cphbusiness

COPENHAGEN BUSINESS ACADEMY

Test-Driven Development

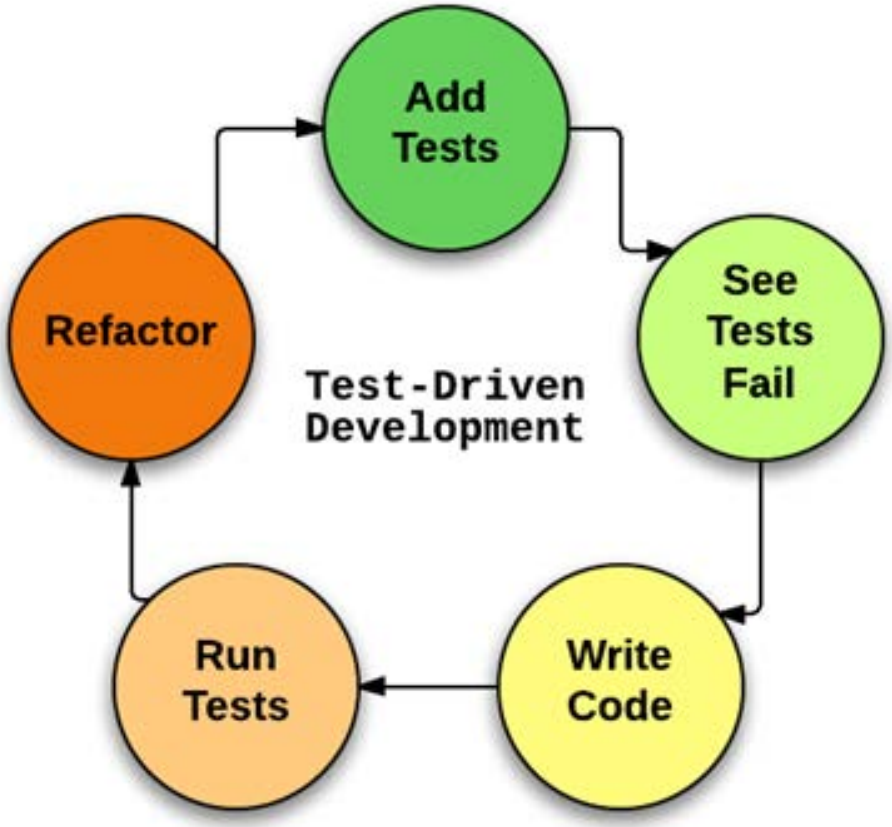
Principles & how to drive TDD

05-04-2018

Workshop Goals

- **TDD principles** and maintaining the test-driven cycle
- Practice getting into the TDD mindset **by example**
- **Use mock objects** to support TDD cycle
  - Create any required mock objects
  - Create any real objects, including the target object
  - Specify how you *expect* the mock objects to be called by target object
  - *Assert* that any resulting values are valid and that all the expected calls have been made

The Test-Driven Cycle



Maintaining The Test-Driven Cycle

- Start each feature with an ***acceptance test***
  - Clarifies WHAT to do with no underlying tech focus
  - Shields acceptance test suite from changes in technical infrastructure
- Start with ***simplest success test case***
  - Gives you better idea of real structure of solution
  - Keep notepad next to you to jot down failure cases, refactoring and other technical tasks that need to be addressed
- Mockist testing develops from the inputs to the outputs
  - To reduce integration problems later on
  - In all circumstances, being agile you work on one story at a time
- Unit test ***behavior***, not methods
  - Makes object responsibility more understandable
  - A test called `testBidAccepted()` tells what it does, but not what it's *for*.

Monopoly - an Example (1)

- 2 use cases (~ stories)
  - Initialization
  - Playing game

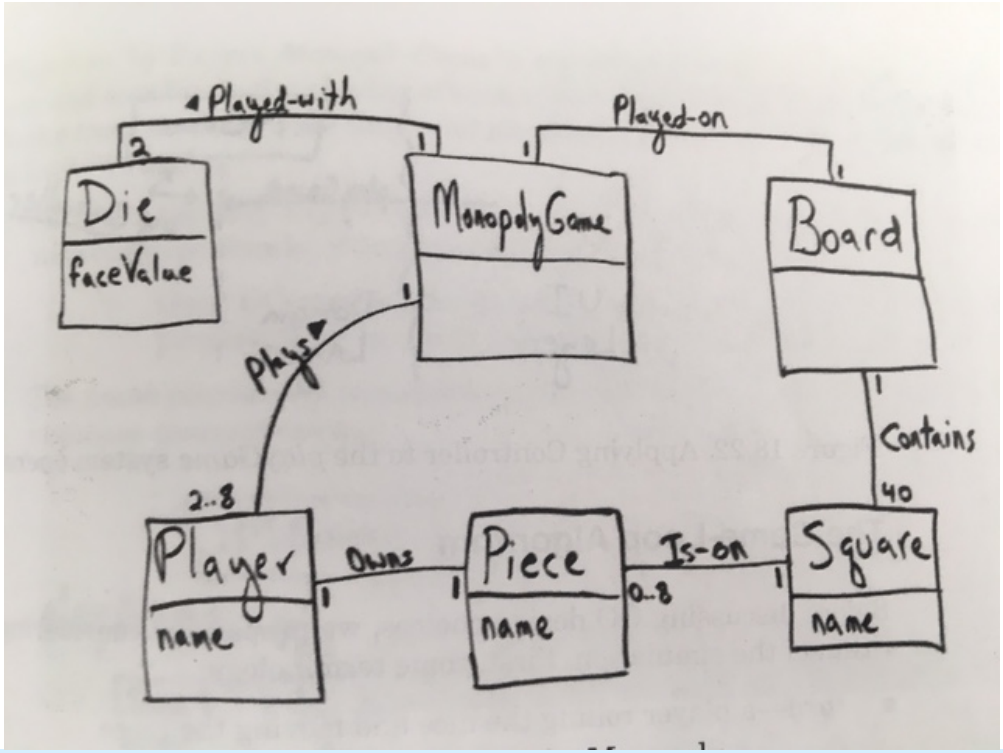
- *Game loop* Algorithm

  Terminology:
  - *turn* – a player rolling the dice and moving the piece
  - *round* - all the players taking one turn

```
For N rounds
    For each Player p
        p takes a turn
```

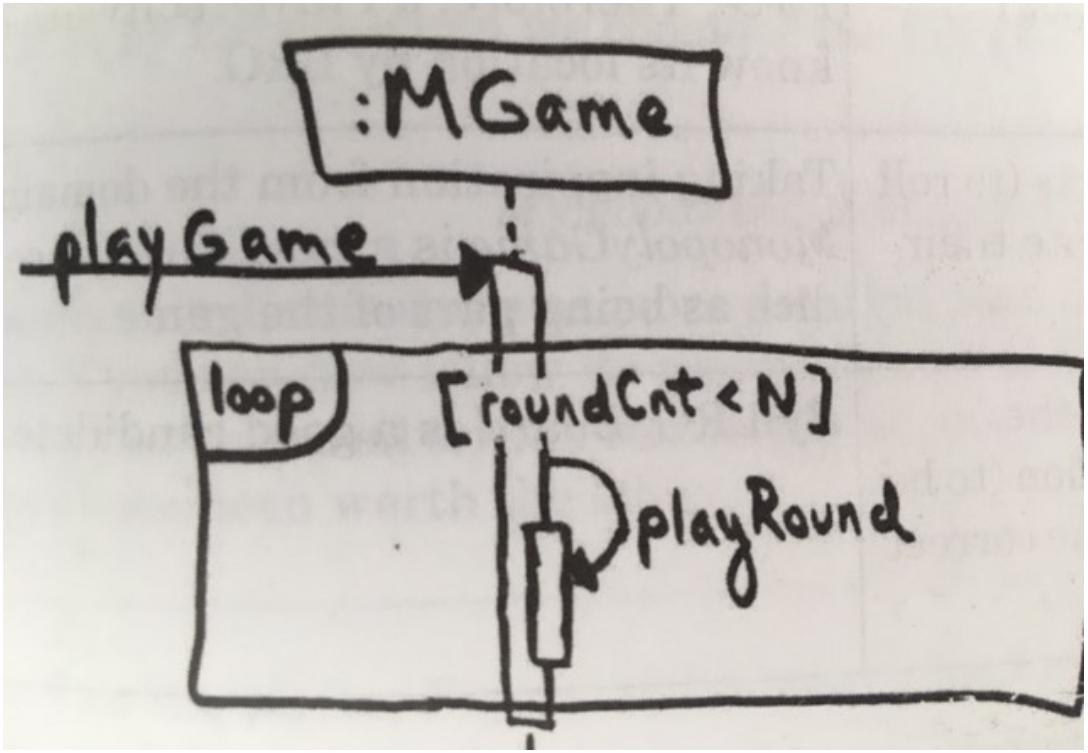
Monopoly - an Example (2)

- Who should be responsible for controlling *Game loop*?
- Let's use the Domain Model to make a decision:



Monopoly - an Example (3)

- *MonopolyGame* knows the players, so is a good choice (is information expert)



Monopoly - an Example (4)

- Who *takes a turn*?
  - Let's look at the Domain Model again
  - Candidates:
    - Player (not just because human player does the task IRL)
    - MonopolyGame
    - Board
- Guideline
  - Sometimes we need to look ahead to make a choice
  - In that case *Player* seems a fit candidate. Why?

Monopoly - an Example (5)

- *Taking a Turn* involves:

1. Calculating random number total between 2 and 12 (range of two dice)
2. Calculating the new square location
3. Moving the player's piece from old location to a new square location

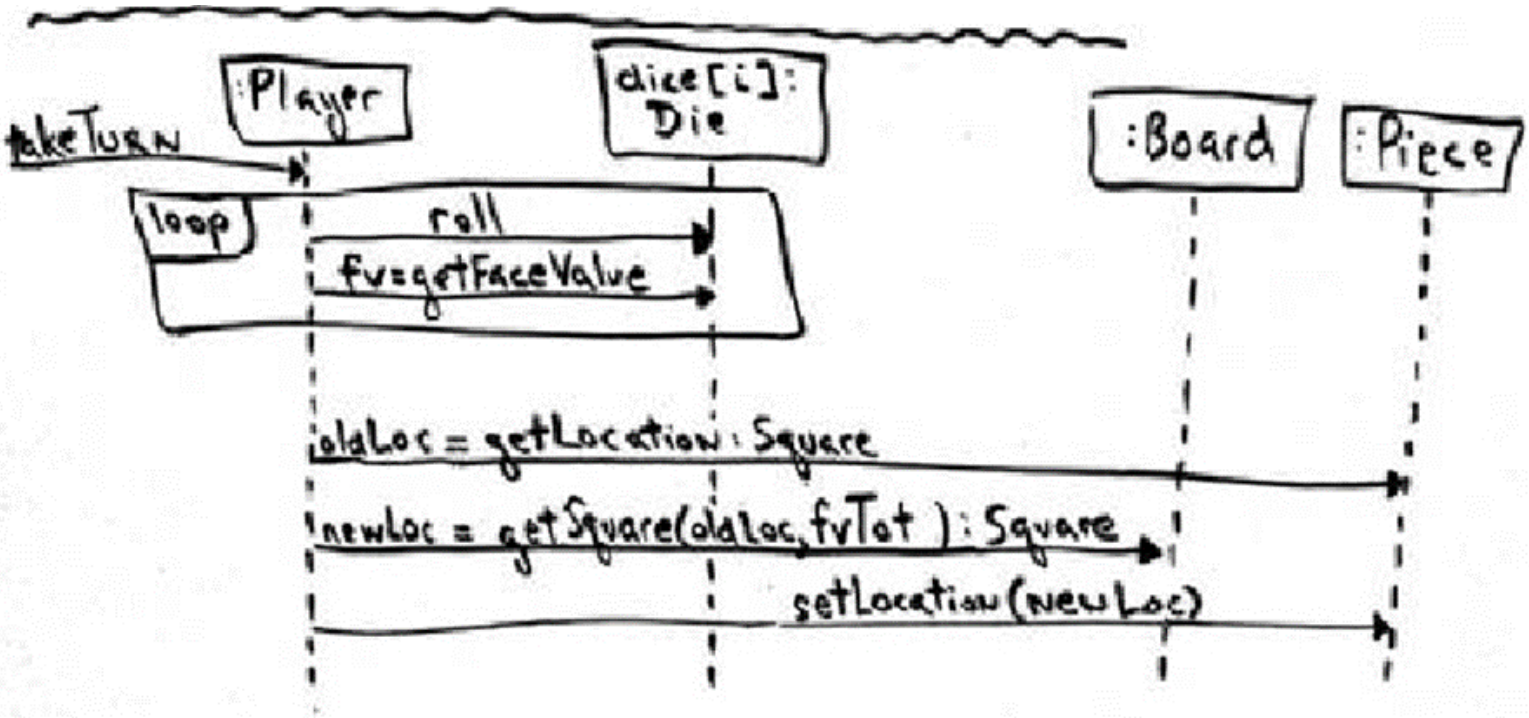
Random number problem: Die has face value and can roll

Calculate new square problem – Board knows its squares. Given an old square location + offset (dice total) → board can be responsible for knowing new location

Piece movement problem – Player knows its piece, and piece knows its location. So piece will set its new location, but could receive new location from player

Monopoly - an Example (6)

- How *Taking a Turn design* looks in a sequence diagram:



Monopoly - an Example (7)

- Demo time

Monopoly - an Example (8)

- We must remember The *Refactoring* step in TDD

- Can we get higher cohesion by using Extract Method?

```
public void takeTurn() {
  int rollTotal = 0;

  for (int i = 0; i < dice.length; i++) {
      dice[i].roll();
      rollTotal += dice[i].getFaceValue();
  }

  Square newLocation = board.getSquare(piece.getLocation(), rollTotal);
  piece.setLocation(newLocation);
}
```

Monopoly - an Example (9)

- We must remember The *Refactoring* step in TDD

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Monopoly - an Example (10)

- Problems
  - How about reuse of the dice (in other apps)?
  - It is not possible to ask for current dice total without rolling again?

solution