AP Computer Science A

Assignment – The Blockchain Assignment 1: Preliminaries

Fork the repl at https://replit.com/@ROYMARQUEZ/blockChainStarter and respond to the following as code or comments in the code.

Reference the Javadoc on the reverse side of this page as required.

1. Write a method that recursively calculates the nth factorial in the Fibonacci sequence. Recall that the Fibonacci sequence is:

   ```
   1, 1, 2, 3, 5, 8, 13, 21, …,
   i.e., f(n) = f(n-1) + f(n-2)
   ```

   Use the method signature that follows:

   ```
   public static long fibonacci (int n)
   /* long is a primitive type like int though
      with a greater range */
   ```

2. Use the `Date` class in the `java.util` package to time how long it takes to execute (in milliseconds) the following method calls; complete the chart.

Call	Execution Time (milliseconds)
`fibonacci (20)`	
`fibonacci (30)`	
`fibonacci (40)`	
`fibonacci (45)`	
`fibonacci (50)`	

3. Let's perform some basic algorithm analysis. Fill in the blank:

   My recursive method implementation has an execution time
   that varies _____ with n.

   (choose one from the following: linearly, exponentially, logarithmically, constantly, quadratically, cubically). Justify your choice somehow with the data from the table.

4. Use the `sha256` method in the `Utilities` static class to calculate the hash code for the string "`Satosho Nakamoto: inventor of bitcoin`". Do the same for the string "`Satosho Nakamoto: inventor of bitcoin!`" Are you surprised at how significantly different the codes are?

Constructor

Constructor and Description
`Date()` Allocates a `Date` object and initializes it so that it represents the time at which it was allocated, measured to the nearest millisecond.

Selected Method Summary

Modifier and Type	Method and Description
`int`	**getMinutes**`()` Returns the number of the minutes represented by this `Date` object.
`int`	**getHours**`()` Returns the number of the hours represented by this `Date` object.
`int`	**getSeconds**`()` Returns the number of the seconds represented by this `Date` object.
`long`	**getTime**`()` Returns the number of milliseconds since January 1, 1970, 00:00:00 GMT represented by this `Date` object.