
Java™
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Java Puzzle Ball

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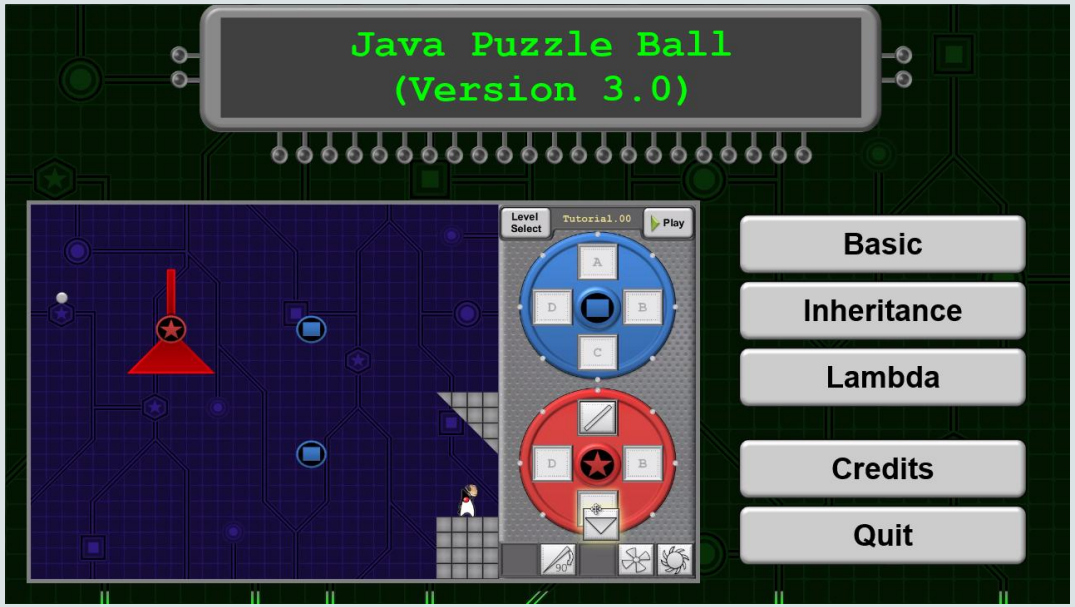
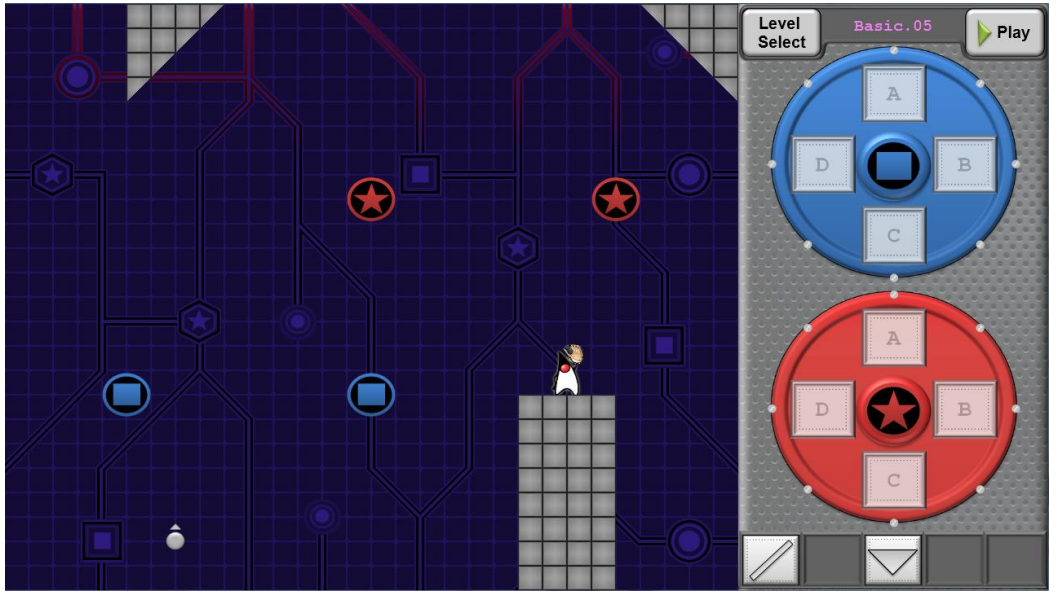
Lesson 1-2
Object Oriented Thinking and Class Design



Exercise 1

- Play **Basic Puzzles 1 through 5.**
  - Your Goal: Design a solution that deflects the ball to Duke.
- Consider the following:
  - What objects do you find on the field of play?
  - What happens when you put a triangle wall or simple wall icon on the blue wheel?

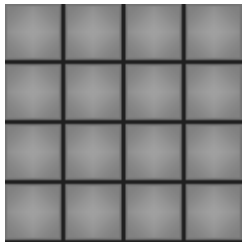
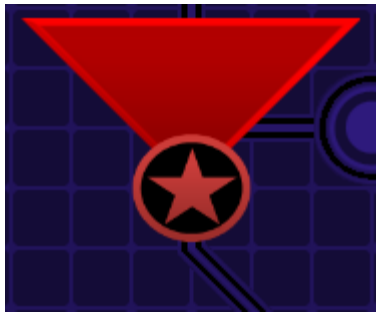
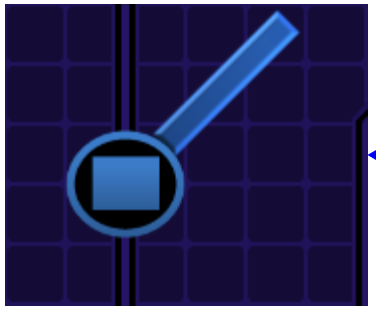


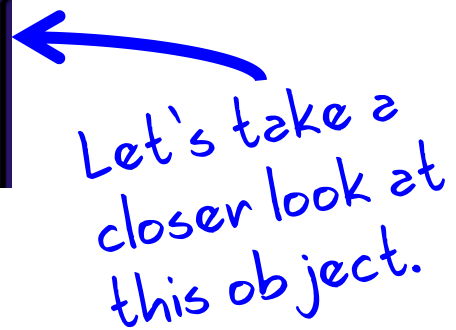
Triangle Wall Icon

Simple Wall Icon

Object Types

What objects did you find on the field of play?

- Ball 
- Duke 
- LevelGeometry 
- RedBumper 
- BlueBumper 

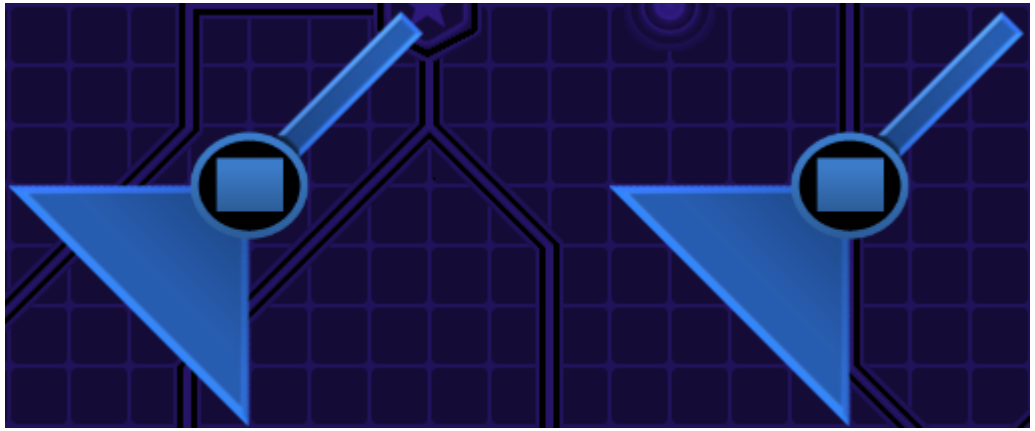


BlueBumper Objects

What happens when you put a triangle wall or simple wall icon on a blue wheel?

- A wall appears on every **instance** of a blue bumper **object**.
- Walls give bumpers **behaviors** that deflect and interact with the ball.
- All blue bumper instances share these same behaviors.

Describing a BlueBumper



- Properties:
  - Color
  - Shape
  - x-position
  - y-position
- Behaviors:
  - Make ping sound
  - Flash
  - Deflect ball (via Simple Wall)
  - Deflect ball (via Triangle Wall)

Describing a Ball

- Properties:
  - Direction
  - x-position
  - y-position

- Behaviors:
  - Make ping sound
  - Change direction
  - Change x-position
  - Change y-position

Why Does This Matter?

- We've observed important aspects of object-oriented programming.
  - Objects can be described as a combination of properties and behaviors.
  - There may be many instances of the same object type.
  - All instances of an object share the same behaviors.
- Once you understand these principals conceptually, it's simply a matter of translating ideas into Java syntax and terminology.
- Remember these observations as lessons and exercises become increasingly technical.

Translating into Java Syntax

```
1  public class BlueBumper {
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16 }
```

Java Terminology

Class declaration

```
 1 public class BlueBumper {
 2     private Color color = Color.BLUE;
 3     private Shape shape = Shape.RECT;
 4     private int xPosition;
 5     private int yPosition;
 6
 7     public void ping(){
 8         System.out.println("Ping");
 9     }
10     public void flash(){
11         System.out.println("Flash");
12     }
13     public void methodA(){
14         simpleWall();
15     }
16 }
```

Fields
(Properties)
(Attributes)

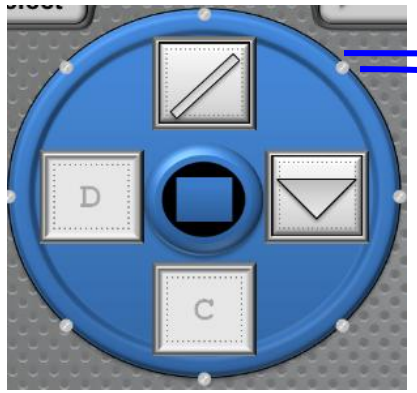
Methods
(Behaviors)

Your Challenge as a Java Programmer

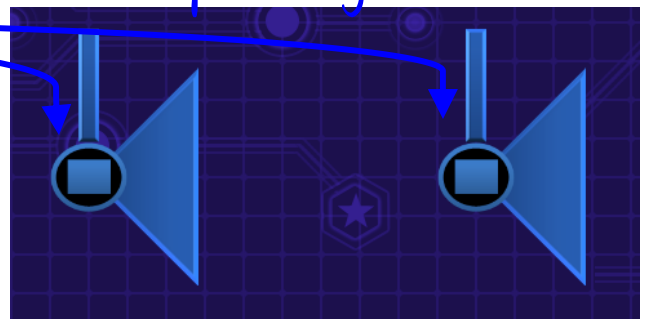
It's a design challenge similar to what you faced in Java Puzzle Ball:

- Consider what type of objects should exist in your program.
- Consider the properties and behaviors of these object types.
  - Design your code with the understanding that every instance of an object will possess the same properties and behaviors.
  - Some behaviors may be inappropriate for a given object type.

Designing the Blue Bumpers



Blue Bumper object instances

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