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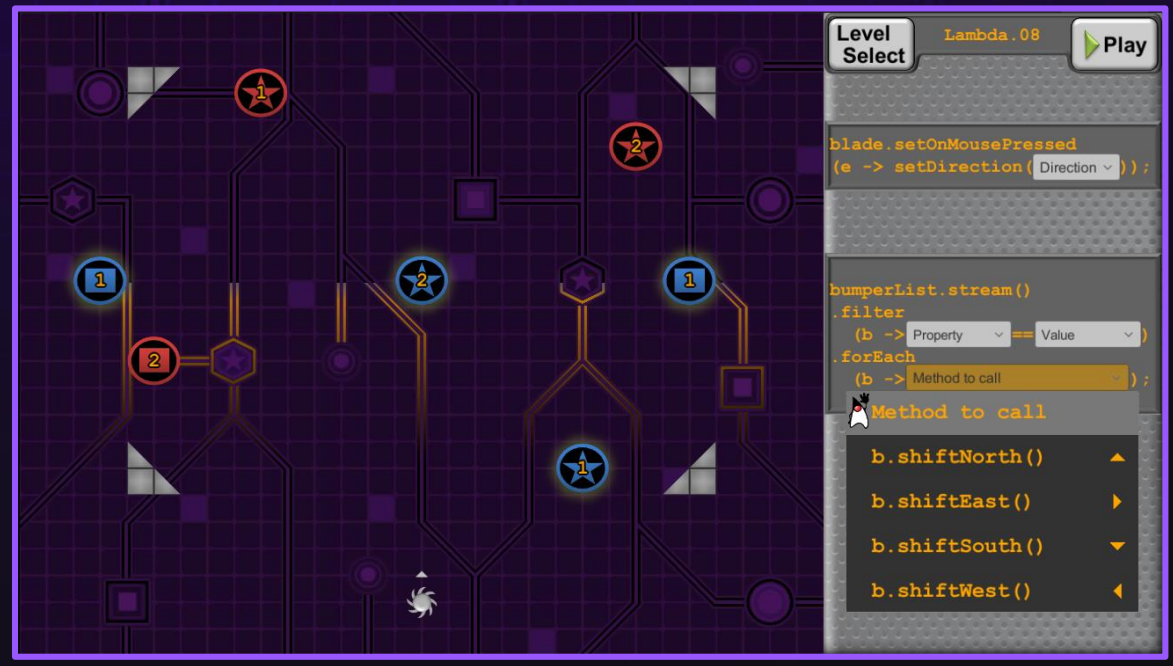
JAVA PUZZLE BALL

Lesson 4
Lambda Puzzles 1-5
Lambda Expressions, Streams, and Functional Programming

www.oracle.com/goto/JavaGame

Did You Try Lambda Puzzles 1-7?

- Can you identify use-cases for lambda expressions?



- How do these logic operators work?

  `==`

  `!=`

  `&&`

  `||`

These are Lambda Expressions

```
blade.setOnMousePressed
(e -> setDirection( Dir.NE ));
```

```
bumperList.stream()
.filter
   (b -> b.getShape() == Shape.STAR)
.forEach
   (b -> b.setShape(Shape.RECT));
```

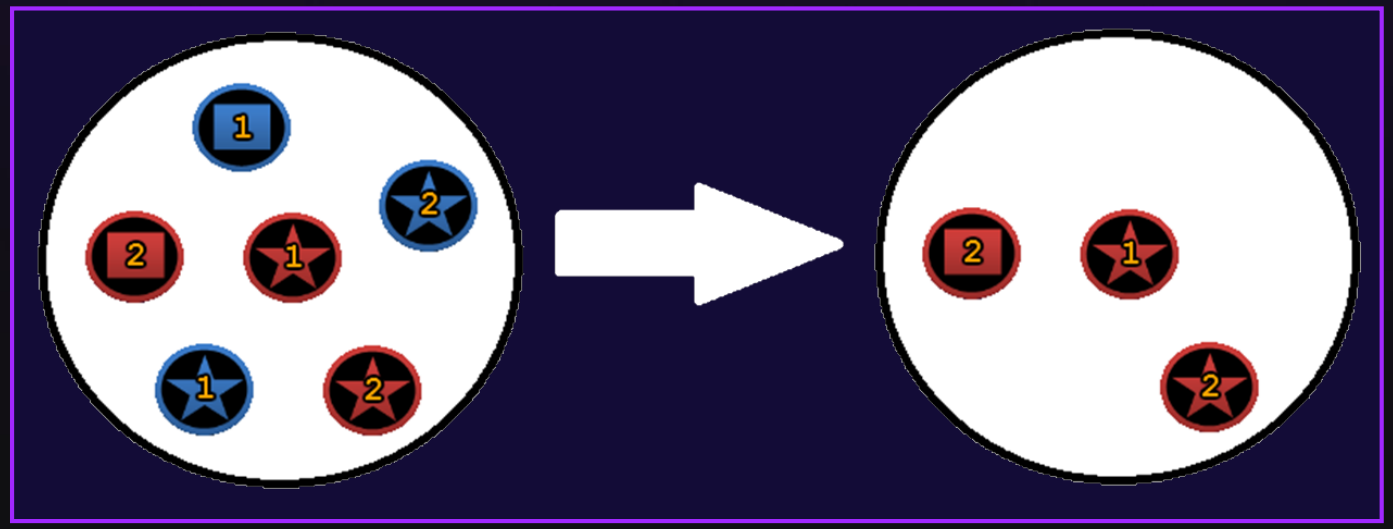
Lambda Use-Case 1

- Lambda expressions handle mouse, keyboard, and other input events.
- An event occurs when the ball/blade is pressed.
- Following the event, the lambda expression executes:
  - `e` represents the event.
  - `setDirection()` is a method which changes the ball's direction field.
  - `Dir.NE` becomes the new value of the direction field.

```
blade.setOnMousePressed
(e -> setDirection(Dir.NE));
```

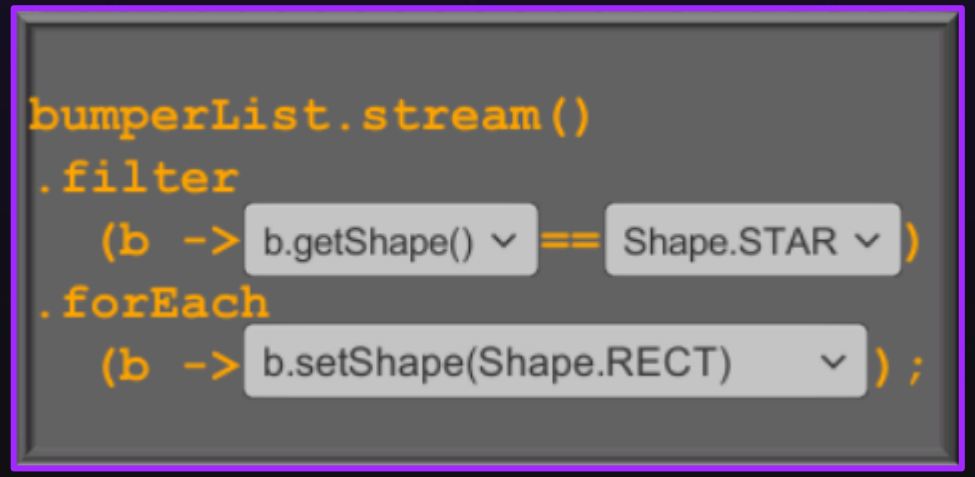
Lambda Use-Case 2

- Lambda expressions let you easily work with a collection of objects.
- As you play, you perform the same logic as the lambda code:
  - Take a collection of many bumpers.
  - Identify bumpers based on certain properties (color).
  - For each bumper matching that criteria, perform an action on it (Destroy/Preserve).



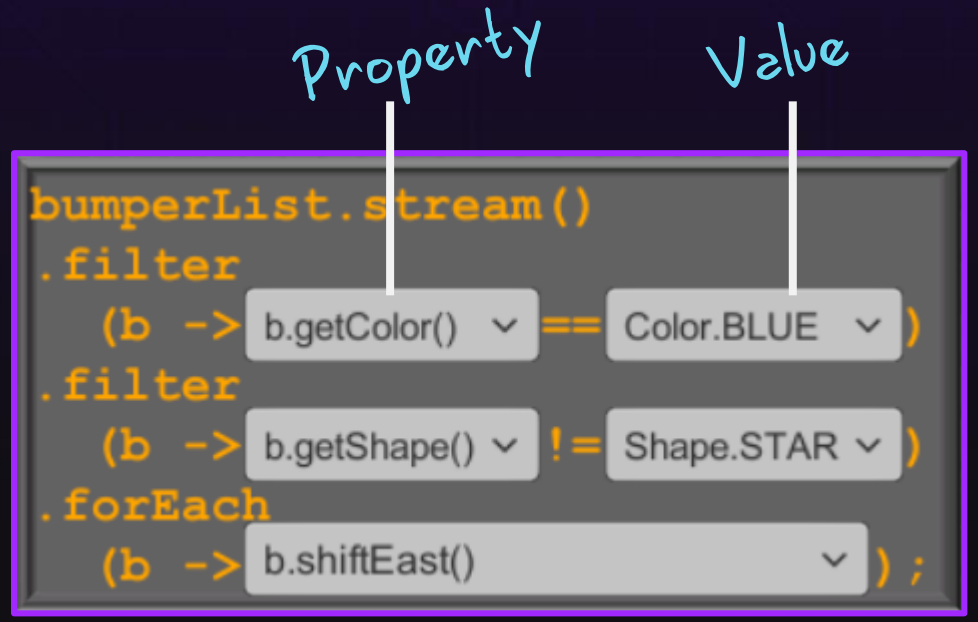
Examining the Java Code

- `bumperList` is the collection of bumpers.
- `b` represents any bumper object in the collection.
- A `filter` isolates objects based on their properties (shape, color, number).
- A method is called `forEach` object that matches the filter criteria.



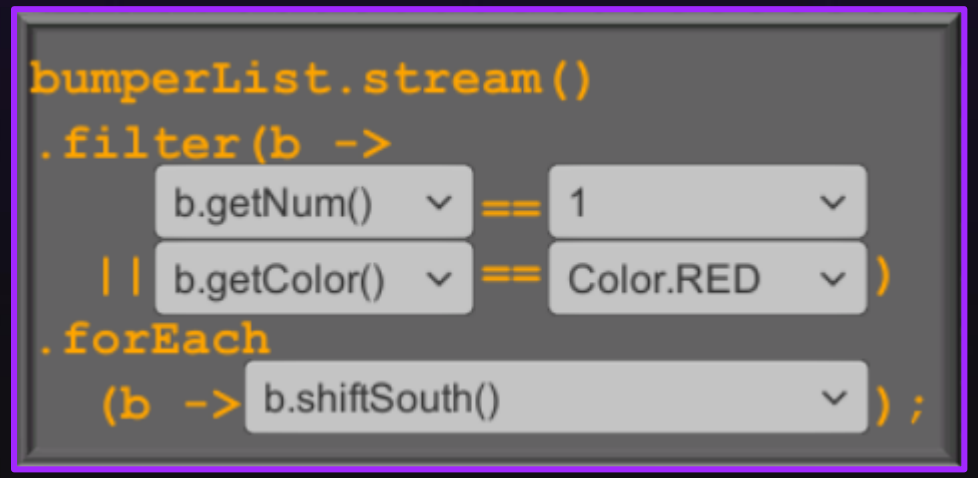
Filter Statements

- == checks if a property **is equal** to a value.
- != checks if a property **is not equal** to the value.
- Lambda Puzzle 7 shows multiple filters can be chained together.
  - Objects must pass both filters



Compound Logic

- Sometimes programs need to compare several values at once.
- Lambda Puzzle 6 shows compound logic applied in filters.
- With `&&`, both criteria must be true for an object to pass through the filter.
- With `||`, either criteria can be true for an object to pass through the filter.



Summary of Logic Operators

What is Functional Programming?

- Remember, variables in Java store more than just numbers.
- Functional programming is about storing and passing around functionality and logic.
  - Save a lambda expression as a variable.
  - Reference that variable later.
  - Pass the variable or lambda logic between different bits of code.

```
public class ExampleClass {
    //Fields
    private Consumer<ImageView> lambdaExample = (e -> setDirection(Dir.NE));
    private int x = 0;
    private int y = 1;
    private int z = 2;
 …
}
```

Further Learning

Edit code and learn more in the multi-day version of this course:

- www.oracle.com/goto/JavaGame