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

Object

- 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.

Class

- A class can be defined as a template/blueprint that describes the behavior/state that the object of its type support.

```
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.