

Homework Assignment 3

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Problem 1:

4.

a. The algorithm adds the values of $X^n + X^{n-1} \dots + X^1$. The algorithm that I wrote is $O(n)$ since it retains the value of the polynomial from the previous addition.

b. The algorithm is already linear.

c. No, it is not possible to have an efficiency that is better than $O(n)$ (linear). This is because we must process each of the values for each power of X and there will always be n of these values.

Problem 2:

8. Sort the list E, X, A, M, P, L, E in alphabetical order by selection sort.

Start: | E X A M P L E

1: A | X E M P L E

2: A E | X M P L E

3: A E E | M P L X

4: A E E L | P M X

5: A E E L M | P X

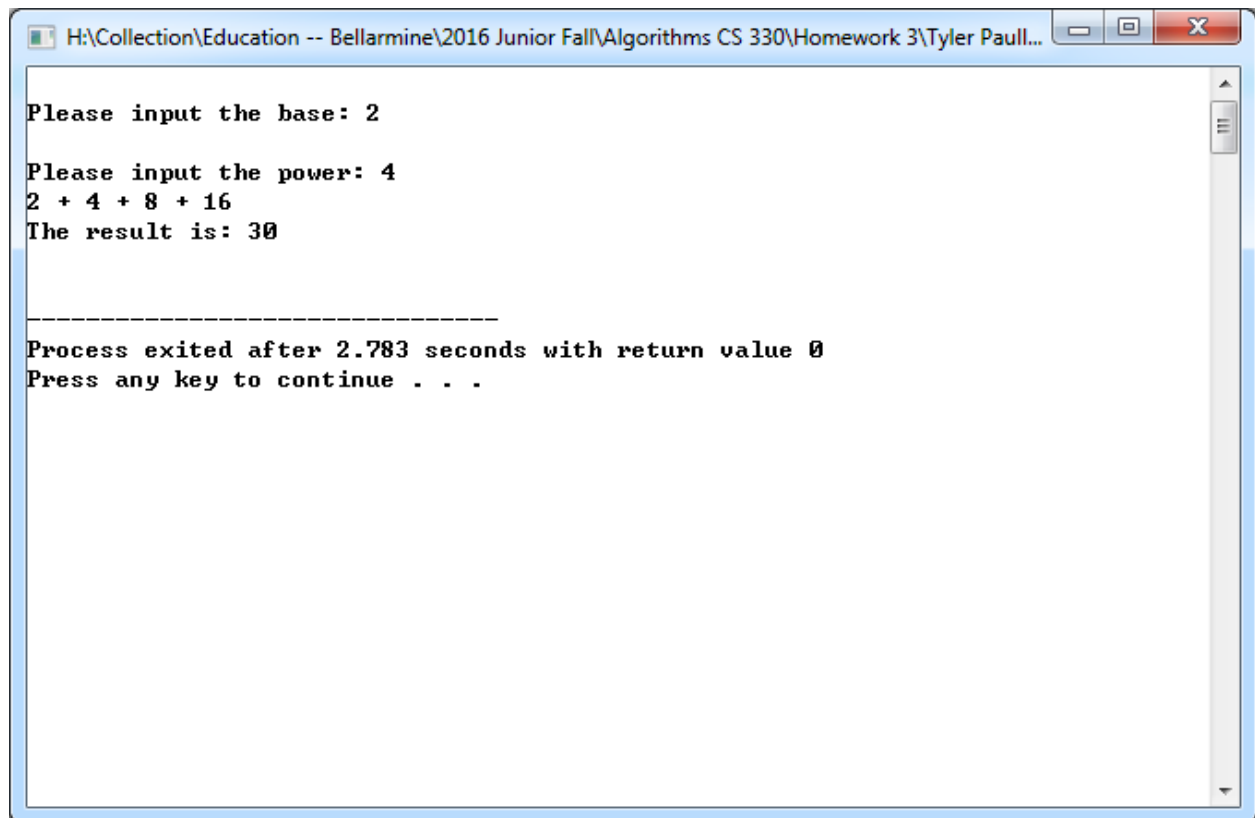
6: A E E L M P | X

Problem 3:

13. Is bubble sort stable?

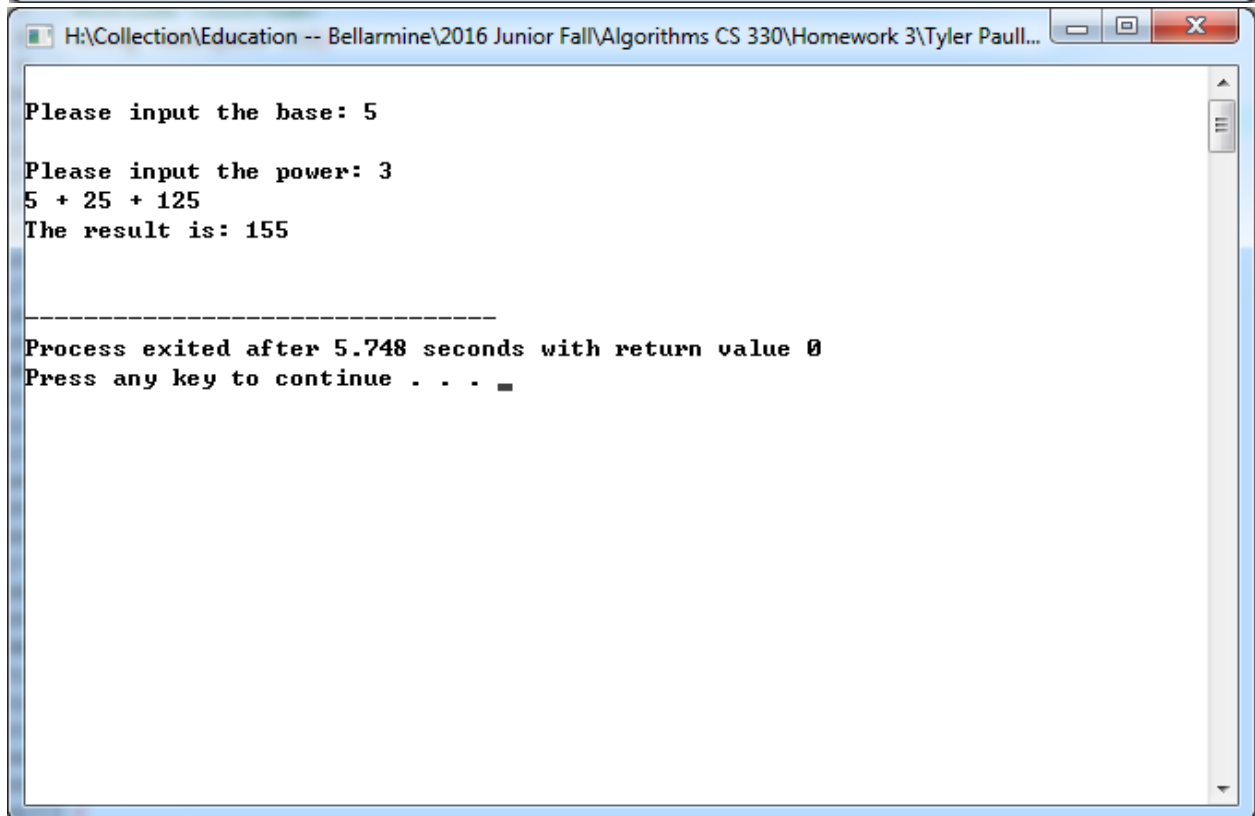
Yes, bubble sort is stable since it keeps all elements in the same order except for the current and next element on any given iteration.

Some examples using my algorithm...



A screenshot of a Windows command prompt window. The title bar shows the file path: H:\Collection\Education -- Bellarmine\2016 Junior Fall\Algorithms CS 330\Homework 3\Tyler Paull... The window contains the following text:

```
Please input the base: 2  
Please input the power: 4  
2 + 4 + 8 + 16  
The result is: 30  
  
-----  
Process exited after 2.783 seconds with return value 0  
Press any key to continue . . .
```



A screenshot of a Windows command prompt window. The title bar shows the file path: H:\Collection\Education -- Bellarmine\2016 Junior Fall\Algorithms CS 330\Homework 3\Tyler Paull... The window contains the following text:

```
Please input the base: 5  
Please input the power: 3  
5 + 25 + 125  
The result is: 155  
  
-----  
Process exited after 5.748 seconds with return value 0  
Press any key to continue . . .
```