DESIGNING
INTERACTIVE

Dave Goerlich

Class of 1994

Yes, that's a long time ago.
Yes, I know you were thinking that.

!false

Agenda

- Introduction
- TDD by Example – Live Code Kata
- Live Code Debrief
- Overview of Workshop Problem
- Pair Programming – Part 1
- Pair Programming – Part 2
- Pair Programming – Part 3
- Pair Programming – Part 4
- Wrap-up

TDD by Example

The Roman Numeral Converter Kata

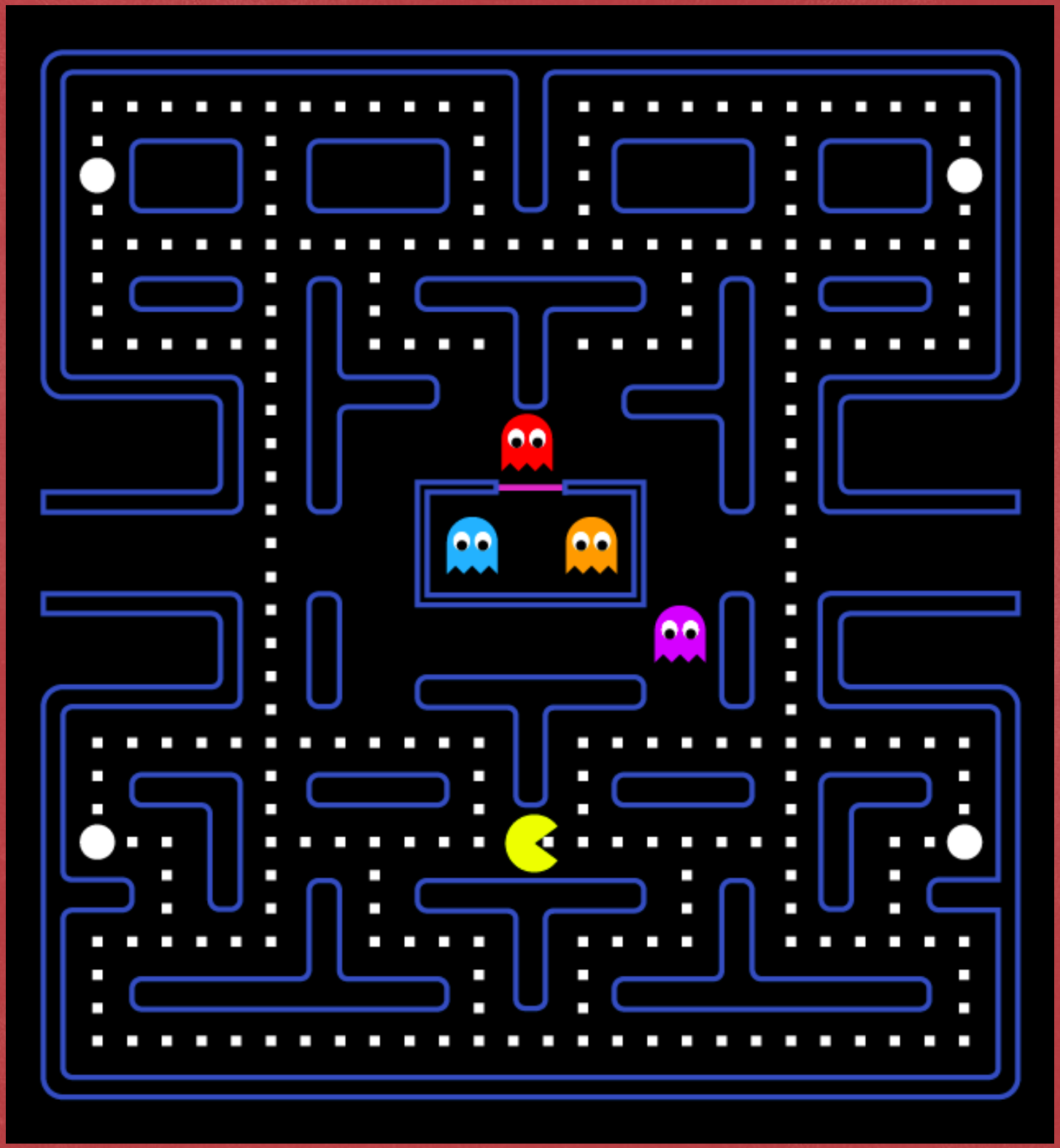
Let's write some code!

Live Coding Debrief

- Where to Start?
- Where to go next?
- Let the known solution drive the tests.
- Know what to skip.
- Recognize duplication.
- Refactor your tests too.
- Know when to leave in duplication.
- Identify and test the edge cases.

Workshop Problem

Your turn to write some code!

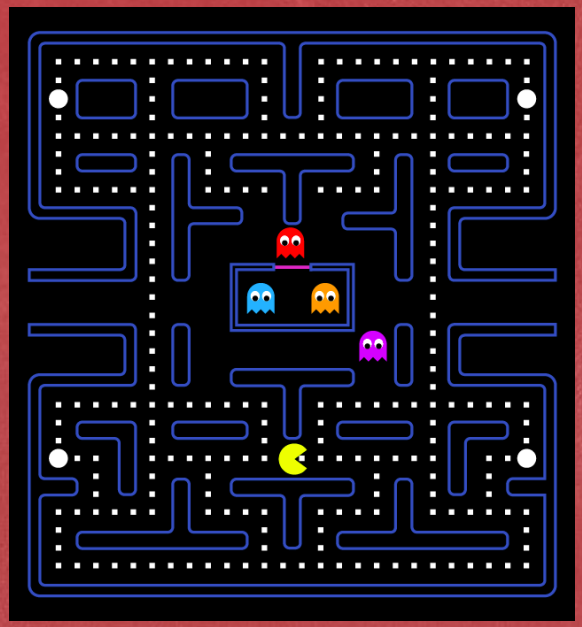


Workshop Problem

Your turn to write some code!

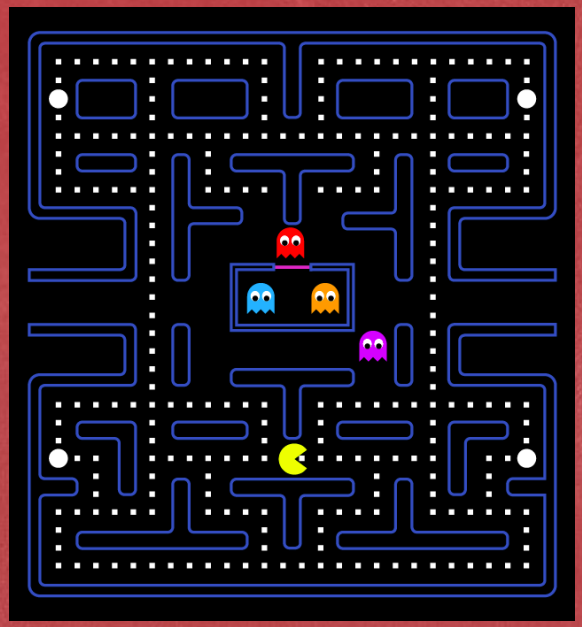
Github Repo

https://github.com/d-i/pacman



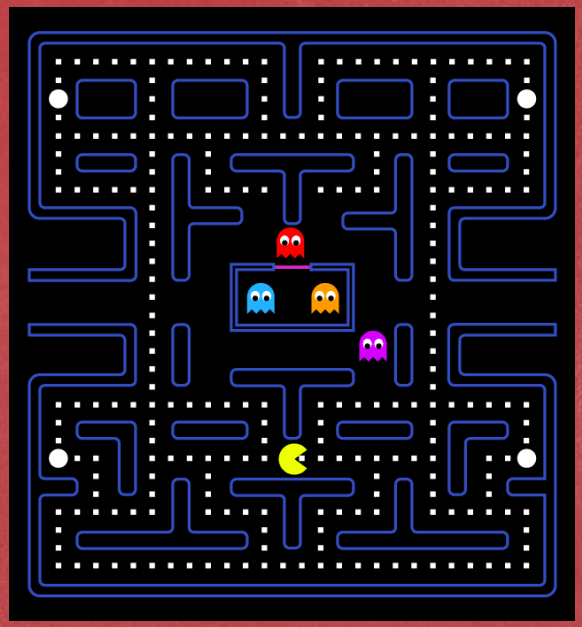
The Board

- Originally 224x288 resolution
- A 'tile' was an 8x8 pixel square
- Board of 28x36 tiles
- Every tile wasn't reachable
- Sprites were bigger than 8x8
- Occupy the tile in which their center point was located.



Ghost Behavior

- Each has it's own “personality”
- 3 Movement Modes:
  - Chase
  - Scatter
  - Frightened
- Target Tiles
  - A specific tile the ghost is trying to reach
  - Might not always be an accessible tile
- All operate within the same basic movement rules
- The selection of the target tile is the primary difference in their personalitites.



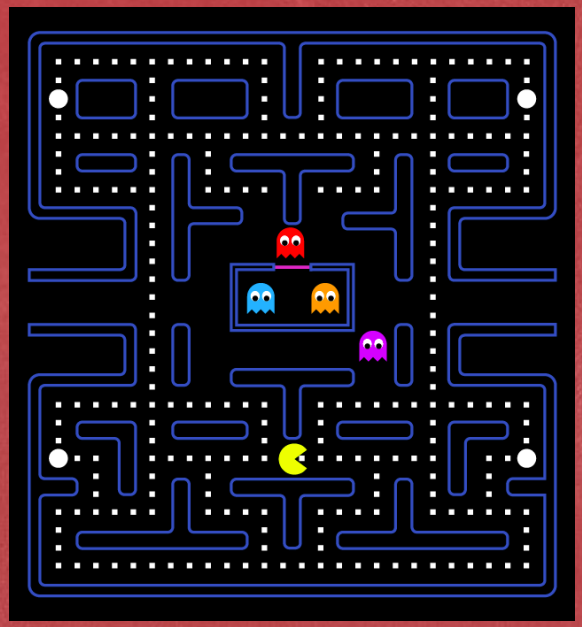
Movement Modes

1) Scatter for 7 seconds, Chase for 20

2) Scatter for 7 seconds, Chase for 20

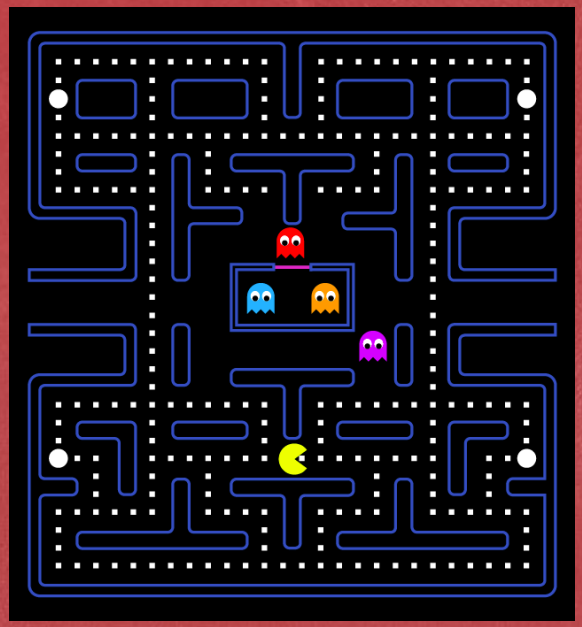
3) Scatter for 5 seconds, Chase for 20

4) Scatter for 5 seconds, Chase permanently



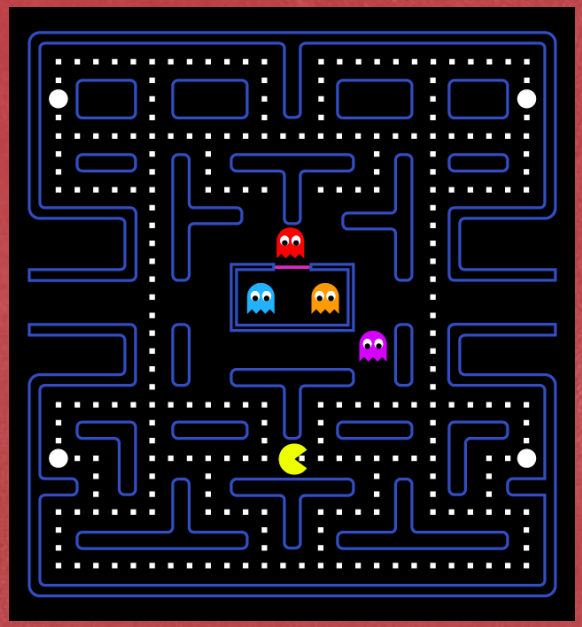
Basic Movement Rules

- Only plan one step into the future
- A ghost cannot reverse its direction
- Only time a decision is necessary is when approaching an intersection.
- The choice is made based on which possible tile is closer to the target tile.
  - “Closer” is defined as straight line distance, not possible route.
  - If 2 options are equal distance, decision is made based on the order:
    - up > left > down
- Special case: at 4 designated tiles, ghosts may not select North as an option.



Scatter Mode

- Each ghost has a separate, pre-defined and fixed target tile
- All 4 target tiles are outside the accessible area.
- All other normal movement rules apply
- Upon entering and leaving scatter mode, the ghost *must* reverse direction
  - This is the only exception to the no-reversing rule.



Frightened Mode

- A pseudo-random number generator (PRNG) is used to select directions at intersections.
- If the selected direction is inaccessible or is a reversal of direction, the next direction clockwise is checked.
  - Repeat until a valid direction is found.
- All other normal movement rules apply
- Upon entering frightened mode, the ghost *must* reverse direction
- PRNG is reset with the same seed on every new level or start of new life.

Shadow a.k.a “Blinky”

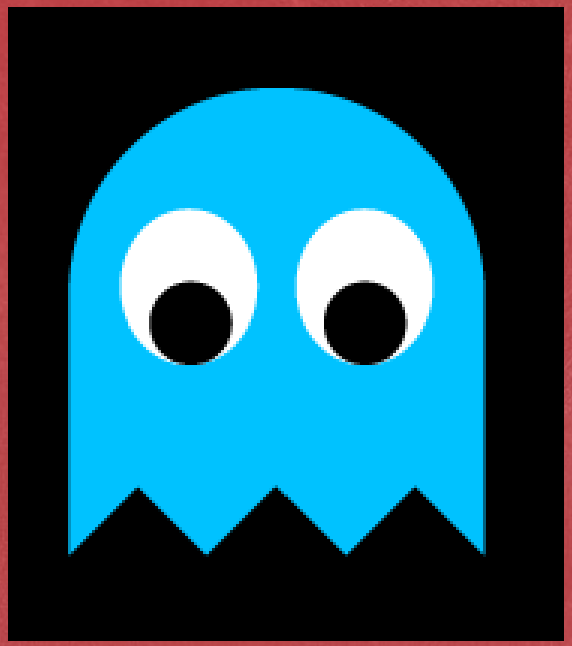
- Scatter Mode Target Tile:
  - [25, 35]
- Chase Mode Target Tile:
  - Pacman's current location
- “Cruise Elroy” Mode
  - Triggered when only 20 dots remain (on Level 1)
  - Uses Pacman's location as target tile during Scatter Mode as well.
  - Does change direction entering & leaving Scatter mode still.

Speedy a.k.a “Pinky”

- Scatter Mode Target Tile:
  - [2, 35]
- Chase Mode Target Tile:
  - 4 tiles straight ahead of Pacman's current location and direction
- Original Overflow Error
  - Only when Pacman's direction is North
  - Target tile is 4 tiles ahead of Pacman AND 4 tiles left.

Pokey a.k.a “Clyde”

- Scatter Mode Target Tile:
  - [0, 0]
- Chase Mode Target Tile:
  - Switches based on distance to Pacman
  - If > 8 tiles, Target is Pacman's current location
  - If <= 8 tiles, Target is Scatter Mode target tile



Bashful a.k.a “Inky”

- Scatter Mode Target Tile:
  - [27, 0]
- Chase Mode Target Tile:
  - First, find an “intermediate offset”, 2 tiles ahead of Pacman
  - Draw vector from intermedate offset to current location of Blinky
  - Double the length of vector past the offset to determine target tile.
- Original Overflow Error
  - Same logic applies to finding intermediate offset.
  - Offset tile is 2 tiles ahead of Pacman AND 2 tiles left.

Wrap-up