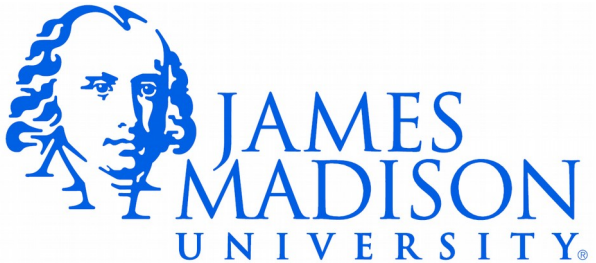
CS139 – PA3 Intro



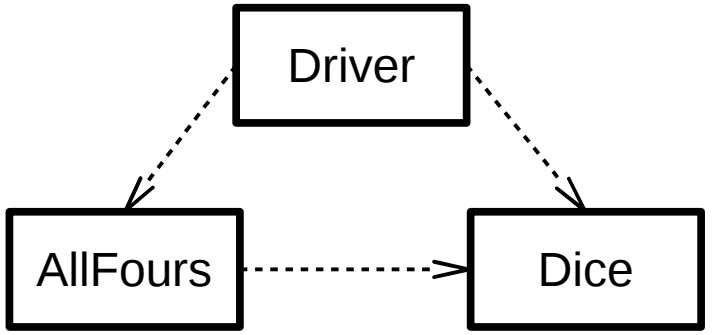
PA3 – Some New Features

- Multiple classes
- Instantiating objects
- Unit Testing
- Class-level constants

- Let's look at a similar application "All-Fours".
  - Betting game where players bet that three dice will all land on 4.

All-Fours Design

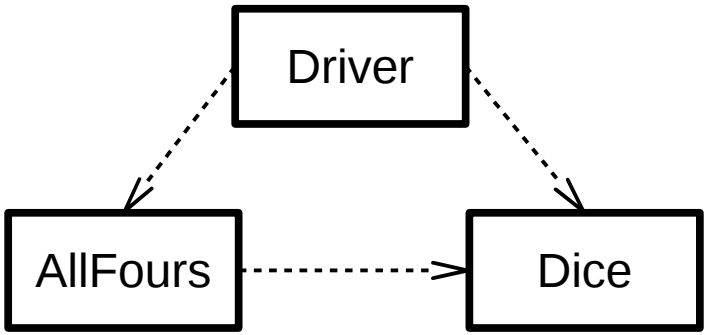
- Divide the application into three classes:



- Dice.java: This class represents three rolled dice. Handles the logic of random rolling and provides methods for accessing the results.
- AllFours.java: Contains the betting logic. Code for recognizing winning rolls and calculating payouts.
- Driver.java: Contains the code for user interaction.
- Why not put all of the Java code into one file?????

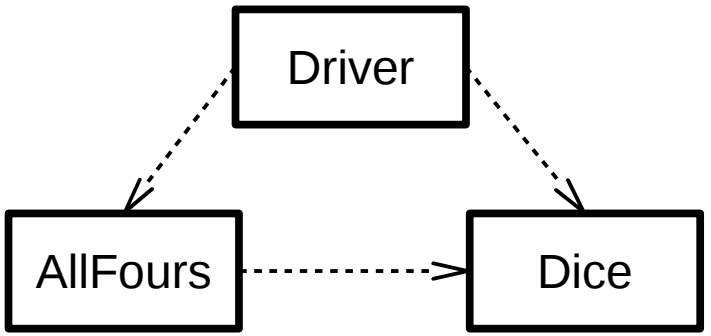
Design Goal: Maximize *Cohesion*

- Cohesion - each Java class handles a single well-defined problem.
- Cohesion leads to modular, re-usable code.
- E.g. the Dice class may be re-used in some other game that involves rolling dice.



Design Goal: Minimize *Coupling*

- Coupling – When one class depends on another class to function.
- Minimizing coupling makes the individual classes easier to code.
- The arrows illustrate dependencies:



- We can program and test the Dice class without ever looking at the other two.

Instantiating Objects

- We've seen code like this:

```
Scanner scan;
scan = new Scanner(System.in);
```

- Terminology:
  - Scanner is a class
  - "`new`" is a Java keyword for instantiating objects of a class
  - An object ties together data and methods
  - "Scanner" is a special method called a constructor that does the work of setting up the new object.
  - The scan variable will contain a reference to the new Scanner object

Instantiating Dice

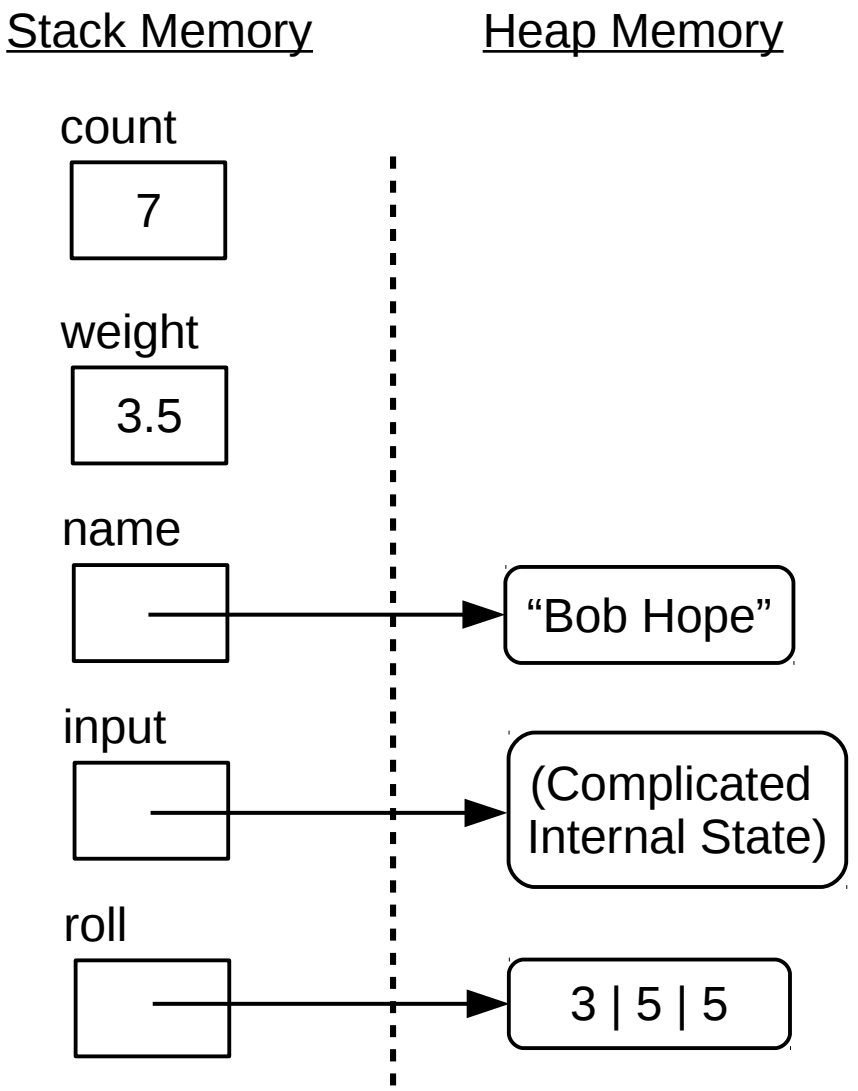
```
int count;
count = 7;


double weight;
weight = 3.5;


String name;
name = "Bob Hope";


Scanner input;
input = new Scanner(System.in);


Dice roll;
roll = new Dice(3, 5, 5);
```



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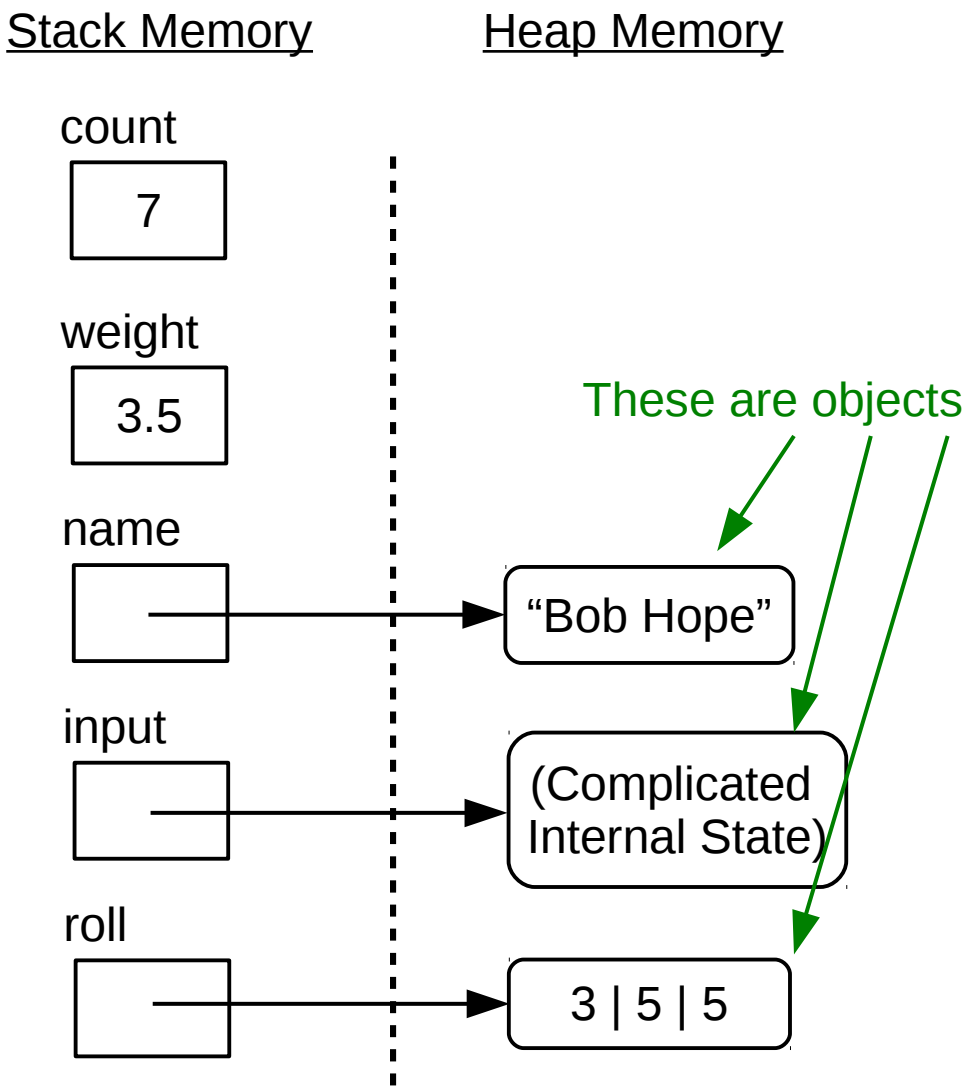

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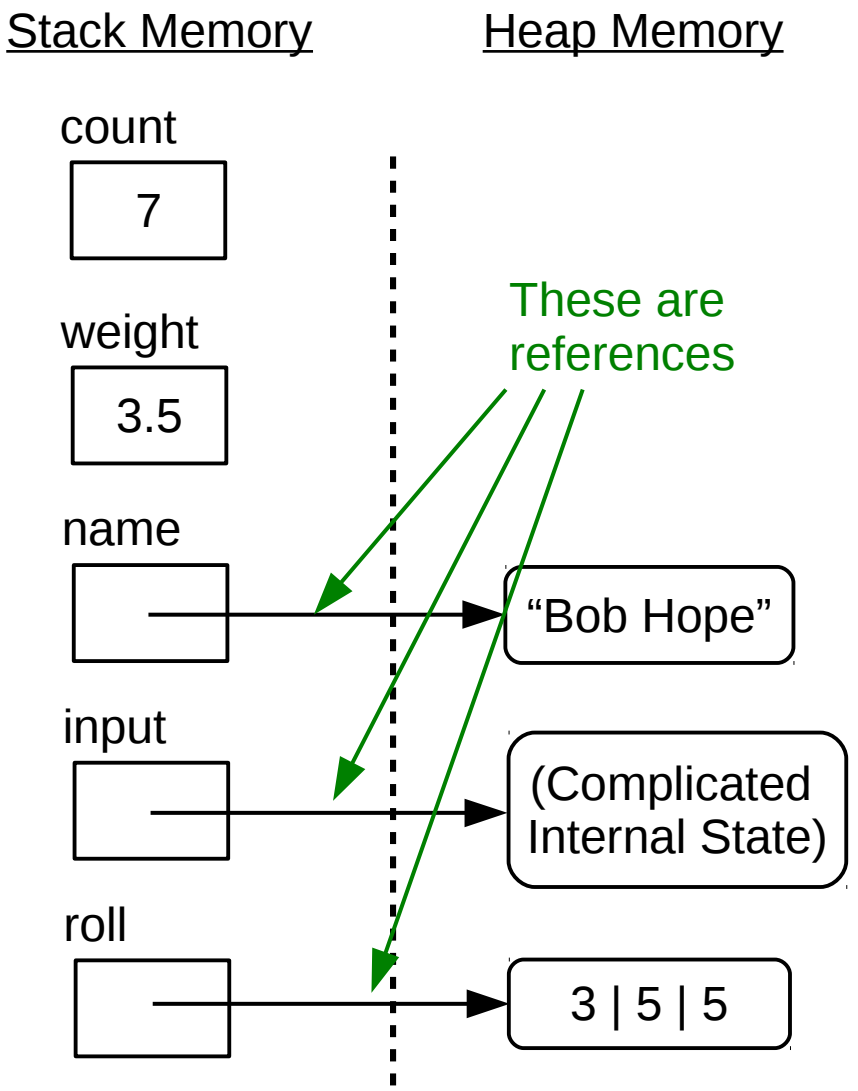
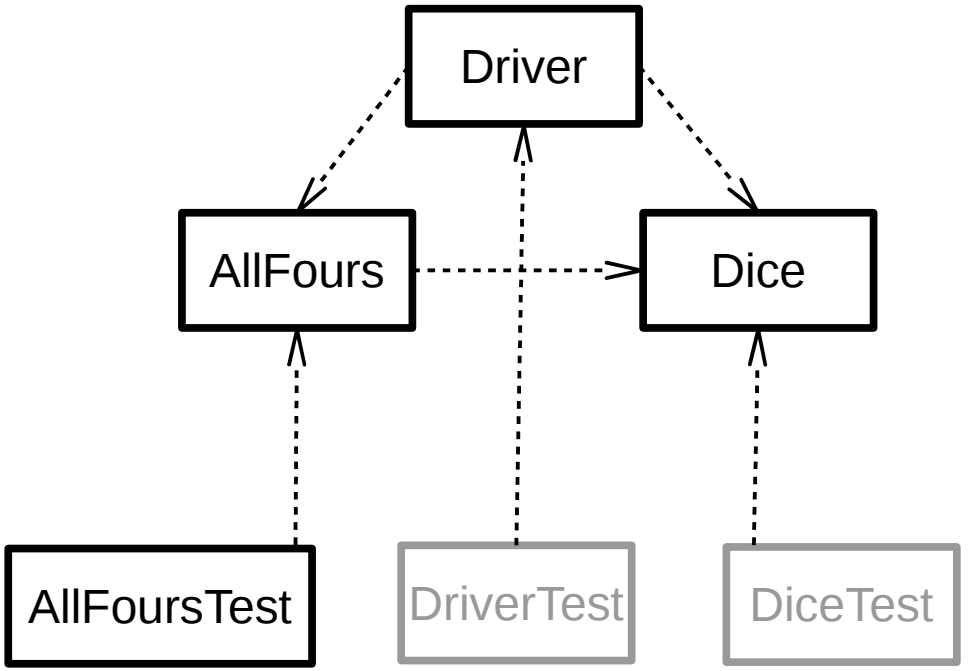


Unit Testing



Finished Application

- `AllFours.java`
- `AllFoursTest.java`
- `Dice.java`
- `Driver.java`