





Object Thinking with CRC cards

Matteo Vaccari
vaccari@pobox.com

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References

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Classes, Responsibilities, Collaborations

- ▶ Class names
 1. Should not end in -er
 2. Should be names of *things*, not *actions*
 3. Should be related to the *domain* of the problem
- ▶ Responsibilities
 - ▶ For knowing
 - ▶ For doing
 - ▶ For deciding

An object with less than three responsibilities does too little. An object with more than five responsibilities does too much.
- ▶ Collaborations.
 - ▶ To fulfill its responsibilities, an object must have the necessary information, or have a collaborator that can provide it.
 - ▶ Not too many responsibilities: delegate to other objects.
 - ▶ An object should not *know too many other objects* (more than 3).

Monopoly Scenarios

Scenario 1: *Movement*

- ▶ Given that player A is on “Oriental Avenue”
- ▶ He rolls 2 and 1.
- ▶ He lands on “Connecticut Avenue”

Scenario 2: *Passing through GO!*

- ▶ Given that
 - ▶ player B's balance is \$1000,00
 - ▶ she is on "Park Place"
- ▶ She rolls 2 and 3.
- ▶ She lands on "Mediterranean Avenue".
- ▶ Player B collects \$200,00 from the bank.
- ▶ Her balance is now \$1200,00.

Scenario 4: *Income Tax when assets are more than \$2000,00: pay \$200,00*

- ▶ Given that player C's balance is \$3000,00.
- ▶ He lands on "Income Tax".
- ▶ He pays \$200,00 to the bank. His balance is now \$2800,00.

Scenario 3: *Go to jail*

- ▶ Player C lands on "Go to jail".
- ▶ He is moved immediately to "In Jail".
- ▶ He does not pass through "GO!"

Scenario 5: *Income Tax when assets are less than \$2000,00: pay 10% of all assets*

- ▶ Given that:
 - ▶ Player C's balance is \$1000,00
 - ▶ Player C owns "Oriental Avenue", which has a purchase price of \$100,00.
- ▶ Player C lands on "Income Tax".
- ▶ He pays \$110,00 to the bank. His balance is now \$890,00.

Scenario 6: *Players play in sequence*

- ▶ Given that:
 - ▶ the players in the game are A and B
 - ▶ it's A's turn
- ▶ Player A rolls and moves
- ▶ Player B rolls and moves
- ▶ Player A rolls and moves

Scenario 8: *Roll double dice three times*

- ▶ Given that:
 - ▶ The players in the game are A and B
 - ▶ It's player B's turn
 - ▶ Player B is on "Go!".
- ▶ Player B rolls 1 and 1, she lands on "Community Chest"
- ▶ Then she rolls again and gets 2 and 2; she lands on "Oriental Avenue"
- ▶ Then she rolls again and gets 3 and 3; she is moved to "In Jail"
- ▶ Now it's A's turn

Scenario 7: *Roll double dice*

- ▶ Given that:
 - ▶ The players in the game are A and B
 - ▶ It's A's turn
 - ▶ Player A is on "Go!".
- ▶ Player A rolls 3 and 3, he lands on "Reading Railroad"
- ▶ Then he rolls again and gets 1 and 2
- ▶ He arrives on "Vermont Avenue"
- ▶ Now it's B's turn

Scenario 9: *Buy property*

- ▶ Given that:
 - ▶ Player A's balance is \$1000,00
 - ▶ "Baltic Avenue" has purchase cost \$80,00 and is owned by the bank
- ▶ Player A lands on "Baltic Avenue".
- ▶ Player A is offered the chance to buy Baltic Avenue
- ▶ Player A decides to buy Baltic Avenue.
- ▶ He pays \$80,00 to the bank. His balance is now \$920,00.
- ▶ He now has the deed for Baltic Avenue

Scenario 10: *Not enough money to buy property*

- ▶ Given that:
 - ▶ Player A's balance is \$10,00
 - ▶ "Baltic Avenue" has purchase cost \$80,00 and is owned by the bank
- ▶ Player A lands on "Baltic Avenue"
- ▶ Player A is not offered the chance to buy Baltic Avenue

Scenario 12: *Pay rent on Railroad property (two railroads)*

- ▶ Given that:
 - ▶ Player A's balance is \$1000,00.
 - ▶ Player B's balance is \$1000,00.
 - ▶ Player B owns Reading Railroad and Pennsylvania Railroad; no mortgages.
- ▶ Player A lands on "Reading Railroad"
- ▶ Player A pays \$50,00 to Player B.
- ▶ Player A's balance is now \$950,00; Player B's balance is now \$1050,00.

Scenario 11: *Pay rent on unimproved property*

- ▶ Given that:
 - ▶ Player A's balance is \$1000,00.
 - ▶ Player B's balance is \$1000,00.
 - ▶ Player B owns "Oriental Avenue",
 - ▶ "Oriental Avenue" has rent \$6,00, has no houses or hotels, is not mortgaged
- ▶ Player A lands on "Oriental Avenue"
- ▶ Player A pays \$6,00 to Player B.
- ▶ Player A's balance is now \$994,00.
- ▶ Player B's balance is now \$1006,00.

Scenario 13: *Everyone donates to you*

- ▶ Given that:
 - ▶ The players in the game are A, B and C
 - ▶ Player A, B and C all have \$1000,00 balance
- ▶ Player B lands on "Community Chance"
- ▶ She picks up the card "Everyone Must Donate 10% of His Holdings to You in Cash"
- ▶ Player A's and C's balance is now \$900,00
- ▶ Player B's balance is \$1200,00