2016 AP® COMPUTER SCIENCE A FREE-RESPONSE QUESTIONS

COMPUTER SCIENCE A SECTION II

Time—1 hour and 30 minutes
Number of questions—4
Percent of total score—50

Directions: SHOW ALL YOUR WORK. REMEMBER THAT PROGRAM SEGMENTS ARE TO BE WRITTEN IN JAVA.

Notes:

- Assume that the classes listed in the Java Quick Reference have been imported where appropriate.
- Unless otherwise noted in the question, assume that parameters in method calls are not null and that methods are called only when their preconditions are satisfied.
- In writing solutions for each question, you may use any of the accessible methods that are listed in classes defined in that question. Writing significant amounts of code that can be replaced by a call to one of these methods will not receive full credit.
- 1. This question involves the implementation and extension of a RandomStringChooser class.
 - (a) A RandomStringChooser object is constructed from an array of non-null String values. When the object is first constructed, all of the strings are considered available. The RandomStringChooser class has a getNext method, which has the following behavior. A call to getNext returns a randomly chosen string from the available strings in the object. Once a particular string has been returned from a call to getNext, it is no longer available to be returned from subsequent calls to getNext. If no strings are available to be returned, getNext returns "NONE".

The following code segment shows an example of the behavior of RandomStringChooser.

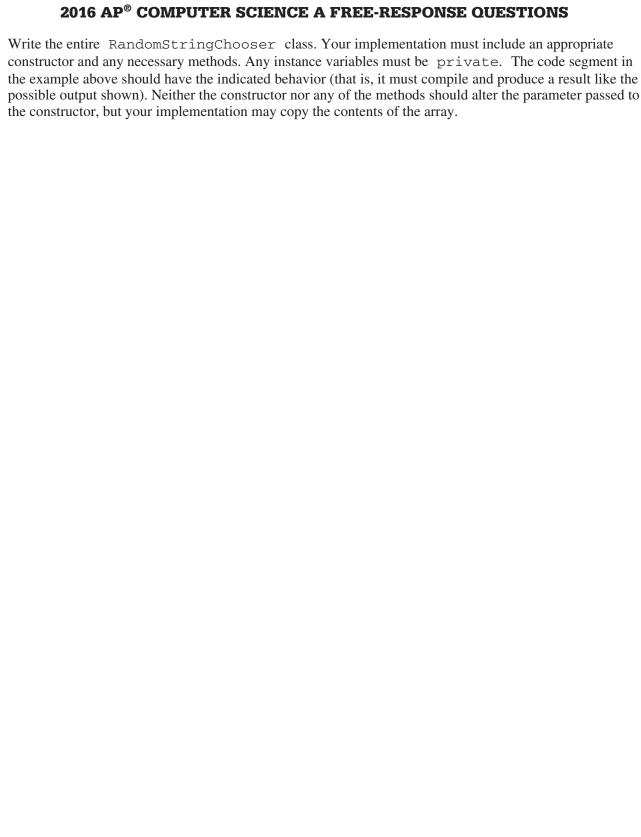
```
String[] wordArray = {"wheels", "on", "the", "bus"};
RandomStringChooser sChooser = new RandomStringChooser(wordArray);
for (int k = 0; k < 6; k++)
{
    System.out.print(sChooser.getNext() + " ");
}</pre>
```

One possible output is shown below. Because schooser has only four strings, the string "NONE" is printed twice.

bus the wheels on NONE NONE

WRITE YOUR SOLUTION ON THE NEXT PAGE.

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Part (b) begins on page 4.

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(b) The following partially completed RandomLetterChooser class is a subclass of the RandomStringChooser class. You will write the constructor for the RandomLetterChooser class.

```
public class RandomLetterChooser extends RandomStringChooser
    /** Constructs a random letter chooser using the given string str.
     * Precondition: str contains only letters.
   public RandomLetterChooser(String str)
       /* to be implemented in part (b) */ }
    / ** Returns an array of single-letter strings.
        Each of these strings consists of a single letter from str. Element k
        of the returned array contains the single letter at position k of str.
        For example, getSingleLetters("cat") returns the
        array { "c", "a", "t" }.
     * /
   public static String[] getSingleLetters(String str)
   { /* implementation not shown */ }
}
The following code segment shows an example of using RandomLetterChooser.
RandomLetterChooser letterChooser = new RandomLetterChooser("cat");
for (int k = 0; k < 4; k++)
{
   System.out.print(letterChooser.getNext());
```

The code segment will print the three letters in "cat" in one of the possible orders. Because there are only three letters in the original string, the code segment prints "NONE" the fourth time through the loop. One possible output is shown below.

actNONE

}

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Assume that the RandomStringChooser class that you wrote in part (a) has been implemented correctly and that getSingleLetters works as specified. You must use getSingleLetters appropriately to receive full credit.

Complete the RandomLetterChooser constructor below.

- /** Constructs a random letter chooser using the given string str.
 - * **Precondition**: str contains only letters.

* /

public RandomLetterChooser(String str)