

Homework Assignment 3

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Problem 1:

4.

a. This problem can be written in a way that it is $O(n)$ instead of $O(n^2)$. By evaluating all of the terms by multiplying the value of c by x would result in an algorithm of $O(n^2)$. If we re-write a problem say: $3x^3 - 4x^2 + 2x - 1$ as $((3x - 4)x + 2)x - 1$, then the problem may be solved in linear time. This linear algorithm is the one I will write.

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 terms for 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

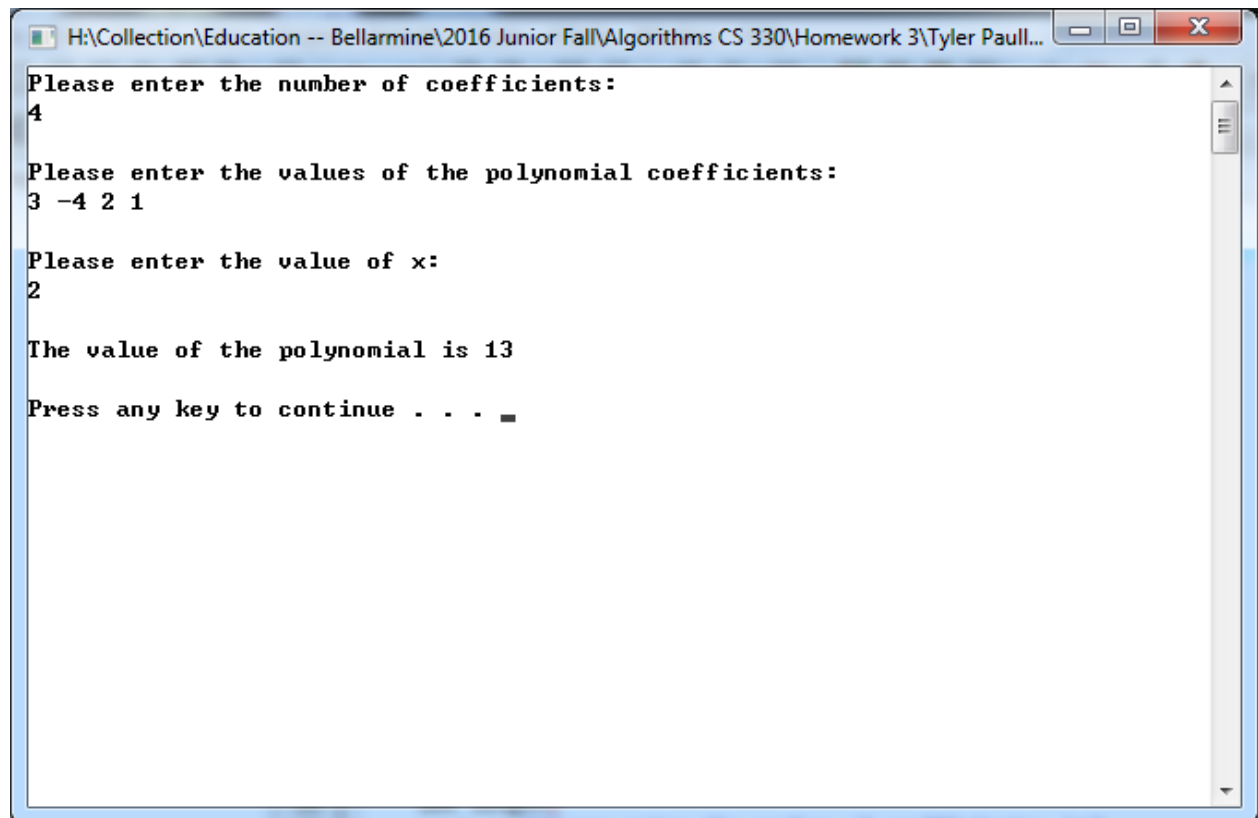
6: A E E L M P | X

Problem 3:

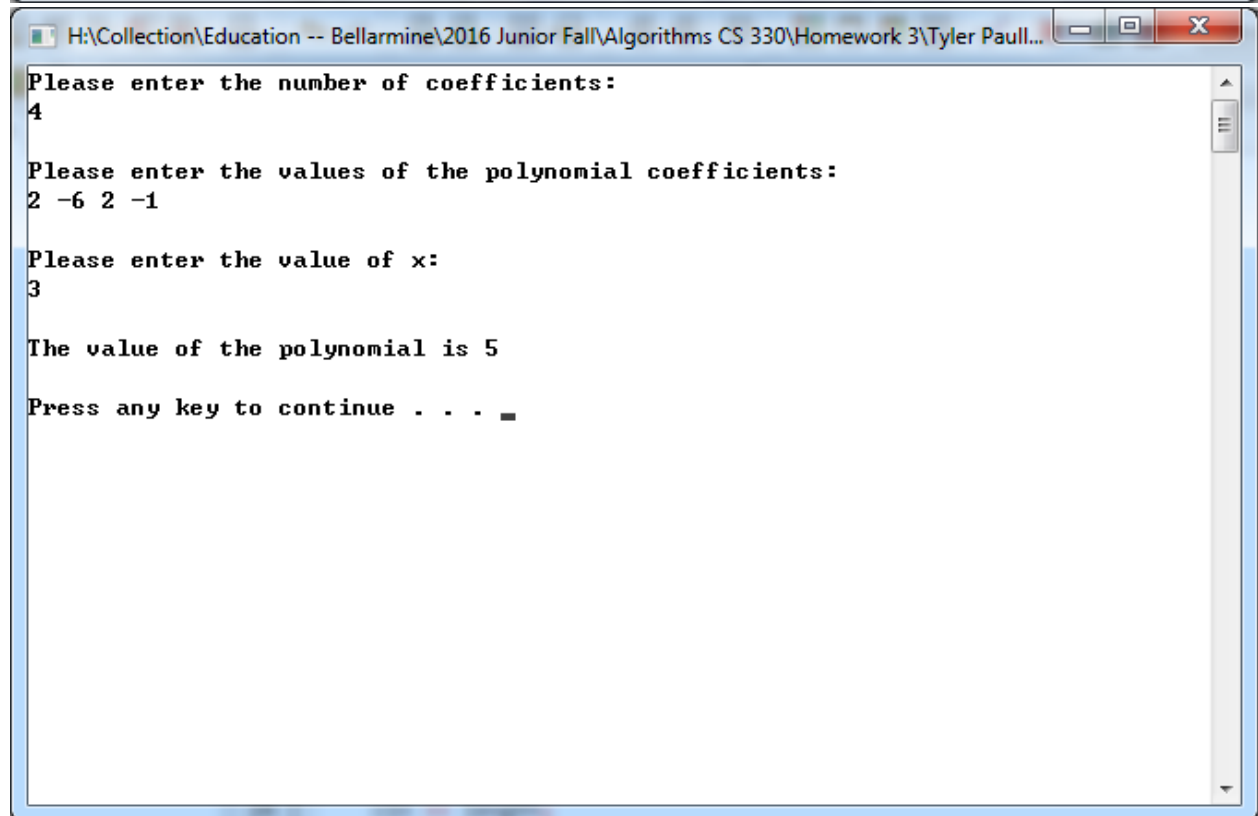
13. Is bubble sort stable?

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...



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H:\Collection\Education -- Bellarmine\2016 Junior Fall\Algorithms CS 330\Homework 3\Tyler Paull...  
Please enter the number of coefficients:  
4  
Please enter the values of the polynomial coefficients:  
3 -4 2 1  
Please enter the value of x:  
2  
The value of the polynomial is 13  
Press any key to continue . . . █
```



```
H:\Collection\Education -- Bellarmine\2016 Junior Fall\Algorithms CS 330\Homework 3\Tyler Paull...  
Please enter the number of coefficients:  
4  
Please enter the values of the polynomial coefficients:  
2 -6 2 -1  
Please enter the value of x:  
3  
The value of the polynomial is 5  
Press any key to continue . . . █
```