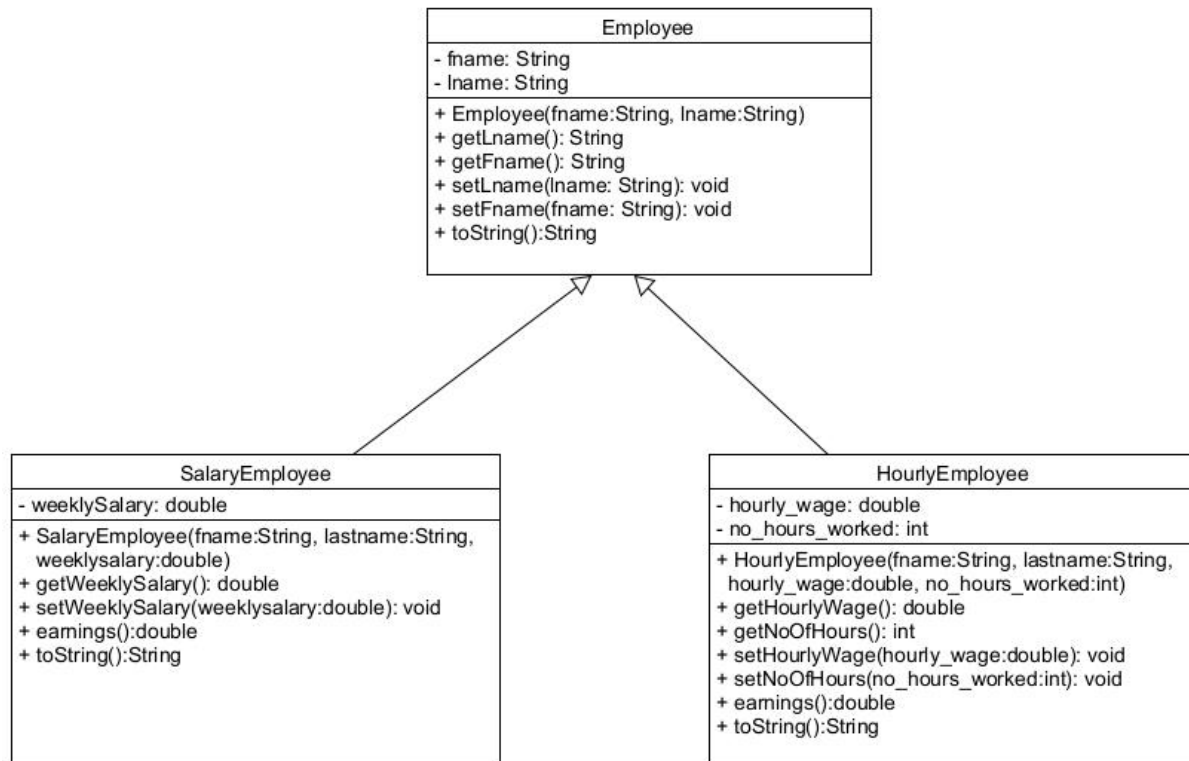# Lab 6 - Polymorphism and Abstract Classes

Task 1

- Firstly, implement all 3 classes named,Employee, Hourly Employee and Salary Employee as shown in the UML diagram below.
- SalaryEmployee class an instance variables: weeklySalary. The HourlyEmployee class has two instance variables: hourly_wage and no_hours_worked.
- Implement earnings() method in both child classes:
  - i) For SalaryEmployee : earnings = weeklySalary * 4
  - ii) For HourlySalary: earnings = no_hours_worked * hourly_wage
- Create an array for 5 employees
- Initialize them as either SalaryEmployee or HourlyEmployee
- Display details of all employees including their earnings.

Call the earning method () for each employee in the array. Does it work properly or give compilation error? Since, there is no earning method in the employee class it causes compilation error.

Change the existing classes in such a way that it resolves this issue.

Task 2

Implement the following UML diagram
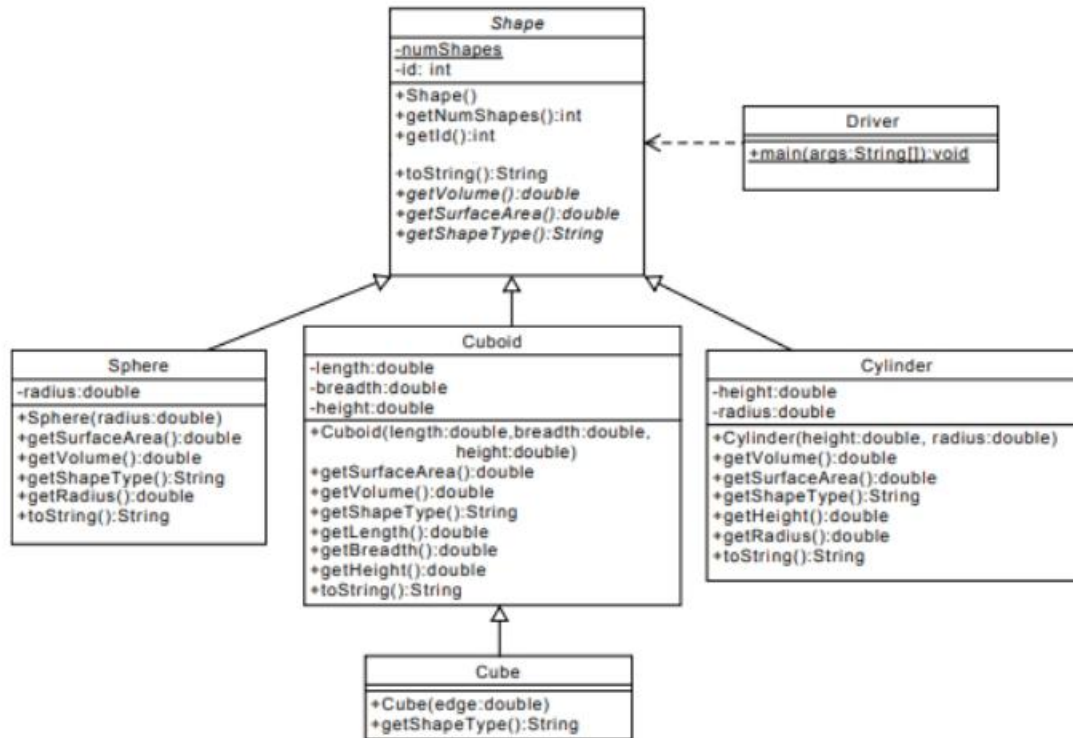
The following methods in the Shape class are abstract: getVolume(), getSurfaceArea() and getShapeType(). For other classes values for these methods are calculated by the formula given below

Class	Surface Area	Volume	Shape Type
Sphere	$4\pi r^2$	$\frac{4}{3}\pi r^3$	"Sphere"
Cuboid	$2(l \times b + b \times h + h \times l)$	$l \times b \times h$	"Cuboid"
Cylinder	$2\pi r(r+h)$	$h\pi r^2$	"Cylinder"
Cube	$6l^2$	l^3	"Cube"

In the driver class do the following:

- Create an array list of the shape which have each object of the shapes.
- Use an iterator to call and print these methods : getVolume(), getSurfaceArea() and getShapeType() for all shapes in the array list.