Lab 1: Gold Trading

Data Structures and Algorithms

This lab is to let you familiar with JAVA programming in problem solving. Your task is to write a JAVA program for solving problem.

In gold trading, you are trying to buy gold and resell it to make the most profit possible. In real life, it is impossible to know the daily gold price in advance. However, this is a makeup lab.

Given daily gold prices in a near future, up to a year, your task is to write a JAVA code to identify which day to buy and which day to sell gold to make the most profit. Please make sure the buying date must come before the selling date. For example, given the below daily gold prices:

Day	1	2	3	4	5	6	7	8
Price	27,650	26,450	25,600	26,600	28,200	28,200	28,400	28,300

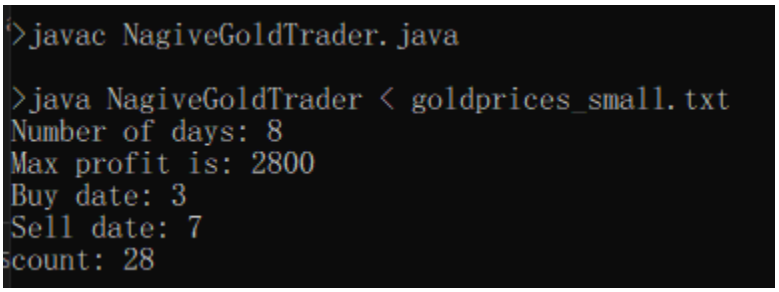
**Note that this is the actual maximum monthly gold price last year.*

We can find that buying at day 3 and selling at day 7 made the most profit. As the data stored in goldprices_small.txt, we can write a very naïve JAVA code to solve the problem as in NaiveGoldTrader.java

To avoid hard-coding file name into our code, after compile, we will run our class as follow:

```
>java NagiveGoldTrader < goldprices_small.txt
```

The sample output of our program will be similar to the following screenshot:



You can see that there is “count” variable and its output that is not belong to the task at hand.

The count variable is there to count how many times we get into the loop. For example, in the file goldprices_small.txt, there are 8 lines of data, our program gets into the loop 28 times.

Your first task: run the program with goldprices.txt and goldprices_large.txt as input. Then record the number of loops and number of inputs (days) from the count variable.

File	Number of inputs	Loop count
goldprices_small.txt	8	28
goldprices.txt		
goldprices_large.txt		

Now, let modify our program to test its efficiency.

First, let add a method with the same name, but different parameter:

```
    static int readGoldPrices(int goldPrices[],int n) {
        for(int i=0; i<n; i++) {
            goldPrices[i] = (int)Math.round(Math.random()*20000+20000);
        }
        return n;
    }
```

Then let replace `int n = readGoldPrices(goldPrices);` with the following code

```
int n = Integer.parseInt(args[0]);
        readGoldPrices(goldPrices,n);
```

After compiling our new code, we can run our new program by specify number of days as input, like this:

```
>java NagiveGoldTrader 1000
Number of days: 1000
Max profit is: 19939
Buy date: 609
Sell date: 931
count: 499500
```

Your second task: Fill the following table.

Number of inputs(n)	Loop count
10,000	499,500
20,000	
30,000	
40,000	
50,000	
60,000	
70,000	
80,000	
90,000	
100,000	
1,000,000	

Your final task: In your own words, describe relationship between number of days and loop count. Describe how loop count may affect the time of execution.

Hand in your work in MS Team assignment by fill in the answer in this file. Change the name of this file to assignment1_xxxxxxx.docx where xxxxxx is your student id.