CSE2012

DAA LAB

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Ex1: Insertion Sort

Task 1: Array Method

Code window:

```cpp
1   #include <iostream>
2   using namespace std;
3   int main()
4   {
5       int elements[20], key, i, j, n;
6       cout << "Enter number of elements";
7       cin >> n;
8       for (i = 0; i < n; i++)
9       cin >> elements[i];
10      for (j = 1; j < n; j++)
11          {
12              key = elements[j];
13          i = j - 1;
14          while ((i >= 0) && (elements[i] > key))
15          {
16              elements[i + 1] = elements[i];
17          i = i - 1;
18          }
19          elements[i + 1] = key;
20      }
21      for (i = 0; i < n; i++)
22      {
23          cout << elements[i] << " ";
24      }
25  }
26
```

Code:

```cpp
#include <iostream>
using namespace std;
int main()
{
    int elements[20], key, i, j, n;
    cout << "Enter number of elements";
    cin >> n;
    for (i = 0; i < n; i++)
    cin >> elements[i];
    for (j = 1; j < n; j++)
        {
            key = elements[j];
        i = j - 1;
        while ((i >= 0) && (elements[i] > key))
        {
            elements[i + 1] = elements[i];
        i = i - 1;
        }
        elements[i + 1] = key;
    }
    for (i = 0; i < n; i++)
    {
        cout << elements[i] << " ";
    }
}
```

Output:

```
Enter number of elements 6
1 5 2 3 8 6
1 2 3 5 6 8
```

2. Insertion Sort using Vector

Code window:

```cpp
1   #include<iostream>
2   #include<vector>
3   using namespace std;
4   int main()
5   {
6       vector<int> elements(20,0);
7       int key,i,j,n;
8       cout<<"Enter number of elements";
9       cin>>n;
10      for(i=0;i<n;i++)
11      {
12          cin>>elements[i];
13      }
14      for(j=1;j<n;j++)
15      {
16          key = elements[j];
17          i = j-1;
18          while((i>=0)&&(elements[i]>key))
19          {
20              elements[i+1] = elements[i];
21              i = i-1;
22          }
23          elements[i+1] = key;
24      }
25      for(i=0;i<n;i++)
26      {
27          cout<<elements[i]<<" ";
28      }
29  }
30
```

Code:

```cpp
#include<iostream>

#include<vector>

using namespace std;

int main()

{

   vector<int> elements(20,0);

   int key,i,j,n;

   cout<<"Enter number of elements";

   cin>>n;

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

   {

      cin>>elements[i];

   }

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

   {

      key = elements[j];

      i = j-1;

      while((i>=0)&&(elements[i]>key))

      {

         elements[i+1] = elements[i];

         i = i-1;

      }

      elements[i+1] = key;

   }

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

```
    {

        cout<<elements[i]<<" ";

    }

}
```

Output:

```
Enter number of elements 6
1 5 3 4 2 7
1 2 3 4 5 7
```

3. Insertion Sort using Point Class

Code window:

```cpp
1   #include<bits/stdc++.h>
2   using namespace std;
3   class point
4   {
5       int x,y;
6       public:
7       bool operator>(point);
8       friend istream& operator>>(istream&,point&);
9       friend ostream& operator<<(ostream&,point&);
10  };
11  bool point::operator>(point p)
12      {
13          float dis1,dis2;
14          dis1 = sqrt(x*x+y*y);
15          dis2 = sqrt(p.x*p.x+p.y*p.y);
16          return (dis1>dis2);
17      }
18      istream& operator>>(istream& in, point &p)
19      {
20          in>>p.x>>p.y;
21          return in;
22      }
23      ostream& operator<<(ostream& out,point &p)
24      {
25          out<<p.x<<" "<<p.y<<endl;
26          return out;
27      }
28
```

```
29  int main()
30      {
31      vector<point> elements;
32      point key,ele;
33      int i,j,n;
34      cout<<"Enter number of elements: ";
35      cin>>n;
36      for(i=0;i<n;i++)
37      {
38          cin>>ele;
39          elements.push_back(ele);
40      }
41      for(j=1;j<n;j++)
42      {
43          key = elements[j];
44          i = j-1;
45          while((i>=0)&&(elements[i]>key))
46          {
47              elements[i+1] = elements[i];
48              i = i-1;
49          }
50          elements[i+1] = key;
51      }
52      for(i=0;i<n;i++)
53      {
54      cout<<elements[i]<<" ";
55      }
56      return 0;
57  }
```

Code:

```cpp
#include<bits/stdc++.h>

using namespace std;

class point

{

    int x,y;

    public:

    bool operator>(point);

    friend istream& operator>>(istream&,point&);

    friend ostream& operator<<(ostream&,point&);

};
```

```cpp
bool point::operator>(point p)

   {

      float dis1,dis2;

      dis1 = sqrt(x*x+y*y);

      dis2 = sqrt(p.x*p.x+p.y*p.y);

      return (dis1>dis2);

   }

   istream& operator>>(istream& in, point &p)

   {

      in>>p.x>>p.y;

      return in;

   }

   ostream& operator<<(ostream& out,point &p)

   {

      out<<p.x<<" "<<p.y<<endl;

      return out;

   }


int main()

   {

   vector<point> elements;

   point key,ele;

   int i,j,n;

   cout<<"Enter number of elements: ";

   cin>>n;

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

   {

      cin>>ele;

      elements.push_back(ele);
```

```
    }

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

    {

        key = elements[j];

        i = j-1;

        while((i>=0)&&(elements[i]>key))

        {

            elements[i+1] = elements[i];

            i = i-1;

        }

        elements[i+1] = key;

    }

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

    {

    cout<<elements[i]<<" ";

    }

    return 0;

}
```

Output: