

Problem Set 3 Exercise #18: Certificate of Entitlement

Reference: Lecture 8 notes

Learning objective: Sorting

Estimated completion time: 40 minutes

Problem statement:

[CS1010 AY2010/2011 Semester 1 Exam, Q7]

The Certificate of Entitlement (COE) is designed to limit the number of vehicles on the roads by requiring potential car owners to first obtain the right to buy a vehicle. Each month, the number of available COEs is made known and people who wish to buy a vehicle will submit their COE bids to a bidding system.

Suppose the number of available COEs for a particular month is n . At the end of the bidding cycle, we obtain the n^{th} highest bid as the **COE Candidate Price**. For example, if there are 4 COEs available for the month of March and the bids received are {1, 100, 50, 2, 8, 10000, 1000, 2, 1000, 10010}, then the COE Candidate Price is the 4th highest bid, which is \$1000. This is also the **COE Final Price**.

In the event that the number of bids that are greater than or equal to the **COE Candidate Price** is more than n , then the **COE Final Price** is set to the next highest bid that is greater than the **COE Candidate Price**.

For example, if there are 4 COEs available for the month of April and the bids received are {1, 100, 2000, 2, 8, 10000, 1000, 2, 1000, 10010}, then the COE Candidate Price is \$1000. However, there are 5 bids that are more than or equal to \$1000. Hence, the COE Final Price for April is the next highest bid (you may assume that you can always find one) that is more than \$1000, which is \$2000.

Write a complete Java program **coe.c** that takes as input the number of available COEs for the month and a list of bid amounts (integers), and outputs the COE Final Price for that month. You may assume there are at most 5000 bids.

Sample run #1:

```
Enter the number of available COEs: 4
Enter the number of bids: 10
Enter 10 bids: 1 100 50 2 8 10000 1000 2 1000 10010
COE final price this month is $1000
```

Sample run #2:

```
Enter the number of available COEs: 4  
Enter the number of bids: 10  
Enter 10 bids: 1 100 2000 2 8 10000 1000 2 1000 10010  
COE final price this month is $2000
```