CMSC 132: Object-Oriented Programming II

Object and Classes
Object Oriented Programming

- An Object-Oriented Language supports the following fundamental concepts:
  - Polymorphism
  - Inheritance
  - Encapsulation
  - Abstraction
  - Classes
  - Objects
  - Instance
  - Method
Objects have **states and behaviors**.

Example: A dog has states - color, name, breed as well as behaviors – wagging the tail, barking, eating.

An object is an instance of a class.

• If we consider the real-world, we can find many objects around us, cars, dogs, humans, etc. All these objects have a state and a behavior.
A class can be defined as a template/blueprint that describes the behavior/state that the object of its type support.

```java
public class Bicycle{
    public int gear;
    public int speed;
    public Bicycle(int startSpeed, int startGear) {
        gear = startGear;
        speed = startSpeed;
    }
    public void setGear(int v){gear = v;}
    public void applyBrake(int dec){speed -= dec;}
    public void speedUp(int inc) { speed += inc; }
}
```
Java Class Example

- Fraction Class
  - Numerator
  - Denominator
  - Reduce a Fraction to Lowest Terms
  - Addition, Multiplication
  - ...

- Now, let us implement the Fraction class.
- Code will be posted on course site.