



Fall 2021 AP CS A Lesson 5.6

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STANDARDS REFERENCED:

CSTA 11-12th grade standards: 3B-AP-12: Compare and contrast fundamental data structures and their uses.

NY State: 9-12.CT.7

Design or remix a program that
utilizes a data structure to maintain
changes to related pieces of data.

9-12.CT.6

Demonstrate how at least two classic algorithms work and analyze the trade-offs related to two or more algorithms for completing the same task.



Do now

be sure to: Get out your binder. Copy goal and answer **do now** questions below. Show all work or write a complete sentence for each answer:

The mathematician George Polya said you could use the four steps to the left to solve **any problem**. Read the steps then answer the questions below:

- A. What parts of this method do you agree with? What do you disagree with?
- B. What's the difference between making a plan and carrying out a plan?
- C. What are some strategies you could use if you don't understand a problem?

how to solve it

1. Understand the task:
 - a. Read the problem carefully.
 - b. What should be the output look like?
2. Make a plan:
 - a. Write out your algorithm in pseudocode
3. Execute the plan:
 - a. Work through your strategy step by step
4. Review your work:
 - a. Does your solution make sense?
 - b. If not go back to (2). Do it again!!

class: AP CS A goal: HDW use the How To Solve It method to tackle free response problems?

- A. Answers will vary. Students might complain that some problems are impossible to understand or impossible to solve.
- B. Making a plan is coming up with the series of steps you will need to perform to solve a problem. Carrying it out is actually doing it. This is like the difference between writing a recipe for cake and actually baking.
- C. Reread the problem, highlight key words. Look up any words you don't understand. Figure out whaty question is being asked



framing

- **what:** use the How To Solve It method to tackle free response problems
- **why:** This method helps organize how we solve free response problems
- **where to:** Comparing Java arrays and Python lists

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Activity: Practice with free response problems

Work through each problem in the worksheet. For each problem...

1. **Understand the problem:** Read carefully. Describe the task your solving in one sentence.
2. **Make a plan:** Write out a code in pseudocode (again in your notes).
3. **Execute your plan:** Translate your pseudocode into Java. Write it in your worksheet.
4. **Review your work:** Does your code make sense? How do you know?

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Practice problem #1

be sure to: Review your work. Be prepared to share out!

Complete the `divBySum` method using an enhanced for loop. Assume that `arr` is properly declared and initialized. The method must use an enhanced for loop to earn full credit.

```
/** Returns the sum of all integers in arr that are divisible by
    num
    * Precondition: num > 0
    */
public static int divBySum(int[] arr, int num)
```

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```
public static int divBySum(int[] arr, int num)
{
    int counter = 0;
    for (int item : arr){
        if ( item % num == 0){
            counter += item;
        }
    }
    return counter
}
```



Practice problem #2

be sure to: Review your work. Be prepared to share out!

An array of String objects, words, has been properly declared and initialized. Each element of words contains a String consisting of at least 3 lowercase letters (a-z).

Write a code segment that uses an enhanced for loop to print all elements of words that end with "ing". As an example, if words contains {"ten", "fading", "post", "card", "thunder", "hinge", "trailing", "batting"}, then the following output should be produced by the code segment.

```
fading
trailing
batting
```

Write the code segment as described above. The code segment must use an enhanced for loop to earn full credit.

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```
for (String word : words){
    int length = word.length();
    String ending = word.substring(length - 3, length);
    if (ending.equals("ing")){
        System.out.println(word)
    }
}
```



Practice problem #3a

be sure to: Review your work. Be prepared to share out!

(a) Write the countNotInVocab method. Assume that there are no duplicates in wordArray. You must use findWord appropriately to receive full credit.

```
/** Counts how many strings in wordArray are not found in theVocab, as described in
 * part (a).
 */
public int countNotInVocab(String[] wordArray)
```

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```
public static int divBySum(int[] arr, int num)
{
    int counter = 0;
    for (int word : wordArray){
        if ( !(word.findWord()) ){
            counter ++;
        }
    }
    return counter
}
```



Practice problem #3b

be sure to: Review your work. Be prepared to share out!

Write the `notInVocab` method (**see handout**). Assume that there are no duplicates in `wordArray`. You must call `findWord` and `countNotInVocab` appropriately in order to receive full credit.

```
/** Returns an array containing strings from wordArray not found in theVocab,  
 * as described in part (b).  
 */  
public String[] notInVocab(String[] wordArray)
```

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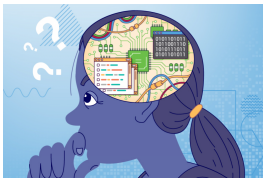
```
public String[] notInVocab(String[] wordArray) {  
    int count = CountNotInVocab(wordArray);  
    String[] newArray = new String[count];  
    counter = 0;  
    while (counter < count){  
  
    }  
}
```




Reflection: Thinking about thinking

be sure to: Answer each question below with a complete sentence.

1. How useful was the how to solve it method for solving these problems?
2. What would you do differently?



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