COSC 190

Assignment 2

Due Date: February 9th, 2024

Instructions: All required files are to be placed in a package **cosc190_assignment_2**.

Question 1 [05 marks]

In the class called RecursiveMethods complete the **recursive** static method **reverse** that will accept a string and return the reverse of that string. For example, if you provided this method with the string "Hello There" it would return "erehT olleH". *[Feel free to add helper methods if needed]*

The method signature:

public static String reverse (String sVal)

Question 2 [10 marks]

In the class RecursiveMethods complete another static ***recursive*** method called **Bin2Dec** which will take a binary number expressed as a string and return the integer equivalent to that binary number.

For example, if given the string "**00100110**" the method would return the value **38**. This must be done recursively. *[Feel free to add helper methods if needed]*

The method signature will be:

public static int bin2Dec(String sBinNumber)

Question 3 [20 marks]

In the class RecursiveMethods complete another static ***recursive*** method called **replaceAll** which will replace all occurrences of an old word with a new word in all files with the suffix **.txt** in each directory and in sub-directories of that directory. *[The replaced content should be stored in the same file. i.e., the replaced content will overwrite the old content].*

The method signature will be:

public static int replaceAll(String oldWord, String newWord, String filePath)

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Question 4 [60 marks]

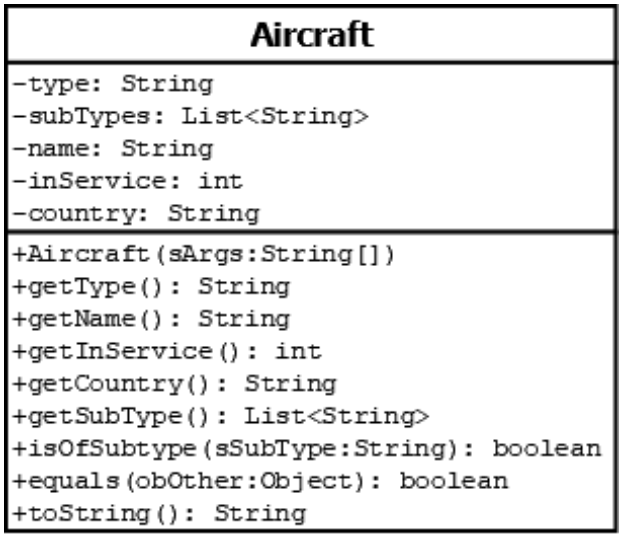
Provided to you is a csv file, **WWIIAircraft.csv**, that lists all the aircraft that were used in the 2nd world war. The csv file details the following for each aircraft:

- Aircraft Type
- Aircraft Sub-Type
- Name
- First year of service (year introduced)
- Country of Origin

Using this CSV file as a base you are required to do the following:

Aircraft Class [10 marks]

Using the following UML diagram as a basis to complete an Aircraft class.



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AirQuery Class [50 marks]

You are provided an AirQuery class which will have the following Stream Based Static methods associated with it. Note that ***you must use*** a stream-based approach when implementing each of these methods. ***[No loops are allowed in the code for these methods].***

public static List<Aircraft> loadInfo(String sPath)

[05 marks]

This method will load the information stored in the given csv (identified by the path) into a List item that is returned. You must use a streams-based approach to this question.

public static List<String> getCountryList(List<Aircraft> obList)

[05 marks]

This method will return a list of (unique) country names of all countries that produced Aircraft for the 2nd world War. The list should be sorted by country name.

public static ArrayList<String> identifyTypes(List<Aircraft> obList)

[05 marks]

This method will return a list of (unique) types of planes that were produced for WWII.

public static int getCount(List<Aircraft> obList, String sCountry)

[05 marks]

This method will return an integer that identifies the number of aircraft that the given country produced for WWII.

public static List<Aircraft> getListByType(List<Aircraft> obList, String sType)

[05 marks]

This method will return a List of Aircraft that are of the given type.

private static List<Aircraft> getListByTypeSortYear(List<Aircraft> olList, String sType)

[05 marks]

This method will return a List of Aircraft that are of the given type. The list will be sorted by the year the plane was introduced in.

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public static List<String> getNamesBySubTypeYear(List<Aircraft> obList, String sSubType, int nYear)

[05 marks]

This method will return a List of Aircraft names that are of the given Sub-type and first appeared in the given year.

public static List<String> getCountByCountry(List<Aircraft> obList)

[05 marks]

This method will return a List of Strings where colon separated entry in the list details the Country and the number of planes they produced. For example, "Germany:158" would indicate that Germany produced 158 different types of Aircraft in WWII.

public static List<String> getCountByType(List<Aircraft> obList, int Year)

[05 marks]

This method will determine for each Type of Aircraft in the list, the number of aircraft that first appeared of that type in the given year. Each string in the list will be a colon separated string that identifies the type, the year it was introduced, and the number of that type introduced that year. For example, one of the individual strings might be **`"Seaplanes:1941:7"`** which would indicate that in 1941, 7 new types of Seaplanes were introduced.

public static List<String> getSubTypes(List<Aircraft> obList)

[05 marks]

This method will return a List off all the unique sub types in the aircraft list. This is probably the hardest question on this assignment (given that this must be written using streams).

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Question 5 [15 marks]

In class Q5, given the following code:

```
public static int doOper (Function<Integer[], Integer> oper, Integer[] aVals)
{
        return oper.apply(aVals);
}

public static void main(String[] args)
{
        Integer[] aVals = { 2, 7, 10, 1 };

        System.out.printf("The first value is %d\n", doOper(getFirst, aVals));
        System.out.printf("The Last value is %d\n", doOper(getLast, aVals));
        System.out.printf("The Average value is %d\n", doOper(getAverage, aVals));
}
```

Write appropriate Lambda definitions for **getFirst**, **getLast**, and **getAverage**.