

2024



AP[®] Computer Science A

Free-Response Questions

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3. This question involves the manipulation and analysis of a list of words. The following `WordChecker` class contains an `ArrayList<String>` to be analyzed and methods that are used to perform the analysis. You will write two methods of the `WordChecker` class.

```
public class WordChecker
{
    /** Initialized in the constructor and contains no null elements */
    private ArrayList<String> wordList;

    /**
     * Returns true if each element of wordList (except the first) contains the previous
     * element as a substring and returns false otherwise, as described in part (a)
     * Precondition: wordList contains at least two elements.
     * Postcondition: wordList is unchanged.
     */
    public boolean isWordChain()
    { /* to be implemented in part (a) */ }

    /**
     * Returns an ArrayList<String> based on strings from wordList that start
     * with target, as described in part (b). Each element of the returned ArrayList has had
     * the initial occurrence of target removed.
     * Postconditions: wordList is unchanged.
     * Items appear in the returned list in the same order as they appear in wordList.
     */
    public ArrayList<String> createList(String target)
    { /* to be implemented in part (b) */ }

    // There may be instance variables, constructors, and methods that are not shown.
}
```

GO ON TO THE NEXT PAGE.

- (a) Write the `isWordChain` method, which determines whether each element of `wordList` (except the first) contains the previous element as a substring. The following table shows two sample `isWordChain` method calls.

<code>wordList</code>	<code>isWordChain</code> Return Value	Explanation
<code>["an", "band", "band", "abandon"]</code>	<code>true</code>	Each element contains the previous element as a substring.
<code>["to", "too", "stool", "tools"]</code>	<code>false</code>	"tools" does not contain the substring "stool".

Complete the `isWordChain` method.

```
/**
 * Returns true if each element of wordList (except the first) contains the previous
 * element as a substring and returns false otherwise, as described in part (a)
 * Precondition: wordList contains at least two elements.
 * Postcondition: wordList is unchanged.
 */
public boolean isWordChain()
```

Begin your response at the top of a new page in the separate Free Response booklet and fill in the appropriate circle at the top of each page to indicate the question number. If there are multiple parts to this question, write the part letter with your response.

GO ON TO THE NEXT PAGE.

- (b) Write the `createList` method, which creates and returns an `ArrayList<String>`. The method identifies strings in `wordList` that start with `target` and returns a new `ArrayList` containing each identified string without the starting occurrence of `target`. Elements must appear in the returned list in the same order as they appear in `wordList`.

Consider an example where `wordList` contains the following strings.

```
["catch", "bobcat", "catchacat", "cat", "at"]
```

The following table shows the `ArrayList` returned by some calls to `createList`. In all cases, `wordList` is unchanged.

Method Call	<code>ArrayList</code> Returned by <code>createList</code>	Explanation
<code>createList("cat")</code>	<code>["ch", "chacat", ""]</code>	Only "catch", "catchacat", and "cat" begin with "cat".
<code>createList("catch")</code>	<code>["", "acat"]</code>	Only "catch" and "catchacat" begin with "catch".
<code>createList("dog")</code>	<code>[]</code>	None of the words in <code>wordList</code> begin with "dog".

Complete the `createList` method.

```
/**
 * Returns an ArrayList<String> based on strings from wordList that start
 * with target, as described in part (b). Each element of the returned ArrayList has had
 * the initial occurrence of target removed.
 * Postconditions: wordList is unchanged.
 * Items appear in the returned list in the same order as they appear in wordList.
 */
public ArrayList<String> createList(String target)
```

Begin your response at the top of a new page in the separate Free Response booklet and fill in the appropriate circle at the top of each page to indicate the question number. If there are multiple parts to this question, write the part letter with your response.

Class information for this question

```
public class WordChecker
private ArrayList<String> wordList
public boolean isWordChain()
public ArrayList<String> createList(String target)
```

GO ON TO THE NEXT PAGE.