

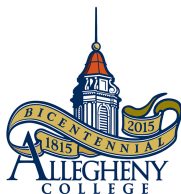
CMPSC 112

Lecture 3: Object Oriented Design, Part 1

Dr. Aravind Mohan

Allegheny College

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Last Time

- Implemented RPS.java
 - Two players: human and CPU
 - Functions to get moves, determine winner, print scores.
 - Each function handled one thing and only one thing.

Goals of All Software

- **Robustness** - In addition to producing the correct output for anticipated inputs, we also want the software to handle unexpected inputs not known in advance.
- **Adaptability** - Software should be able to evolve over time to changing conditions and environment.
- **Reusability** - The same code should be usable as a component in different systems with varying applications.

ToDo: What Else?

- Post some thoughts in the #lectures channel on Slack. What did we do well and what did we do poorly with respect to these three goals?

What is an object

- Object - An instance of a class, the primary "actors" of Java programs.
- Class - The type of the object.
- Scanner is an object
- String is an object
- Random is an object
- int, boolean, and char are not objects
- Integer, Boolean, Character ARE objects

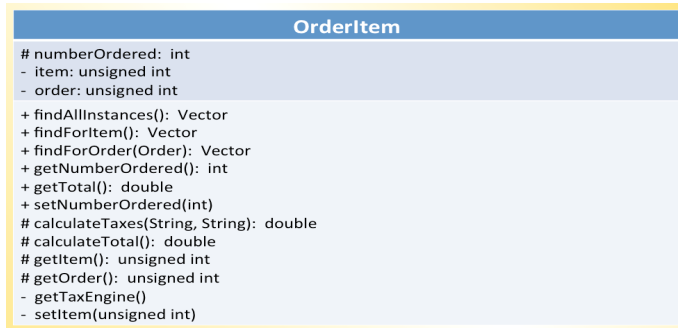
Additional Goals for OOPS

- Abstraction - Distill a complicated system down into fundamental parts. Specify what each operation does, and how it does it.
- Encapsulation - Different components of a software system should not reveal the internal details of their respective implementations. Data accessed through public interfaces.
- Modularity - Different components of a software system are divided into separate functional units, which later get integrated into a larger software system.

Unified Modeling Language (UML)

- Provides a standard way to visualize the design of a system.
- Class Diagram - Describes the structure of a system showing the system's classes, their attributes and operations, and the relationships between them.

Class Diagram



Access Control

- Public - Everything can access. The class, the package, any subclasses, any external classes.
- Protected - Everything can access except for external classes.
- Default / no modifier / "Package-Private" - Only the class and package can access.
- Private - Only the class can access.

RPS Classes

RPS

- userScore: int
- computerScore: int
- tiesScore: int
- + main()
- + roundWinner(): int
- + generateComputerChoice(): String
- + getUserInput(): String
- + playAgain(): boolean
- + playRound()
- + printScores()

Human

- points: int
- + Human()
- + getScore(): int
- + getInput(): String
- + incrementScore()
- + playAgain(): boolean

Try out

- Create a new version of RPS program with access control mechanism.
- Try to change some class members into protected and default access control.

Reading Assignment

- GT Chapter 2.1

Any Questions

- Reminder: REVIEW FORM