MAT 335E Programming Algorithms

Lab-11 / CRN : 10611

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1 Question 1

Write a java program which includes a static method named "**longArray**" that accepts two array of strings a1 and a2 as parameters and returns a new array a3 such that each element of a3 at each index i stores whichever string has greater length between the elements at that same index i in arrays a1 and a2. If there is a tie, take the element from a1.

For example, if a1 and a2 store the following elements:

String[ ] a1 = {"star","**pie**","**jelly bean**","car"};

String[ ] a2 = {"**cookie**","fig","banana","**soda**"};

Then your method should return the new array {"cookie","pie","jelly bean","soda" }.

If the arrays a1 and a2 are not the same length, the result returned by your method should have as many elements as the larger of the two arrays. If a given index i is in bounds of a1 but not a2 (or vice versa), there are not two elements to compare, so your results array's element at index ishould store the value "oops". For example, if a1 and a2 store the following elements:

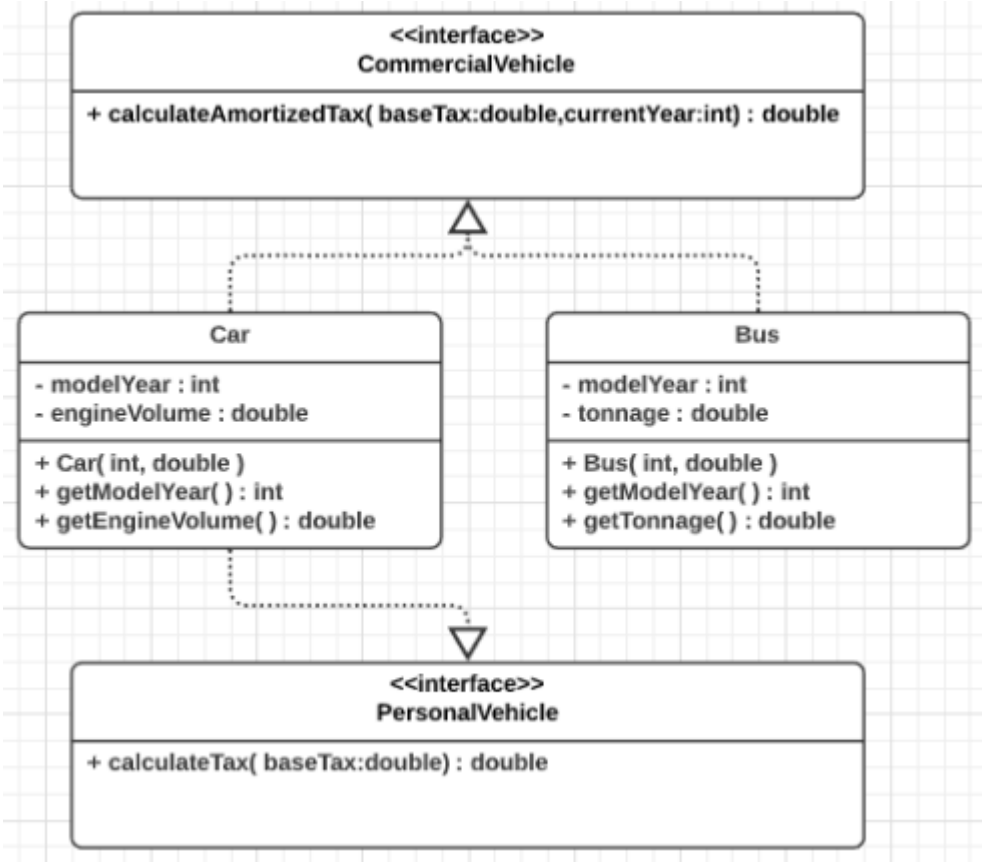
String[ ] a1 = {"**Splinter**","Leo","**April**","Don","Raph"};

String[ ] a2 = {"Krang","**Shredder**","Bebop"};

Then your method should return the new array {"Splinter","Shredder","April","oops", "oops" }.

2 Question 2

Write a Java source code of the UML diagram below and a test class to run your program.



Class Car:

- **calculateTax():** This method calculates the tax as product of the vehicle's engine volume and the tax base.
- **calculateAmortizedTax():** Tax can be reduced 10 percent for each year. After 9 years, amortization rate should be taken as 0.9(constant).

Class Bus:

- **calculateAmortizedTax():** The amortization tax of this vehicle is the product of the tax base and two specially determined rates. These rates are called tonnage and age rates. The tonnage and age rate is calculated as follows,respectively.
  - If tonnage is less than 1, then tonnage rate is 1. If tonnage is between 1 and 10, then tonnage rate is 1.4 and tonnage rate is calculated as 1.6 for a vehicle with its tonnage greater than 10.
  - Age rate is determined by multiplying age with 0.05 coefficient. If age rate is greater than 2, this ratio should be taken as 2(constant).