

COMP101 Lab4: Apartment rental report

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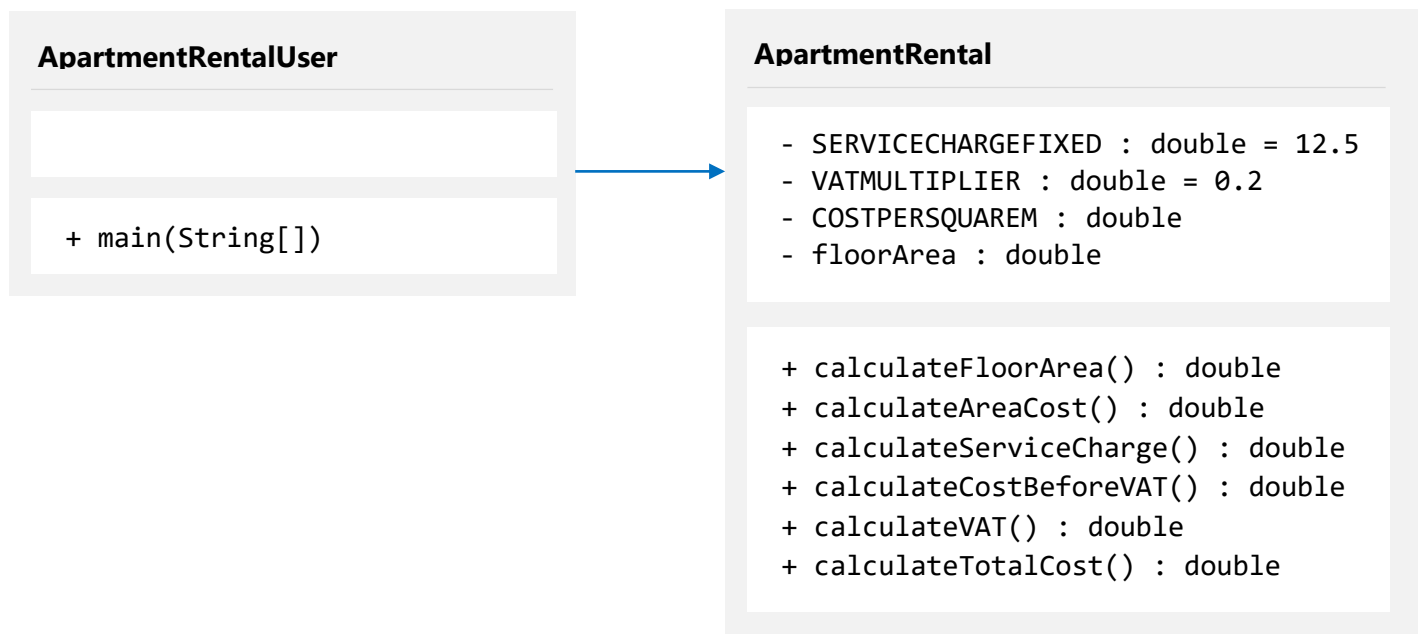
Requirements

The problem to solve were to write a program that will calculate and print the floor area (a real number in m²), the floor area cost, the service charge, the cost before VAT, the VAT and the total cost for each type of apartment (basic, smart, luxury) when we give the width and length of apartment.

Analysis and design

I wrote this program in two classes – `ApartmentRentalUser` – class where I call another `ApartmentRental` class. In `ApartmentRental` class I created three constants of double type which one of them is set conditionally later (the value of basic or smart or luxury). In constructor method I set `floorArea` variable to be used in further methods.

Class diagram



Pseudocode

```
CLASS ApartmentRental
    LOCAL DATA SERVICECHARGEFIXED = 12.5, VATMULTIPLIER = 0.2, COSTPERSQUAREM - all
        of these are double constants
    LOCAL DATA floorArea - double variable
    METHOD ApartmentRental (Constructor method)
        INPUT width, height, costPerSquareM - all of these are double
        COMPUTE area of the floor by multiplying width and height and save to the
            floorArea variable
        SET the COSTPERSQUAREM constant with value of costPerSquareM
    CALCULATE the floor area, the floor area cost, the service charge, cost before
        VAT, the VAT and total cost - each of them in separate method.

CLASS ApartmentRentalUser
    METHOD main
        INPUT args
        OUTPUT
        READ width, length from the keyboard
        PRINT the floor area
        PRINT the floor area cost, service charge, cost before VAT, the VAT and
            total cost of apartment for each type of apartment (basic, smart,
            luxury)
```

Testing

INPUT VALUES	EXPECTED RESULT
<p>Width of apartment = 0 Length of apartment = 0</p> <p>OR</p> <p>Width of apartment = 0 Length of apartment = 2</p> <p>OR</p> <p>Width of apartment = 2 Length of apartment = 0</p>	<p>Floor area = 0.00</p> <p>Basic Floor area cost = 0.00 Service charge = 12.50 Cost before VAT = 12.50 VAT = 2.50 Total cost of apartment = 15.00</p> <p>Smart Floor area cost = 0.00 Service charge = 12.50 Cost before VAT = 12.50 VAT = 2.50 Total cost of apartment = 15.00</p> <p>Luxury Floor area cost = 0.00 Service charge = 12.50 Cost before VAT = 12.50 VAT = 2.50 Total cost of apartment = 15.00</p>
<p>Width of apartment = 2 Length of apartment = 3</p>	<p>Floor area = 6.00</p> <p>Basic Floor area cost = 39.00 Service charge = 13.10 Cost before VAT = 52.10 VAT = 10.42 Total cost of apartment = 62.52</p> <p>Smart Floor area cost = 54.00 Service charge = 13.10 Cost before VAT = 67.10 VAT = 13.42 Total cost of apartment = 80.52</p> <p>Luxury Floor area cost = 81.00 Service charge = 13.10 Cost before VAT = 94.10 VAT = 18.82 Total cost of apartment = 112.92</p>

The finally working program returned:

CONSOLE

```
width = 0.0 length = 0.0
```

```
-----  
Floor area = 0.0
```

```
----- BASIC -----
```

```
Floor area cost = 0.00
```

```
Service charge = 12.50
```

```
Cost before VAT = 12.50
```

```
VAT = 2.50
```

```
Total cost = 15.00
```

```
----- SMART -----
```

```
Floor area cost = 0.00
```

```
Service charge = 12.50
```

```
Cost before VAT = 12.50
```

```
VAT = 2.50
```

```
Total cost = 15.00
```

```
----- LUXURY -----
```

```
Floor area cost = 0.00
```

```
Service charge = 12.50
```

```
Cost before VAT = 12.50
```

```
VAT = 2.50
```

```
Total cost = 15.00
```

```
width = 0.0 length = 2.0
```

```
-----  
Floor area = 0.0
```

```
----- BASIC -----
```

```
Floor area cost = 0.00
```

```
Service charge = 12.50
```

```
Cost before VAT = 12.50
```

```
VAT = 2.50
```

```
Total cost = 15.00
```

```
----- SMART -----
```

```
Floor area cost = 0.00
```

```
Service charge = 12.50
```

```
Cost before VAT = 12.50
```

```
VAT = 2.50
```

```
Total cost = 15.00
```

```
----- LUXURY -----
```

```
Floor area cost = 0.00
```

```
Service charge = 12.50
```

```
Cost before VAT = 12.50
```

```
VAT = 2.50
```

```
Total cost = 15.00
```

```
width = 2.0 length = 0.0
```

```
-----  
Floor area = 0.0
```

----- BASIC -----

Floor area cost = 0.00
Service charge = 12.50
Cost before VAT = 12.50
VAT = 2.50
Total cost = 15.00

----- SMART -----

Floor area cost = 0.00
Service charge = 12.50
Cost before VAT = 12.50
VAT = 2.50
Total cost = 15.00

----- LUXURY -----

Floor area cost = 0.00
Service charge = 12.50
Cost before VAT = 12.50
VAT = 2.50
Total cost = 15.00

width = 2.0 length = 3.0

Floor area = 6.0

----- BASIC -----

Floor area cost = 39.00
Service charge = 13.10
Cost before VAT = 52.10
VAT = 10.42
Total cost = 62.52

----- SMART -----

Floor area cost = 54.00
Service charge = 13.10
Cost before VAT = 67.10
VAT = 13.42
Total cost = 80.52

----- LUXURY -----

Floor area cost = 81.00
Service charge = 13.10
Cost before VAT = 94.10
VAT = 18.82
Total cost = 112.92

Encountered problems

1. I set double type for constructor class. I needed to delete the type to solve problem.
2. The program encountered calculating doubles problem. That is what console showed during the testing:

CONSOLE

...

```
Floor area = 6.0
----- BASIC -----
Floor area cost = 39.0
Service charge = 13.1
Cost before VAT = 52.1
VAT = 10.420000000000002
Total cost = 62.52
----- SMART -----
Floor area cost = 54.0
Service charge = 13.1
Cost before VAT = 67.1
VAT = 13.42
Total cost = 80.52
----- LUXURY -----
Floor area cost = 81.0
Service charge = 13.1
Cost before VAT = 94.1
VAT = 18.82
Total cost = 112.91999999999999
```

I solved this by printing using `printf` instead `println` and the program printed formatted numbers with precision of 0.01 – larger precise is not necessary because we use Pound sterling currency and it has the minimum unit of 0.01 = 1 penny.