


Name _____ Period _____

1. The `GradBookStats` class is intended to compute basic statistics associated with different assignments in a gradebook. Below is a portion of a gradebook.

	Exam 1	Exam 2	Exam 3	Lab 1	Lab 2	Lab 3	Project 1	The number of assignments continues. 
Bart	5	1	3	1	2	3	3	
Homer	4	4	4	4	4	4	4	
Wilma	4	5	2	5	3	4	4	
Averages	4.33	3.33	3.0	3.33	3.0	3.66	3.66	

The grade book above can be visualized as a series of parallel arrays as follows,

```
String assignments[] = {"Exam 1", "Exam 2", "Exam 3", "Lab 1", "Lab 2", "Lab 3", "Project 1", ...};
int Bart[] = {5, 1, 3, 1, 2, 3, 3, ...};
int Homer[] = {4, 4, 4, 4, 4, 4, 4, ...};
int Wilma[] = {4, 5, 2, 5, 3, 4, 4, ...};
/* averages array implementation not shown */
```

- (a) In the space below write code that could be used to calculate the average of each assignment, then store the resulting average in a new array called `averages`. Each index in `averages` should map to the appropriate assignment. The number of assignments is not known; therefore, `averages` should be initialized in terms of the length of the `assignments` array. You must also be mindful that the number of digits to the right of the decimal should not exceed 2. For example, the Exam 1 average should be reported as 4.33, not 4.333333333333333

```
public class GradeBookStats{
    public static void main{

        double averages[] = new double[assignments.length];
        for(int i = 0; i < assignments.length;i++){
            double tempTotal = Bart[i] + Homer[i] + Wilma[i];
            //below calculates the average and converts it to the
            //correct decimal places
            int tempAverage = (int)(tempTotal/3*100);
            averages[i] = tempAverage/100.0;
        }

    }
}
```

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- (b) The mode of a data set refers to the value that occurs most often. The mode for each assignment is shown below.

	Exam 1	Exam 2	Exam 3	Lab 1	Lab 2	Lab 3	Project 1	mode
Bart	5	1	3	1	2	3	3	3
Homer	4	4	4	4	4	4	4	4
Wilma	4	5	2	2	3	3	2	2

In the space below write code that could be used to calculate the mode for a given student. Where `student` represents an array of scores received by a student. For example,

```
int student[] = Bart;
```

The score that occurs most often should be assigned to the variable `mode`.

```
public class GradeBookStats{
    public static void main{

int Bart[] = {5,1,3,1,2,3,3};
int Homer[] = {4,4,4,4,4,4,4};
int Wilma[] = {4,5,2,5,3,4,4};
int student[] = Bart;
int mode = 0;
int count = 0;

        for(int i = 0; i < student.length; i++){
            int tempMode = student[i];
            int tempCount = 0;
            for(int j = 0; j < student.length; j++){
                if(student[i] == student[j]){
                    tempCount++;
                }
            }
            if(tempCount > count ){
                mode = tempMode;
                count = tempCount;
            }

        }

    }
}
```

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2. The `Vocab` class, is used to analyze words in terms of their presence in a vocabulary list. For example,

Consider the vocabulary and word lists below which are stored in the arrays `vocabList` and `wordList`, respectively.

```
String vocabList[] = {"time", "food", "dogs", "cats", "health", "plants", "sports"};
String wordList[] = {"dogs", "toys", "sun", "plants", "time"};
```

The `Vocab` class does the following,

- Counts the number of words in `wordList` that are not in the `vocabList` and stores this value in `countNotInVocab`
- Creates a new array called `missingVocab` that is the same length as the value of `countNotInVocab`
- Stores the missing vocab in the `missingVocab` array

The following example illustrate the behavior of the `Vocab` class.

`vocabList`

"time"	"food"	"dogs"	"cats"	"health"	"plants"	"sports"
--------	--------	--------	--------	----------	----------	----------

`wordList`

"dogs"	"toys"	"sun"	"plants"	"time"
--------	--------	-------	----------	--------

`missingVocab`

"toys"	"sun"
--------	-------

(a) Write code that could be used to count the number of words in `wordList` that are not found in `vocabList`. The final value should be stored in the variable `countNotInVocab`.

```
public class Vocab{
    public static void main{
String vocabList[] = {"time", "food", "dogs", "cats", "health", "plants", "sports"};
String wordList[] = {"dogs", "toys", "sun", "plants", "time"};
String missingVocab[];
int countNotInVocab = 0;
```

```
String notFound = "";

    for(int i = 0; i < wordList.length; i++){
        boolean found = false;
        for(int j = 0; j < vocabList.length;j++){
            if(wordList[i].equals(vocabList[j])){
                found = true;
            }
        }
        if(found == false){
            notFound += wordList[i] + ",";
        }
    }
missingVocab = notFound.split(",");
countNotInVocab = missingVocab.length;

    }
}
```

