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# Java Puzzle Ball

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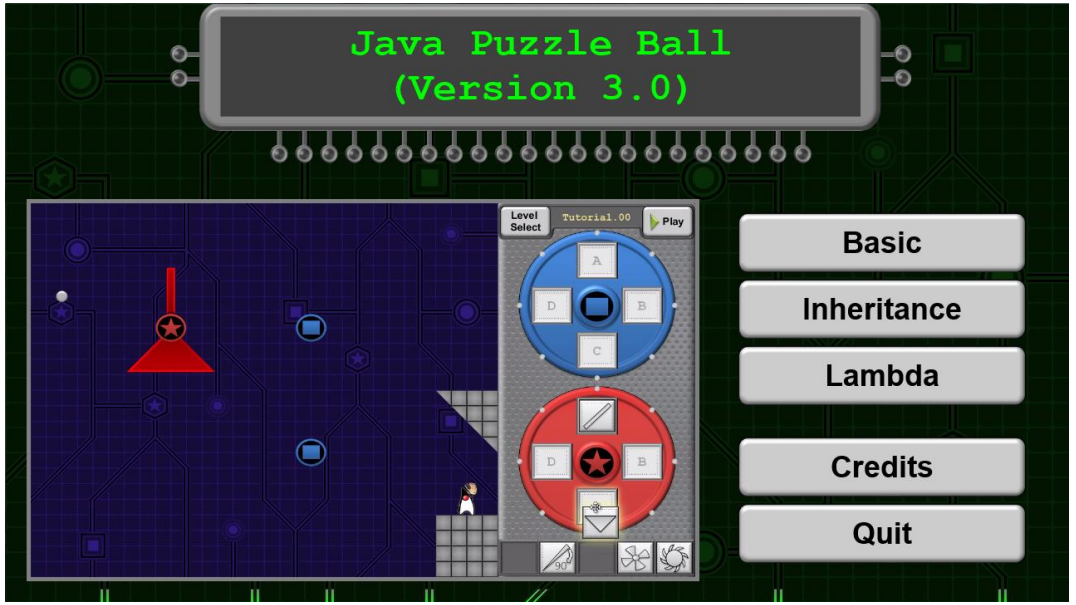
**Lesson 1-1**
**Educational Games**

# What is Java Puzzle Ball?

- An educational game used across several Oracle courses:
  - Oracle University (various)
  - Oracle Academy Java Foundations

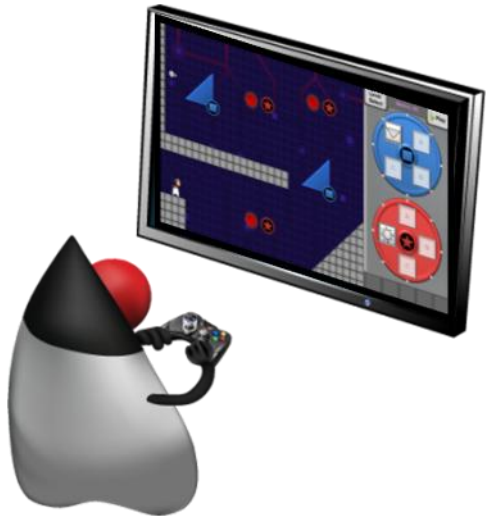
I'll point out these opportunities

- Game modes are designed to teach Java programming concepts:
  - Basic
  - Inheritance
  - Lambda
- Developed entirely in Java FX



# Can I *Really* Learn from a Game?

- Yes, if they're designed and implemented properly.
- Let's examine…
  - A bad use of an educational game
  - A good use of an educational game
  - How Java Puzzle Ball is used in this course
  - What makes this implementation effective



# Demo

# Introducing: Pig Pounder!

- Solve fun questions to save the pigs!
- Maximize your score!
- Earn badges and increase your rank!
- Brag to your friends on social media!


# Find the # to save the Pigs!

- 2 # 6 = _____
- 7 # 5 = _____
- 11 # 3 = _____

# You Lose…

# End Demo

# Where Pig Pounder Fails

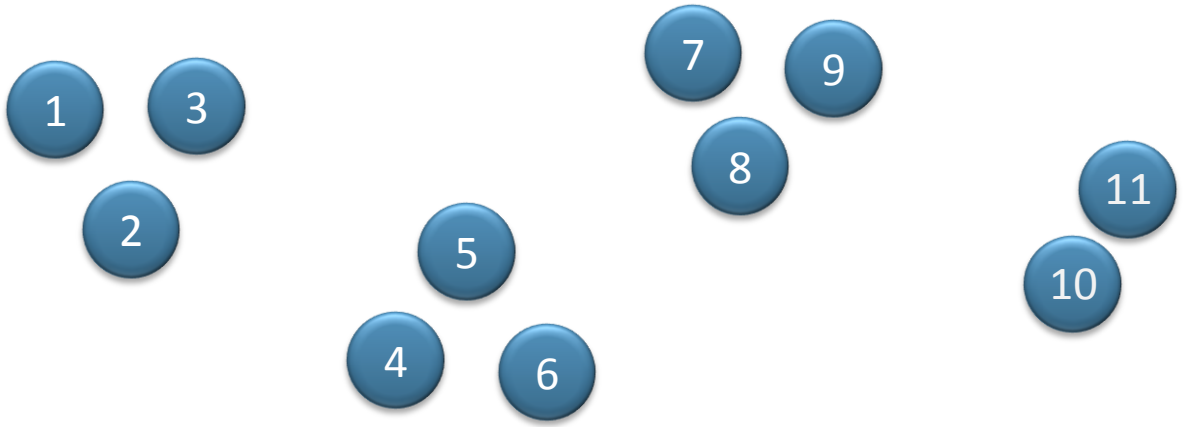
- Despite having trendy features…
  - Cute Characters!
  - Points!
  - Badges!
  - Social Media!
- Pig Pounder does nothing to help you understand the # operation.
- # represents a mathematical operation.
- Maybe you'd do better if # was something you already knew, like % (modulus).

# The Problem with most "Educational" Games

- They're not fun.
- They're not educational.
  - It's a mistake to drill content. This creates a glorified quiz.
  - People don't learn new skills.
  - People aren't prepared to think through new situations.
  - To succeed, people must arrive already understanding what the game tests for.
- They improve existing skills or recognition ability.

# How to Fix Pig Pounder

- If we want people, with no prior understanding, to learn the % operator…
- Create an experience where they can **learn through exploration.**
  - Group a number of objects.
  - Identify when a full group can't be formed.




11 % 3
-When taking 11 objects…
-And creating groups of 3's…
-There are 2 remaining

# Explorative Learning through Java Puzzle Ball

- Java Puzzle Ball is similar.
- But instead building an understanding for a simple mathematical concept…
- Java Puzzle Ball builds your understanding of complex computer science concepts:
  - Object oriented thinking and class design
  - Static vs Instance variables
  - Inheritance
  - Lambda expressions in GUI applications and collection sorting/filtering

New Feature to Java 8

# Misconceptions about Java Puzzle Ball

- You won't come away knowing…
  - Java syntax.
  - How to write code.

(with the exception of Lambda puzzles)

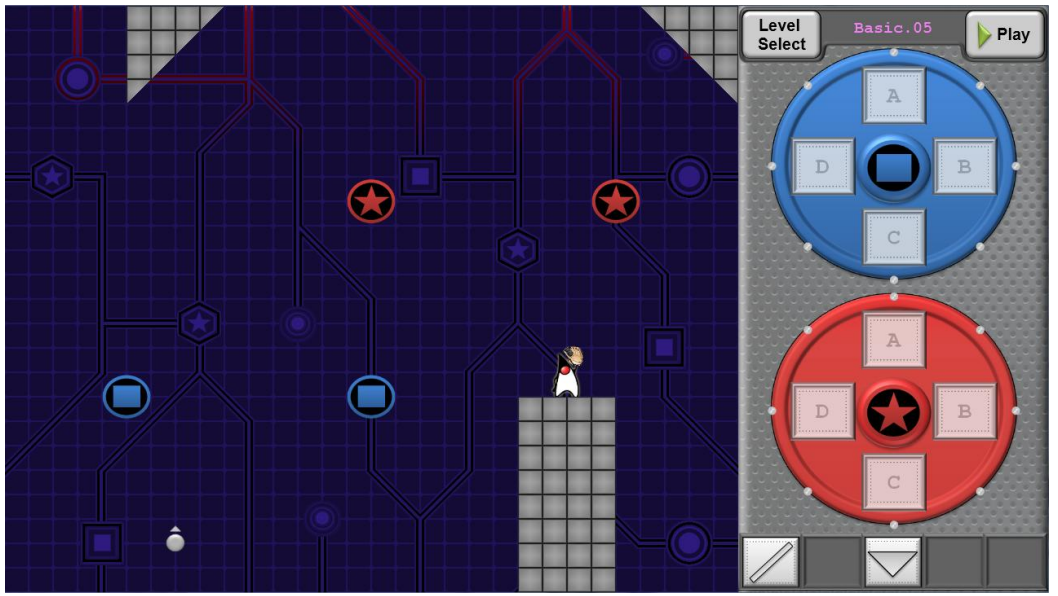
- Students who play come away…
  - With a robust conceptual foundation to build from.
  - More receptive to technical information.
  - Able to participate in discussions and ask insightful questions.
- To achieve this, the course debriefs and provides coding exercises after you play.
  - Debriefing contextualize your observations in terms of Java.
  - This is where everything 'clicks' for students.
  - This process accelerates learning and your ability to understand how to program.

# The Approach used with Java Puzzle Ball

- Play a set of puzzles.
- Become familiar with the game mechanics.
- Consider questions as you play.
- Listen to the lesson's debriefing on what you've observed.
- Apply your observations to understand Java concepts and work with code.

# 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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