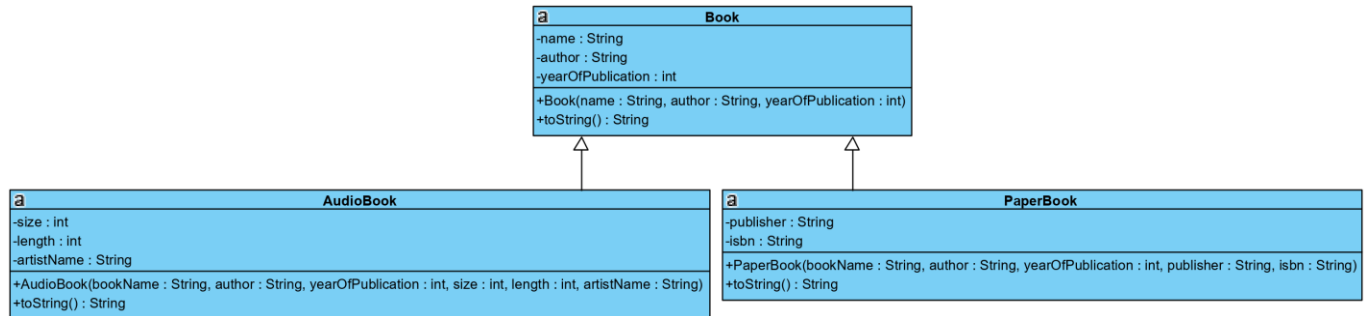


## CMPS 251 Tutorial 5 – Fall 2019

### Inheritance & Polymorphism

#### Exercise 1 – Book Class Hierarchy

Create a package named `tutorial5.excercise1` to place all the classes of this exercise.  
Implement the following class hierarchy:



- The `toString()` of **Book** should return Name - Author - Year Of Publication.
- The `toString()` of **PaperBook** should return Name - Author - Year Of Publication - Publisher - ISBN.
- The `toString()` of **AudioBook** should return Name - Author - Year Of Publication - Size - Length - Artist name.

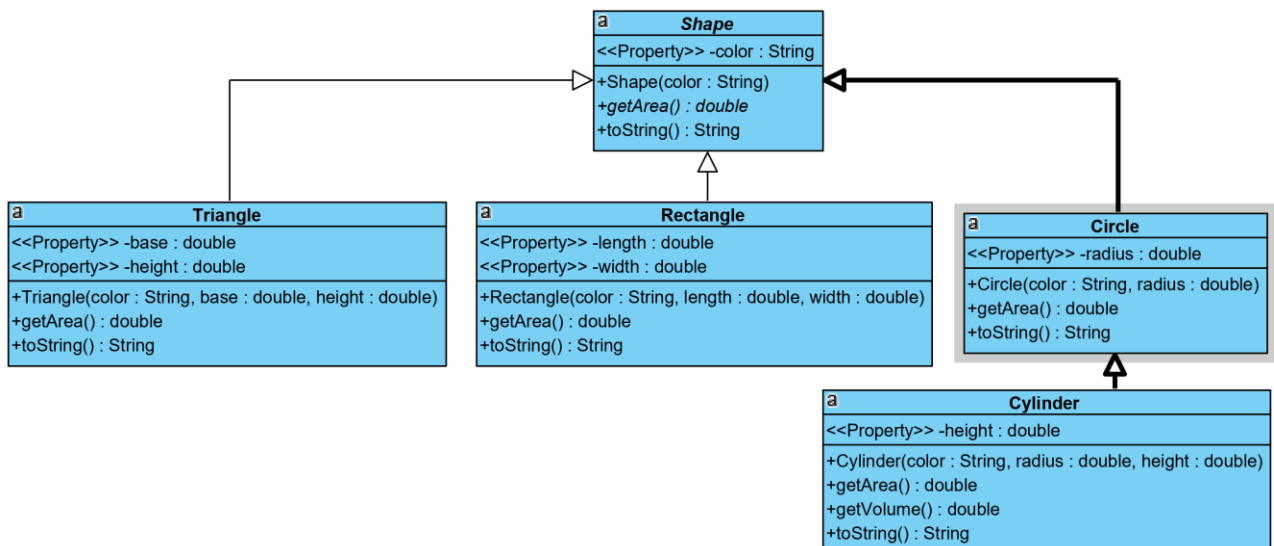
The data returned by the `toString` should be labeled (e.g., Name: Ali Baba and the Forty Thieves – Author: Hanna Diyab).

Test your implementation using the main method @

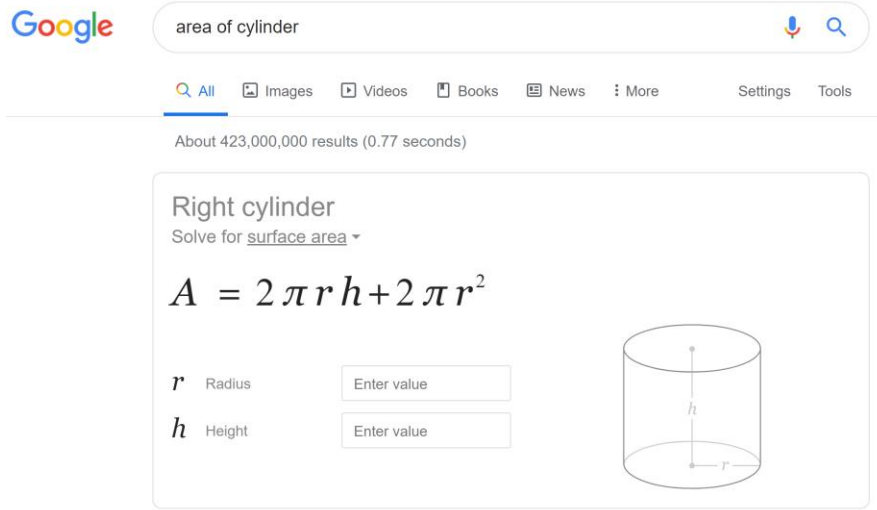
<https://gist.github.com/erradi/f59d63f7caadbeab7adbb357ea60cf0d>

#### Exercise 2 – Book Class Hierarchy

Create a package named `tutorial5.excercise2` to place all the classes of this exercise.  
Implement the following class hierarchy:



- Lookup the area of each shape on Google then implement the `getArea()` method in each class.  
E.g.:



- Implement the `toString` of each class to produce the output shown below.
- Test your implementation using the main method @

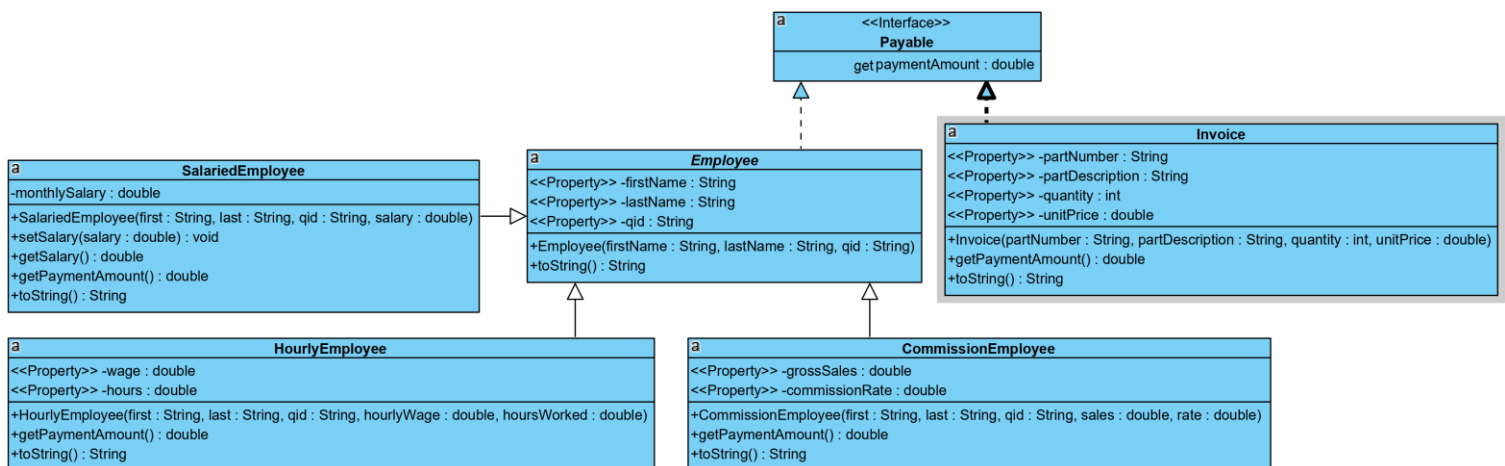
<https://gist.github.com/erradi/389426d19413d648a71cf574c8bbd26f>

```
White Circle - Area: 28.27 - Radius: 3.00
Red Cylinder - Area: 282.74 - Radius: 5.00 - Height: 4.00 - Volume: 1130.97
Blue Cylinder - Area: 226.19 - Radius: 3.00 - Height: 9.00 - Volume: 2035.75
Yellow Rectangle - Area: 43.50 - Length: 7.50 - Width: 5.80
Brown Triangle - Area: 100.00 - Base: 10.00 - Height: 20.00
```

### Exercise 3 – Employee Class Hierarchy

Create a package named `tutorial5.excercise3` to place all the classes of this exercise.

Implement the following class hierarchy:



- Note that the amount to pay for `HourlyEmployee` is `wage * hours`. For `CommissionEmployee`, it is `grossSales * commissionRate`. For `Invoice`, it is `quantity * unitPrice`.
- Test your implementation using the main method @

<https://gist.github.com/erradi/f20ad7000635db37b3f5ee0f5c986cd2>

- Exercise 1 solution is user tutorial5/exercise1 subfolder.
- Solutions for ex2 and ex3 are included in the 07-Inheritance demos posted to GitHub (see image below).

✓ 📁 > 07-Inheritance [cmps251-content master]

> 📁 JRE System Library [jdk-13]

✓ 📁 > src

> 📁 > inheritance.employee

Exercise 3  
solution

> 📁 inheritance.livingthings

> 📁 > inheritance.member

> 📁 > inheritance.shape

Exercise 2  
solution

> 📁 > simple.employee