Program Name: project1.java  
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Assignment: Project 1  
Date: October 19, 2017

**Problem:**

You will implement and test a preliminary version of the polynomial class, using a small array to store the coefficients of the polynomial in order, following the design pattern of object-oriented approach.

**Analysis of Algorithm Complexity:**

The contractor of the polynomial class has a Big O of **O(n)** because it only contains a single for loop that copy the array. The getArray method has a Big O of **O(1)** because it goes runs only ones regardless of the input. The printout method also has a Big o of O(n) do to having a nested for loop. The add method has a Big O of **O(n)** it has multiple for loops but none are nested so it stays O(n). The sub method is **O(n)** because it is exactly the same as the add method.

**Analysis of Algorithm Design:**

The algorithms are somewhat simple, it mostly consists of a for loop then runs through the array and adds or subtracts integers from it, and then transfers the result into a new array. The main part is, that it uses the array index as a data value as well as the content data.

**Program Input/Output:**

The constructor of the polymer class takes an int array as in input, the getArray method has a return output of an int array, the add method has an input of a polynomial object and, a return output of an polynomial class object, the sub method has an input of an polynomial object and, a return output of an polynomial class object. The printout method has a string as an input and prints out the store polynomial in the console window

**Tested Result:**

input\_1

int test[]={0,1,1,1,1}; //x+1x2+1x3+1x4  
Polynomial TEST=new Polynomial(test);   
TEST.printout("");

output\_1

1x1+1x2+1x3+1x4

the program displays the polynomial correctly

input\_2

int test\_2[]={0,6,12,0,2}; //6x1+12x2+2x4  
Polynomial TEST\_2=new Polynomial(test\_2);   
TEST\_2.printout("");

output\_2

6x1+12x2+2x4

the program displays the polynomial correctly

input\_3

int testA[]={0,2,4,3,7};  
 int testB[]={0,5,9,0,3};  
 Polynomial TESTA=new Polynomial(testA);  
 Polynomial TESTB=new Polynomial(testB);  
 Polynomial TESTC = TESTA.add(TESTB); //ADD  
 TESTC.printout("");

output\_3

7x1+13x2+3x3+10x4

the program displays the polynomial correctly