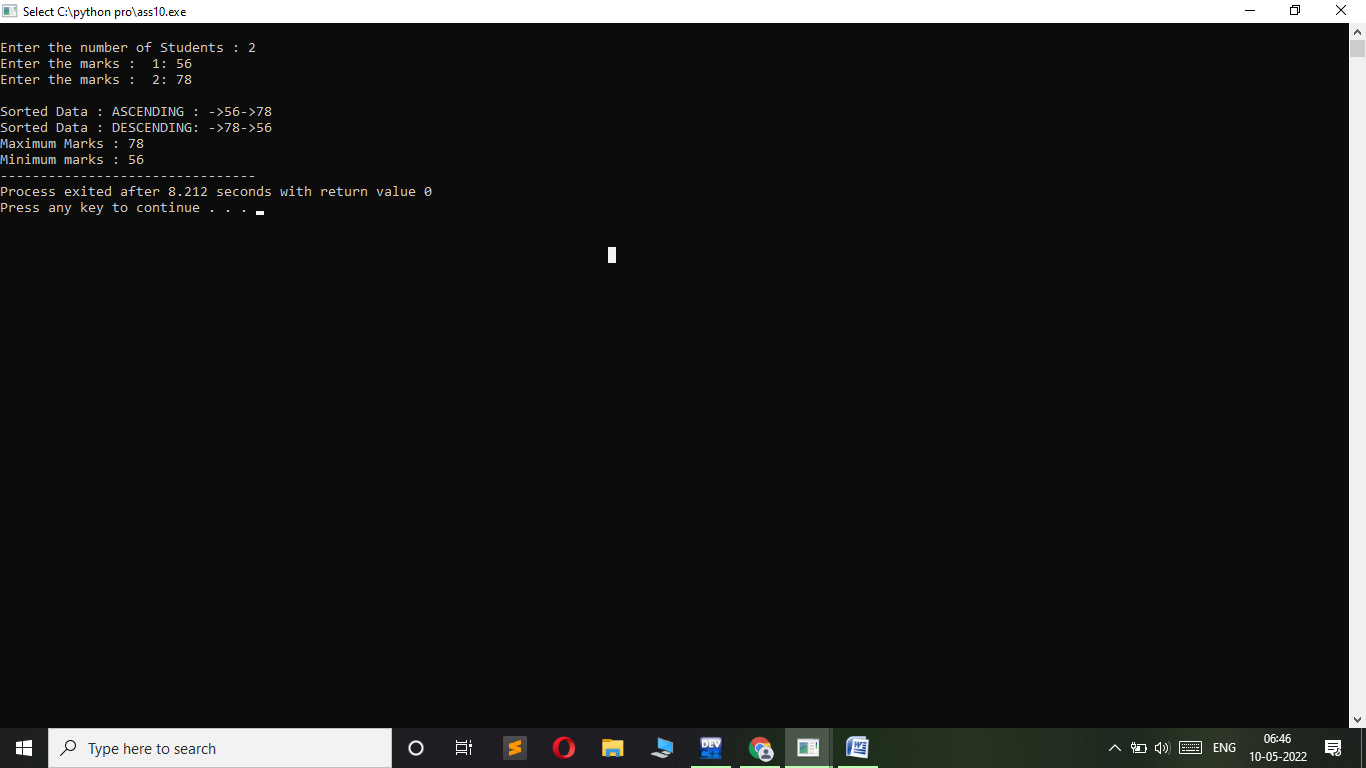
cout<<"->"<<arr[i];

cout<<"\nMaximum Marks : "<<max<<"\nMinimum marks : "<<min;

return 0;

}

**Output**

****