

Background**UNO the card game**

According to Wikipedia...

**Uno** is an American card game which is played with a specially printed deck. The game was initially developed in 1971 by Merle Robbins, an Ohio barbershop owner, who loved to play cards. Merle came up with the idea for UNO and introduced the game to his family. When his family and friends began playing UNO more and more, Robbins and his family spent \$8,000 to have 5,000 games made. At first, Robbins sold UNO from his barbershop. A few local businesses sold it as well. Later Robbins sold the UNO rights to a funeral parlor owner and UNO fan from

Joliet, Illinois, for \$50,000, plus royalties of 10 cents per game, International Games Inc. was formed to market UNO, and sales skyrocketed. In 1992, International Games became part of the Mattel product line



The UNO deck consists of ...

108 cards, of which there are 25 of each color (red, green, blue, and yellow),

Each color having two cards of each rank except for 0.

The ranks in each color are 0 to 9, "Skip", "Draw Two" and "Reverse" (the last three of these ranks are classified as "Action Cards").

In addition, the deck contains four cards "Wild" and four cards "Wild Draw Four", you can say that it is one of each per color.

To play a UNO game, seven cards are dealt out for each player (these cards form the player's hand), and the remaining cards are place face down. The top card of the remaining deck is flipped over and set aside to begin the discard pile of cards. The player to the dealer's left plays first unless the first card on the discard pile is an Action Card or Wild card (see table below for details). Each player must do one of the following actions upon the person's turn:

- Play a card matching the discard in color, number or action.
- Play a Wild card, or a playable Wild Draw Four card (read restriction below)
- Draw the top card of the deck. If a player chooses to draw the top card of the deck, and that card is playable (it matches the discard, or is a playable wild card), then the player can play the card or not.

The turn goes clockwise around the table initially

Action and Wild cards have the following effects:

Action Card	Effect when played from a Player's Hand	Effect as the first discard
<b>SKIP</b>	The next player in sequence loses a turn	The player to the dealer's left loses a turn
<b>DRAW TWO</b>	The next player in sequence draws two cards and loses a turn	The player to the dealer's left draws two cards and loses a turn
<b>REVERSE</b>	Order of play switches directions (clockwise to counterclockwise, and vice versa)	The dealer plays first; play proceeds counterclockwise
<b>WILD</b>	The player declares the next color to be matched (may be used on any turn even if the player has a matching color)	The player to dealer's left declares the first color to be matched, then plays normally
<b>WILD DRAW 4</b>	The player declares the next color to be matched; the next player draws four cards and loses a turn (may be legally played only if the player has no cards of the current color or number)	Return card to the deck, shuffle again, then flip the top card to start the discard pile

- A player may draw a card from the deck even if that player has a playable card.
- If a player chooses to draw a card and the drawn card is playable, the player has the option of either keeping it or playing it immediately (as part of that turn).
- If a player chooses to draw, the player may not play any card (other than the drawn card, if playable) on that turn.
- A player may play a Wild card at any time (even if that player has other playable cards).
- A player may play a Wild Draw Four card only if that player has no cards matching the current *color* (the player may have cards matching the current number or symbol). A player who plays a Wild Draw Four may be challenged.
- If the entire draw deck is used during a play, the top discard is set aside and the rest of the pile is shuffled to create a new deck. Play then proceeds normally.
- It is illegal to trade cards of any sort, including special cards such as wild, blank, and reversal cards.

A player who plays his/her next-to-last card must call "UNO" as a warning to the others.<sup>[4]</sup> A player who is caught failing to call "UNO" may be penalized.

The first player to get rid of his/her last card ("going out") wins the hand and scores points for the cards held by the other players. Number cards count their face value, all action cards count 20, and Wild and Wild Draw Four cards count 50. If a Draw Two or Wild Draw Four card is played to go out, the next player in sequence must draw the appropriate number of cards before the score is tallied.

The first player to reach 500 points is the winner.

### UNO deck Workout

When using the deck of cards UNO for a workout, the person needs to select an exercise for each color.

For example, consider

BLUE	YELLOW	RED	GREEN
Push Ups	Squat	Sit Ups	Lounges

- Shuffle the deck and used it as a pile to draw cards.
- Draw seven cards to form a Hand.
- Sort the cards in the player's hand by colors then by rank.
- For each hand, add the numbers per color and apply the corresponding action cards, as described below.
- Once the total is computed, then performed the round of exercises, one after another, without taking breaks.
- In the case that a round contains a Zero card, the person gets a 2-Minute break after the corresponding exercise associated with the color.
- Once a round of exercises is completed, another hand of seven cards is drawn for the next round of exercises. This continues until the whole pile is consumed.

**Note:** *If the person wants a more challenging workout, additional decks shuffle either individually or combined.*

When a hand contains one or more of the special cards are drawn, they are processed in the following order.

**"Skip"**, All the cards of this color in hand are discarded for this round.

**"Draw 2"**, The Total number of the matching color is multiple by 2.

**"Reverse"**, All the cards of the matching color are return to the back of the pile except the "Reverse" card that is discarded.

**"Wild"**, The presence of this card will add 4 Burpees to the round of exercises.

**"Wild Draw 4"**, This card, in addition, to add the Burpees, will multiply by 4 the total number of repetitions for each color.

### Project Description

**THIS PROJECT IS NOT FOR IMPLEMENTING THE GAME RULES**

Perform an Object-Oriented Analysis and Design to model the deck of cards UNO, then use it for the Deck Workout.

Implement the Design in Java, Document the Design using UML notation, internal documentation using JavaDoc, Test your classes.

If you need a Data Structure, you must implement it using classes. You are NOT allowed to use classes already defined in Java that have not been introduced in class by the time this project is assigned.

Then your solution must allow the user to select...

- The number of decks to be used from 1 - 3.
- Decide if the decks are shuffled together or individually.
- Decide to include or remove actions cards the decks before shuffle takes place. By default, all action cards are included.

The output of your project is a HTML document file, where you show...

- Each hand of 7 cards drawn is sorted by color and rank.
- The effect of any action card in this hand, according to the description given before.
- The total number of repetitions for each exercise, after all computations are done.
- The number of cards left on the pile.
- Once the pile is consumed completely, provide the following statistics at the end of the document.
  - The total number of repetitions performed per exercise.
  - The total number of repetitions that were skipped during the workout.
  - Any additional statistic that might benefit the user.
- The user selects where to save the file and its name.

Your submission should include

- Internal and External documentation, including. Headers on each file. Descriptions for each Class, Method and Parameter.
- UML Class Diagrams for every class you modeled in the project.
- Test cases for each of the classes and their methods, using client classes or JUnit