

CSE 3010 – Data Structures & Algorithms

Lecture #26

What will be covered today

- Introduction to sorting
- Order of sorting
- Types of sorting techniques

Introduction to sorting

- Sorting is one of the common operations performed on a list of elements
 - Elements may be numbers, characters and strings
 - Elements may be structures or objects
- Need for sorting
 - Roll number wise list of students
 - Grade wise list of students
 - Date of joining wise list of employees
 - Population wise list of cities
 - Size wise list of images

Examples of order of sorting

Decreasing order				User-defined order	
14	600	A	abandon	2015-MIIT-CSE-059	2015-MIIT-CSE-059
32	321	C	ability	2015-MIIT-CSE-060	2015-MIIT-CSE-060
66	214	K	able	2015-MIIT-ECE-001	2016-MIIT-CSE-058
78	102	O	above	2015-MIIT-ECE-002	2016-MIIT-CSE-059
102	78	Q	absolute	2016-MIIT-CSE-058	2015-MIIT-ECE-001
214	66	S	beetle	2016-MIIT-CSE-059	2015-MIIT-ECE-002
321	32	T	bike	2016-MIIT-ECE-001	2016-MIIT-ECE-001
600	14	U	bumper	2016-MIIT-ECE-002	2016-MIIT-ECE-002
Increasing order				Lexicographical order	

Bubble sort algorithm

```
void bubbleSort(int numb[]) {  
    int i, temp;  
    bool interchange;  
    interchange = true;  
    while (interchange) { // Outer iteration  
        interchange = false;  
        for (i = 0; i < SIZE-1; i++) // Inner iteration  
            if (numb[i] >= numb[i+1]) {  
                temp = numb[i];  
                numb[i] = numb[i+1];  
                numb[i+1] = temp;  
                interchange = true;  
            }  
    }  
    return;  
}
```

Bubble sort – How does it work?

321	214	66	66	66	32	14
214	66	214	102	32	14	32
66	321	102	32	14	66	66
600	102	32	14	78	78	78
102	32	14	78	102	102	102
32	14	78	214	214	214	214
14	78	312	312	312	312	312
78	600	600	600	600	600	600

- After 6 iterations the elements are in sorted order
- Each iteration goes through the entire array and swaps the elements when found not in order
- At the end of each iteration the largest element reaches its rightful position in the array