

**COMP132: Advanced Programming**

**Programming Project Report**

**<UNO Card Game Simulation>**

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**Format**

**When preparing the project report, you can use the following format:**

- Regular text: 12pt Times New Roman with 1.5 line spacing.

- Section Headings: Bold, 15pt Times New Roman

- Source code: 10pt Courier with single-spaced lines.

- All section headings should be numbered.

- The paragraphs should be justified.

- All figures should have descriptive captions and be referred to at the appropriate place in the text.

**Part 1**

**General Demo Information:**

* List of users (nickname, password):

1. Nickname: fi@gmail.com, Password: Mimahs2003#
2. Nickname: fic@gmail.com, Password: Mimahs2003%
3. Nickname: fik@gmail.com, Password: Mimahs2003$

* Information about each user:

1. Email: fi@gmail.com, Sex: Male, Age: 20, Total Score: 42, Wins: 1, Losses: 0, Games Played: 1
2. Email: fic@gmail.com, Sex: Male, Age: 22, Total Score: 0, Wins: 0, Losses: 1, Games Played: 1
3. Email: fik@gmail.com, Sex: Male, Age: 21, Total Score: 0, Wins: 5, Losses: 1, Games Played: 1

* List of existing game sessions created by the users.

1. gameSave1.txt: Session Name: vser, Players: fi@gmail.com, Bot 1
2. gameSave2.txt: Session Name: bevdrss, Players: fic@gmail.com, Bot 1
3. gameSave3.txt: Session Name: vs zewvaw, Players: fik@gmail.com, Bot 1

**Application usage information** *(In that part, describe how to use your application. You can add screenshots of the required steps a user should follow.)*

* Sign up/Login Guide:

Sign Up: Users can register by providing an email, password, sex, age, and selecting a profile picture.

Login: Users can log in by entering their registered email and password.

* User’s Guide

Profile Page: Users can view and edit their profile information including email, password, age, and profile picture.

* Game Session Gameplay

1. Starting a New Game: Users can start a new game by specifying the session name and the number of players.
2. Continuing an Existing Game: Users can load a previously saved game session.
3. Gameplay: Players take turns to play cards that match the color or number of the top card on the discard pile. Special cards like "Skip", "Reverse", and "Draw Two" have unique effects.

* Saving/Loading Game Sessions

1. Saving: Users can save the current state of the game at any time. Each save creates a new file (e.g., gameSave1.txt, gameSave2.txt).
2. Loading: Users can load a saved game to continue from where they left off.

* Leaderboard:

The leaderboard displays the total scores of all registered users.

* How to check log information:

Log information is stored in a file named game\_logs.txt. This file logs significant events and errors during gameplay.

**Part 2**

**Project Design Description:**

* Class relations:

1. UserData: Represents user information and statistics.
2. Session: Manages the game session, including the deck, players, and game state.
3. Player: Represents a player in the game, which could be a human or a bot.
4. Card: Represents an individual card in the UNO deck.
5. Deck: Manages the collection of cards, including shuffling and drawing cards.

* Inheritances, type hierarchies, interfaces, abstract classes:

1. Player class has subclasses for human players and bots.
2. Card and Deck are basic classes representing the components of the game.
3. Session is the main controller class that coordinates gameplay.

* GUI components:

1. MainMenuPage: The main menu interface where users can start or continue games, log out, and view the leaderboard.
2. ProfilePage: Allows users to view and edit their profile information.
3. RegistrationPage: Registration form for new users.
4. Session: Game interface where the actual gameplay takes place.

* .txt file processing details:

User data is stored in users.txt in a comma-separated format.

Game sessions are saved in individual files (e.g., gameSave1.txt) with a structured format to store game state, including deck, discard pile, and players' hands.

* Your game session loop implementation

1. Starting a New Game: Users can start a new game by specifying the session name and the number of players.
2. Continuing an Existing Game: Users can load a previously saved game session.
3. Gameplay: Players take turns to play cards that match the color or number of the top card on the discard pile. Special cards like "Skip", "Reverse", and "Draw Two" have unique effects.
4. End Turn: After a player has taken their turn, the game checks if the player has won (i.e., has no cards left). If the game is not over, the turn passes to the next player based on the current direction (clockwise or counter-clockwise).
5. Repeat: The loop continues until a player wins the game.

* Your computer bot implementation
  + The computer bot is implemented as an AI player that can automatically play its turn. The bot's behavior is defined by a set of rules and strategies:
  + Play Card: The bot tries to play a card from its hand that matches the color or number of the top card on the discard pile. If it has a special card (e.g., "Wild"), it will use it strategically.
  + Draw Card: If the bot cannot play a card, it will draw cards from the draw pile until it can play a card.
  + Call UNO: The bot will call "UNO" if it has only one card left.
  + Decision Making: The bot's decisions are based on a simple strategy to minimize the number of cards in its hand while maximizing its chances of winning.
* Any additional design details that you want to mention:

The project uses a logging mechanism to keep track of game events and errors.

GUI is implemented using Swing, providing an interactive interface for users.

During registration, users can upload a profile picture. The profile picture is stored as part of the user's data and can be viewed and updated on the Profile Page.

**References**

Give the list of references you used during the project design and development. All the references should be cited within the text of the report.

1. Oracle Java Documentation: https://docs.oracle.com/javase/
2. Java Swing Tutorial: https://docs.oracle.com/javase/tutorial/uiswing/
3. UNO Card Game Rules: https://www.unorules.com/