3. This question involves analyzing and modifying a string. The following `Phrase` class maintains a phrase in an instance variable and has methods that access and make changes to the phrase. You will write two methods of the `Phrase` class.

```java
public class Phrase
{
    private String currentPhrase;

    /** Constructs a new Phrase object. */
    public Phrase(String p)
    {   currentPhrase = p;   }


    /** Returns the index of the  nth  occurrence of  str  in the current phrase;
     *   returns  -1  if the  nth  occurrence does not exist.
     *   Precondition: str.length() > 0  and  n > 0
     *   Postcondition:  the current phrase is not modified.
     */
    public int findNthOccurrence(String str, int n)
    {   /*  implementation not shown  */   }


    /** Modifies the current phrase by replacing the  nth  occurrence of  str  with  repl.
     *   If the  nth  occurrence does not exist, the current phrase is unchanged.
     *   Precondition: str.length() > 0  and  n > 0
     */
    public void replaceNthOccurrence(String str, int n, String repl)
    {   /* to be implemented in part (a) */   }


    /** Returns the index of the last occurrence of  str  in the current phrase;
     *   returns  -1  if  str  is not found.
     *   Precondition: str.length() > 0
     *   Postcondition:  the current phrase is not modified.
     */
    public int findLastOccurrence(String str)
    {   /* to be implemented in part (b) */   }


    /** Returns a string containing the current phrase.  */
    public String toString()
    {   return currentPhrase;   }
}
```

Part (a) begins on page 12.

GO ON TO THE NEXT PAGE.

(a) Write the `Phrase` method `replaceNthOccurrence`, which will replace the `nth` occurrence of the string `str` with the string `repl`. If the `nth` occurrence does not exist, `currentPhrase` remains unchanged.

Several examples of the behavior of the method `replaceNthOccurrence` are shown below.

Code segments	Output produced
| ```
Phrase phrase1 = new Phrase("A cat ate late.");
phrase1.replaceNthOccurrence("at", 1, "rane");
System.out.println(phrase1);
``` | A crane ate late. |

Code segments	Output produced
| ```
Phrase phrase2 = new Phrase("A cat ate late.");
phrase2.replaceNthOccurrence("at", 6, "xx");
System.out.println(phrase2);
``` | A cat ate late. |

Code segments	Output produced
| ```
Phrase phrase3 = new Phrase("A cat ate late.");
phrase3.replaceNthOccurrence("bat", 2, "xx");
System.out.println(phrase3);
``` | A cat ate late. |

Code segments	Output produced
| ```
Phrase phrase4 = new Phrase("aaaa");
phrase4.replaceNthOccurrence("aa", 1, "xx");
System.out.println(phrase4);
``` | xxaa |

Code segments	Output produced
| ```
Phrase phrase5 = new Phrase("aaaa");
phrase5.replaceNthOccurrence("aa", 2, "bbb");
System.out.println(phrase5);
``` | abbba |

```
Class information for this question

public class Phrase

private String currentPhrase
public Phrase(String p)
public int findNthOccurrence(String str, int n)
public void replaceNthOccurrence(String str, int n, String repl)
public int findLastOccurrence(String str)
public String toString()
```

The `Phrase` class includes the method `findNthOccurrence`, which returns the `nth` occurrence of a given string. You must use `findNthOccurrence` appropriately to receive full credit.

Complete method `replaceNthOccurrence` below.

```
    /** Modifies the current phrase by replacing the nth occurrence of str with repl.
     *   If the nth occurrence does not exist, the current phrase is unchanged.
     *   Precondition: str.length() > 0 and n > 0
     */
    public void replaceNthOccurrence(String str, int n, String repl)
```

Part (b) begins on page 14.

GO ON TO THE NEXT PAGE.

(b) Write the `Phrase` method `findLastOccurrence`. This method finds and returns the index of the last occurrence of a given string in `currentPhrase`. If the given string is not found, `-1` is returned. The following tables show several examples of the behavior of the method `findLastOccurrence`.

```
Phrase phrase1 = new Phrase("A cat ate late.");
```

Method call	Value returned
`phrase1.findLastOccurrence("at")`	11
`phrase1.findLastOccurrence("cat")`	2
`phrase1.findLastOccurrence("bat")`	-1

Class information for this question

public class Phrase

private String currentPhrase
public Phrase(String p)
public int findNthOccurrence(String str, int n)
public void replaceNthOccurrence(String str, int n, String repl)
public int findLastOccurrence(String str)
public String toString()

WRITE YOUR SOLUTION ON THE NEXT PAGE.

You must use `findNthOccurrence` appropriately to receive full credit.

Complete method `findLastOccurrence` below.

```
/** Returns the index of the last occurrence of str in the current phrase;
 *  returns -1 if str is not found.
 *  Precondition: str.length() > 0
 *  Postcondition: the current phrase is not modified.
 */
public int findLastOccurrence(String str)
```