CSCI 2251, Fall 2018
Programming Assignment 2 – RentalDue

This assignment has three objectives:

1. to apply inheritance to objects
2. to implement interface
3. to apply polymorphism to the class hierarchy
4. to generate UML class diagram with object oriented design

Problem Description

A small real estate investor company in Albuquerque, New Mexico has conducted their residential rental business since 2010. Their business expanded from a few single-family houses to a few dozen houses and a couple of apartment complexes. The monthly rental fees for single-family house are $900.00, $1,100.00, and $1,300.00 for one, two, and three bedroom respectively. The monthly rental fees for apartment are $600.00 and $800.00 for one and two bedroom respectively.

Due to the increase of business tax and other expenses, the company decided to increase the single-family house rent by 4% and the apartment rent by 8%. You are going to write a program to compute the rent for the two type rentals. In your program, you need to have at least the followings:

a) An interface, `Payment`, for the two type of rentals to standardize the rent computation.
b) A super class, `RentalProperty`, for different rental properties.
c) Two subclasses: `SingleFaimlyRental` and `ApartmentRental` for the two different rental properties.
d) Apply polymorphism to print the rent due using a method, `OutputCurrentRent()`.

You need to open a text file, `rentalDB`, and get the rental information for your program. The record format of `rentalDB` as follows:

Field 1: rental type – S means single-family rental, A means apartment rental
Field 2: rental ID – a 7 characters rental property identification
Field 3: number of bedrooms – 1 means 1-bedroom, 2 means 2-bedroom, 3 means 3-bedroom
Note: A blank separates two fields.

Example of the `rentalDB` text file as follow:

```
S SABQ138 3
A AABQ205 2
S SABQ127 1
S SABQ126 2
A AABQ302 2
. . .
```

The above example represents:
Single-family rental, ID number SABQ138, three bedrooms
Apartment rental, ID number AABQ205, two bedrooms

Single-family rental, ID SABQ127, one bedroom
. . .

The output of your method `OutputCurrentRent()` method should look like the following (sort the output by the number of bedrooms followed by the rental unit ID number):

```
Single-Family Rental Summary:
House ID Number     # of Bedrooms       Rental Due
==============     =============       ==========
   SABQ138               3              $1,352.00
   SABQ126               2              $1,144.00
   SABQ127               1                $936.00
   . . .

Apartment rental Summary:
Apartment ID No.    # of Bedrooms       Rental Due
================   =============       ==========
   AABQ127               2                 $864.00
   AABQ126               1                 $648.00
   . . .
```

Specifications

Your program must meet the following specifications:

- Work on your own
- The name of the source code file must be the same as the class names as described above. You need to have a `RentalDueTest` class (file name `RentalDueTest.java`) that contains the main method and the main method may simply invoke other methods based on your design.
- Comments at the top with short description of each java program, including your name, date and course title.
- We expect programming assignments to be implemented using Java 1.8 (the version installed in the SB-0208 and SB OpenLab VMware Horizon, SRC 203 POD 14). Your code will be tested on one of the machines (or machines installed the same Java compiler and JVM) in the either SB-0208, SB OpenLab, or SRC 203, so make sure your code runs on those machines.
- Two part submissions (Blackboard):
    - First part: design document, how to approach and solve this problem, UML class diagrams, and any other special features of your program.
    - Second part: your java source code file(s) (.java file(s) only).
- No late, refer to the syllabus for the late policy.

I will test your program as follows (assume all your .java code and RentalDueTest.java are in the default folder)

```
javac RentalDueTest.java
java RentalDueTest
```