

April 22 2008

Final Project & Sorting Algorithms

CS135 Spring 2008

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Final Project

- **Final Project counts 20% of overall grades!**
- **Design Document (100pts)**
 - All sections: Tuesday **April 29** before lab.
 - 50% loss of credit if turned in one day late.
 - Zero credit after Wednesday, **April 30**
- **Program code and documentation (200pts)**
 - All sections: Wednesday **May 7** from **10:00 - 1:00 pm** at the TA office (**NO LATE PROJECT WILL BE ACCEPTED!**)

Sorting Algorithms

Introduction: Sorting

- What is sorting?
 - The objective is to take an unordered set of comparable data items and arrange them in order.
- We will usually sort the data into **ascending order** — sorting into **descending order** is similar
- We will concentrate on sorting data that is stored in an **array**.

Sorting Algorithms

- How to implement these sorting algorithms in C++:
 - Bubble sort
 - Selection sort
 - **More: Insertion sort

Bubble Sort

```

for (int i=(length-1); i>0; i--)
{
  for (int j=1; j<=i; j++)
  {
    if (arr[j-1] > arr[j])
    {
      temp = arr[j-1];
      arr[j-1] = arr[j];
      arr[j] = temp;
    }
  }
}

```

end of one inner loop

5	3	2	4
3	5	2	4
3	2	5	4
3	2	4	5

5 'bubbled' to the correct position
remaining elements put in place

2	3	4	5
---	---	---	---

Selection Sort

```

for (int i=0; i<(length-2); i++)
{
  for (int j=(i+1); j<(length-1); j++)
  {
    if (arr[j] < arr[i]) {
      temp = arr[j];
      arr[j] = arr[i];
      arr[i] = temp;
    }
  }
}

```

Selection Sort Example

35	65	30	60	20	scan 0-4, smallest 20
					swap 35 and 20
20	65	30	60	35	scan 1-4, smallest 30
					swap 65 and 30
20	30	65	60	35	scan 2-4, smallest 35
					swap 65 and 35
20	30	35	60	65	scan 3-4, smallest 60
					swap 60 and 60
20	30	35	60	65	done

Example Code

- `selsort_dmo.cpp`
http://www.cse.unr.edu/~chang/Labs/FP/selsort_dmo.cpp