

# Monopoly Design

## November 5, 2008

### Candidate Classes

These are the candidate classes that we developed in class considering the sections of the rules labeled: the play, buying property and paying rent.

#### GameController

- Responsibilities:
  - Figure out who has the highest roll
  - Keep track of players
  - Know whose turn it is
- Collaborators:
  - Player
  - Board

#### Dice

- Responsibilities:
  - throw and return a number
- Collaborators:

#### Property

- Responsibilities:
  - Know its rents
  - Keep track of house and hotels
- Collaborators:
  - Player
  - Bank / banker
  - Title deed card
  - House
  - Hotel

#### Token

- Responsibilities:
  - move to a specific place
  - move some number of spaces
  - know my position
- Collaborators:
  - Board space
  - Board

#### Player

- Responsibilities:
  - move token to go
  - play a turn
  - buy
  - pay rent
  - pay taxes
  - pass go
  - return dice total
  - keep track of last dice total
- Collaborators:
  - Token
  - Money
  - Dice
  - Property

#### Board space

- Responsibilities:
- Collaborators:
  - Board space GO

#### Banker

- Responsibilities:
  - Sell at auction
- Collaborators:
  - Player
  - Bank
  - TitleDeedCard
  - Property

#### Board

- Responsibilities:
  - Know the order of board spaces
  - Determine which space is a particular distance after another space
  - Be immutable
- Collaborators:

#### ColorGroup

- Responsibilities:
  - Knows which properties are in it
  - Knows if all are owned by 1 player and who that player is
  - Determines when building is legal
  - Knows the color
- Collaborators:
  - Property
  - Player

### Other candidate classes for our design

- Title deed card - **this is a UI element.**  
We are ignoring the UI for now.
- Bank
- Auction
- Board space GO

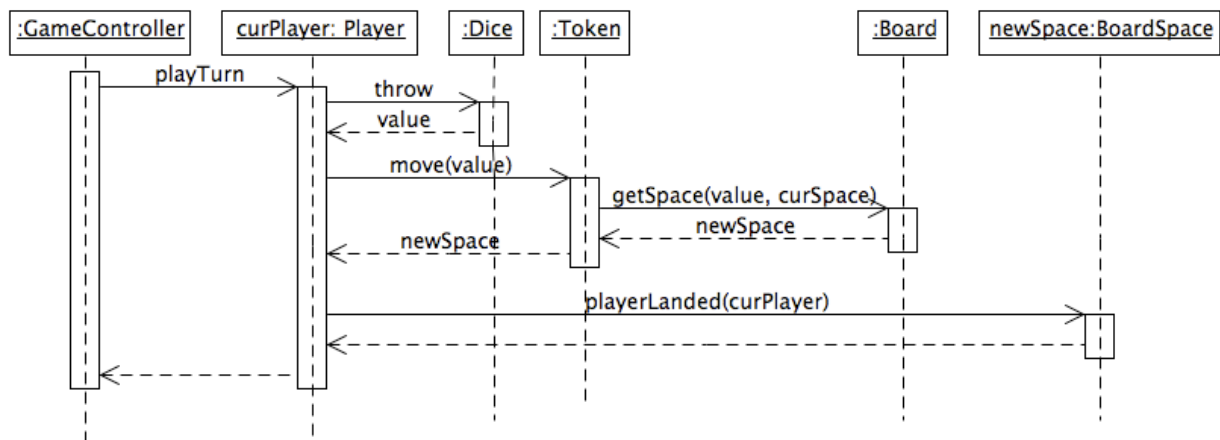
### Things we no longer believe are classes

- Rent - this is an attribute of Property
- House - need a counter in Property
- Hotel - need a boolean in Property
- Money - attribute of Player
- Owner - relationship between a Player and a Property

### Some other comments on our design

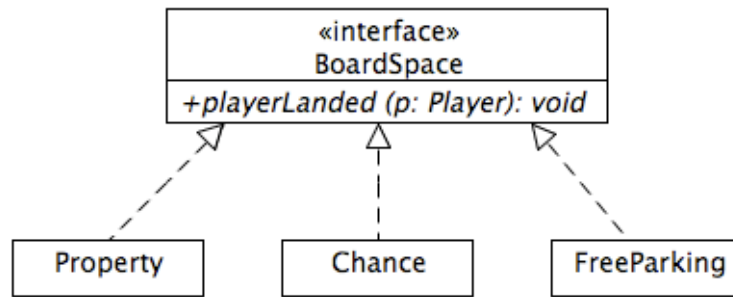
- A buyer is a transient role that a player may have

### Sequence Diagram for the Player's playTurn method.



There is more to a turn than this diagram shows - such as buying houses/hotels, trading with other players, etc. Also missing are the details about what playerLanded does. This will vary a lot depending on the type of square the player landed on. For example, an unowned property vs. an owned property vs. chance vs. free parking. As the class diagram below shows, we will rely on polymorphism to carry out the details appropriate to the type of square.

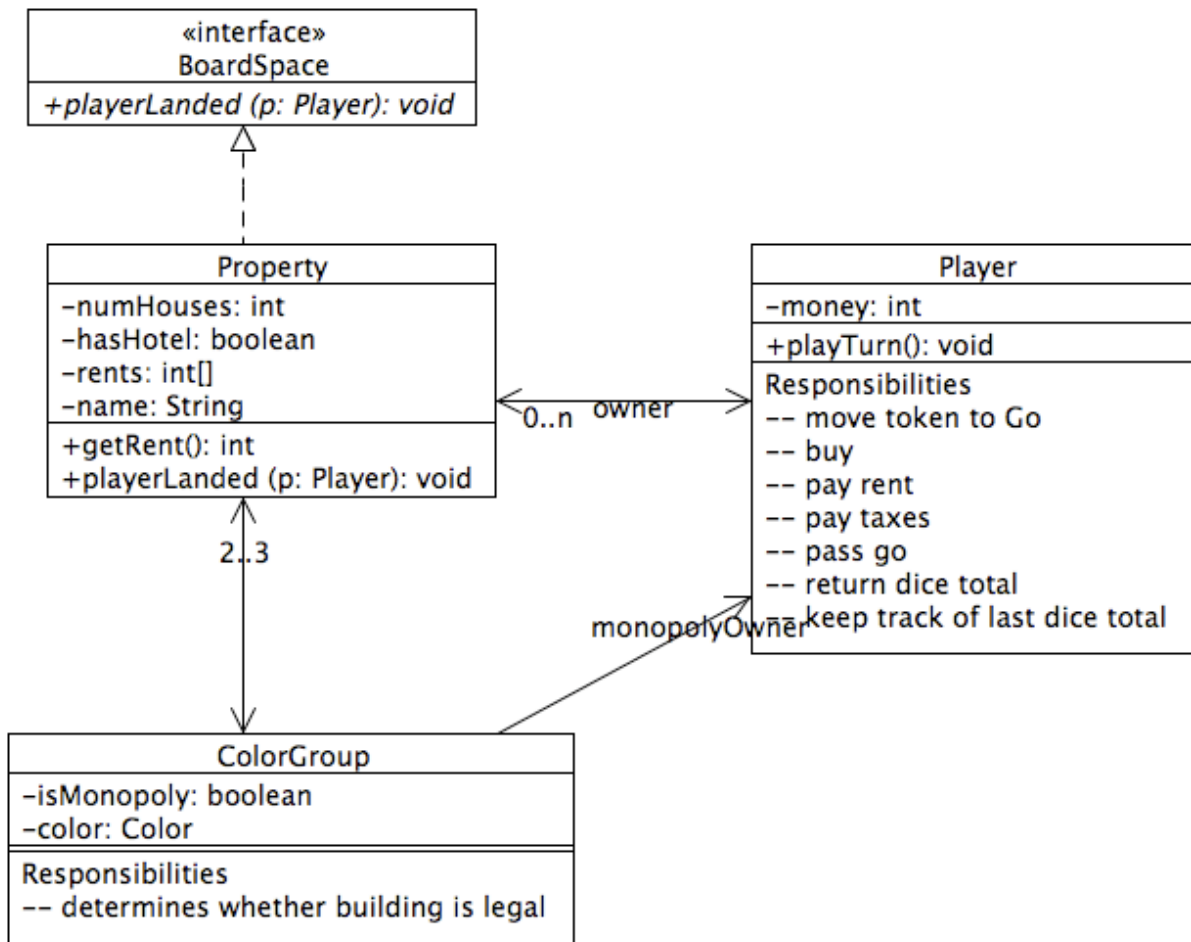
### Class Diagram showing BoardSpace Hierarchy



There would be other types implementing BoardSpace as well.

### Class Diagrams derived from the CRC cards

This one shows the relationships between players and property.



This one shows the relationships to understand how tokens move on the board according to dice rolls.

