Esthergen Poker

User Manual

Version 1.2

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Glossary

Action: The betting and raising in a hand.

All-In: Betting all of your chips in one go.

Assertion: A statement in a program that checks if a condition is true at a particular point in code execution. If the condition is false, an assertion failure occurs, indicating a programming error.

Blinds: Forced bets placed by players before the cards are dealt.

Board: The community cards in the center of the table.

Button: The disc indicating the dealer position, moves clockwise after each hand.

Call: Matching the current bet.

Check: Passing the opportunity to bet (if no bet has been made).

Community Cards: The cards dealt face-up in the center of the table, shared by all players.

Dealer: Person responsible for shuffling and dealing the cards, managing the betting rounds, and overseeing the game's progress.

Flop: The first three community cards dealt face-up.

Flush: Five cards of the same suit.

Fold: To discard your hand and forfeit any chance of winning the current pot.

Graphical User Interface (GUI): A visual interface that allows users to interact with software applications using graphical elements such as windows, buttons, and menus, rather than text-based commands.

Hole Cards: The two cards dealt face-down to each player.

Object-Oriented Programming: programming paradigm that uses objects and classes to structure code. It emphasizes encapsulation, inheritance, and polymorphism to organize and manage complex software systems

Pair: Two cards of the same rank.

Pot: The total amount of chips in play during a hand.

Raise: Increasing the current bet.

River: The fifth and final community card dealt face-up.

Royal Flush: A Royal Flush is the highest-ranking hand in standard poker and consists of five cards of the same suit in sequence, from 10 to Ace. The specific cards are: 10, Jack, Queen, King, and Ace, all of the same suit.

Showdown: The final phase of a hand where remaining players reveal their cards to determine the winner.

Socket: A software endpoint that establishes a communication channel between two computers over a network. It enables data transmission and reception between clients and servers.

Stack: The total number of chips a player has.

Straight: Five consecutive cards of any suit.

TCP/IP Communication: A set of protocols used for communication over the internet. TCP (Transmission Control Protocol) ensures reliable, ordered, and error-checked delivery of data, while IP (Internet Protocol) handles the addressing and routing of data packets.

Turn: The fourth community card dealt face-up.

1. Online Poker

1.1 Usage Scenario

Esthergen Poker offers a visually appealing graphical user interface (GUI) as shown in Figure 1, that provides each player with a clear view of their cards, along with their name and chip count. The interface also displays other players at the table, allowing for easy interaction and engagement. Additionally, the GUI showcases all the chips on the table, creating a dynamic and immersive gaming experience for all participants.

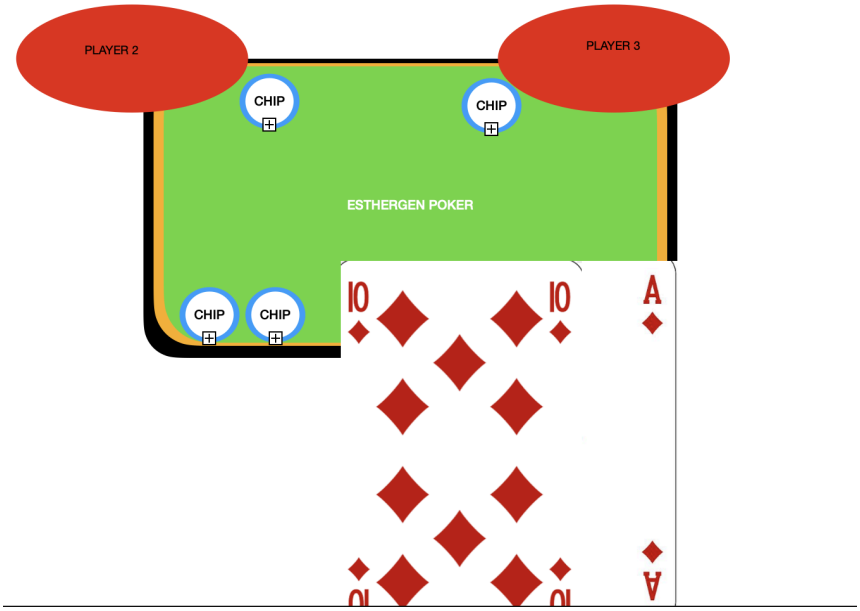

Figure 1.1: ESTHERGEN POKER Concept Sketch

1.2 Goals

Esthergen Poker offers an online gaming experience inspired by the classic Texas Hold'em style of poker. Players can enjoy all the excitement and strategy of this beloved game from the comfort of their own homes.

All basic functions:

1. Each player will be able to connect with the online poker program and choose their seat. Their name will be displayed when playing the game.
2. The server will keep track of points for each player.
3. The server deals the cards to the various players as well as shuffling the cards randomly.
4. The server will properly end a game during the final round and award the winner with points.
5. A graphical user interface on the client (user) side.

6. Program will have at least one basic bot player.
7. Git version control.
8. Communication between server and client, TCP/IP communication via sockets.
9. Unit tests for all major modules.
10. User/software deliverable and detailed documentation.
11. Support a scoreboard followed by the player rankings, and what the poker hands that they received.

1.3 Features

Esthergen Poker, inspired by the classic Texas Hold'em variant, offers a comprehensive gaming experience with several key features:

1. Seat Allocation and Player Identification: Players can connect to the Esthergen Poker platform and choose their seat. Their names are prominently displayed during gameplay, ensuring a personalized experience.

2. Card Distribution: The server deals two private "hole cards" to each player, along with five community cards dealt face-up on the table. These cards are shared among all players and are used to form the best hand.

3. Betting Rounds: Esthergen Poker follows the standard betting rounds:
- **Preflop:** Players decide whether to bet, raise, call, or fold after receiving their hole cards.
- **Flop, Turn, and River:** Additional community cards are dealt in stages, with betting rounds following each deal.
- **Showdown:** If multiple players remain after the final betting round, a showdown occurs to determine the winner.

4. Blinds: The game uses small and big blinds to stimulate action before the hand begins, rotating around the table.

5. Hand Rankings: Players aim to create the best five-card hand using their hole cards and the community cards. Hand rankings, including Royal Flush, Full House, and High Card, determine the winner.

6. Dealer Button: A dealer button rotates clockwise around the table after each hand, with the player to its left acting first in each betting round.

7. Player Actions: Players have various options during betting rounds, including betting, raising, calling, or folding.

8. Pot: The pot accumulates all bets made by players during the hand, with the winner receiving the pot.

9. All-In: Players can go "all-in" if they don't have enough chips to match a bet, competing for a portion of the pot.

10. Table Limits: Esthergen Poker supports different betting structures, including no-limit, pot-limit, and fixed-limit, dictating the maximum bet size and betting increments.

These features ensure an exciting and strategic gaming experience, ensuring Esthergen Poker will be a favorite among players worldwide.

2. Installation

2.1 System Requirements

compatible with Linux distributions that support Linux Kernel 4.14 or newer. Minimum recommended distributions include:

- Debian 9
- Ubuntu 18
- Fedora 27
- Red Hat Enterprise 7

Minimum recommended system hardware requirements:

- 10 MB disk space
- 1+ GB RAM

2.2 Unpacking and Configuration

1. Unpack the Poker_V1.0.tar.gz file using gunzip or a comparable utility.
2. Run the ./ESTHERGEN_Installer script to install the game in the /usr/local/bin/ESTHERGEN_Poker folder on your computer.
3. Run the ./ESTHERHEN_Poker app from the installation path folder to launch the game.
4. If using a Windows environment, ensure Xming or a similar X server is installed and running to display the graphical user interface properly.
5. Each run of the game exports a transcript of moves to the move_log.txt file in the game directory.

2.3 Uninstalling

To uninstall ESTHERGEN_Poker, run the **./uninstall_ESTHERGEN** script from the game directory.

3. Program Functions and Features

3.1 Client and Server communication

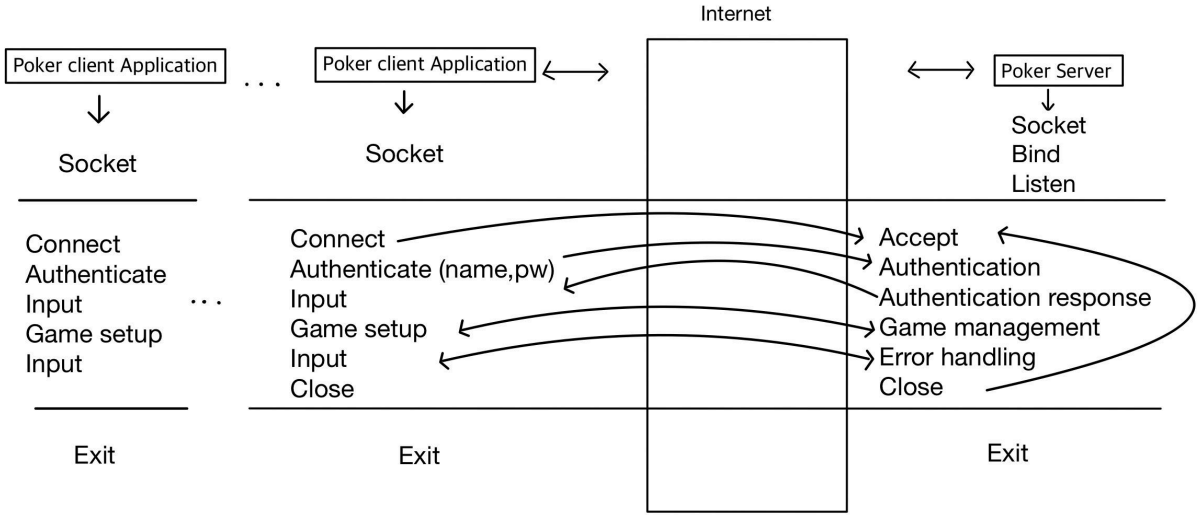

Figure 3.1: Diagram of Client and Server Communication.

The client and server communication is established using sockets, as shown in Figure 3.1. Sockets serve as the communication bridge between the Poker clients and the Poker server. The server sets up a socket, binding it to an IP address and port, and listens for incoming connections. Meanwhile, each client creates its own socket and connects to the server's socket. After a handshake to establish the communication protocol, data exchange begins. The server sends game updates to the clients, such as dealing cards or updating the pot, while clients may send commands like placing bets or folding. Sockets manage the transmission of data packets, ensuring reliable delivery and error checking. When the game ends or a client disconnects, the sockets are closed, ending the connection. This enables real-time communication and interaction between the clients and server during the Poker game.

3.2 Dealer Choice and Card Distribution

Users will input their name, and then select their preferred seat at the table as shown in Figure 3.2a. The dealer will shuffle the cards and distribute two cards to each player (Figure 3.2c), known as "hole cards." The community cards will be displayed on the table for all players to see.

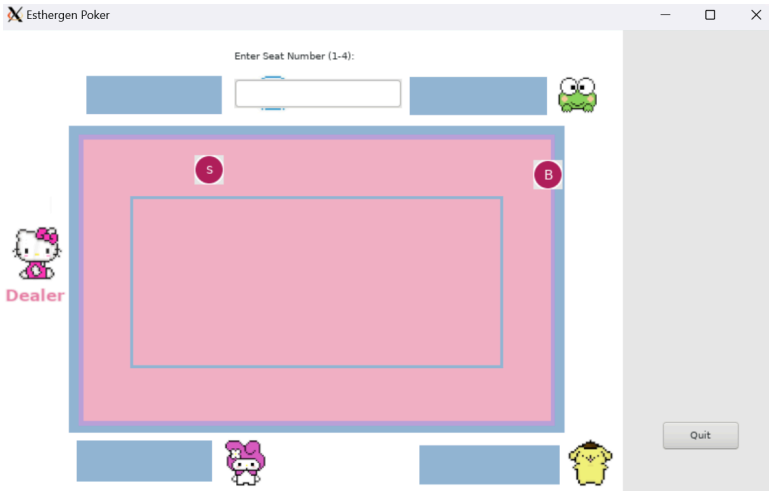

Figure 3.2a: Screenshot of player choosing their seat.

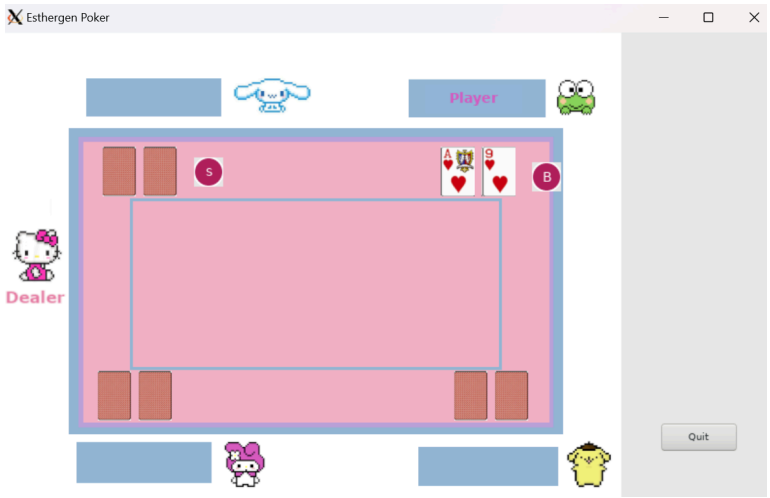

Figure 3.2b: Concept Sketch of display when dealer shuffle cards.

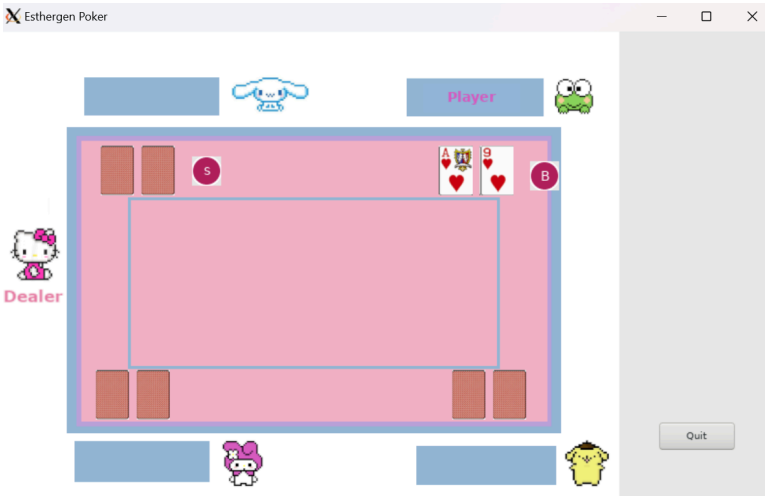

Figure 3.2c: Concept Sketch of players getting handed cards with their names displayed.

3.3 Poker Game Integration

During each player's turn, they will have the option to check, fold, or raise the bet as shown in Figure 3.3.

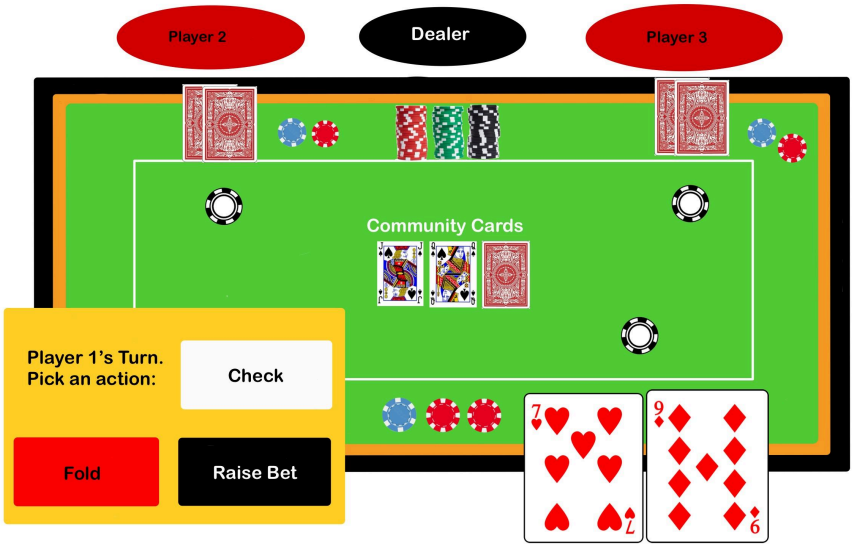

Figure 3.3: Concept sketch of active poker game with options to fold, check, and raise bet.

3.4 Poker Game End Status

The poker game typically ends when one player remains after all others have folded, or when multiple players reach a showdown and the best hand is determined. Alternatively, the game may

end if all players agree to end it prematurely, or if external factors such as time limits are reached. Figure 3.4 shows a concept sketch of an end game screen where the player has the option to quit or play again.

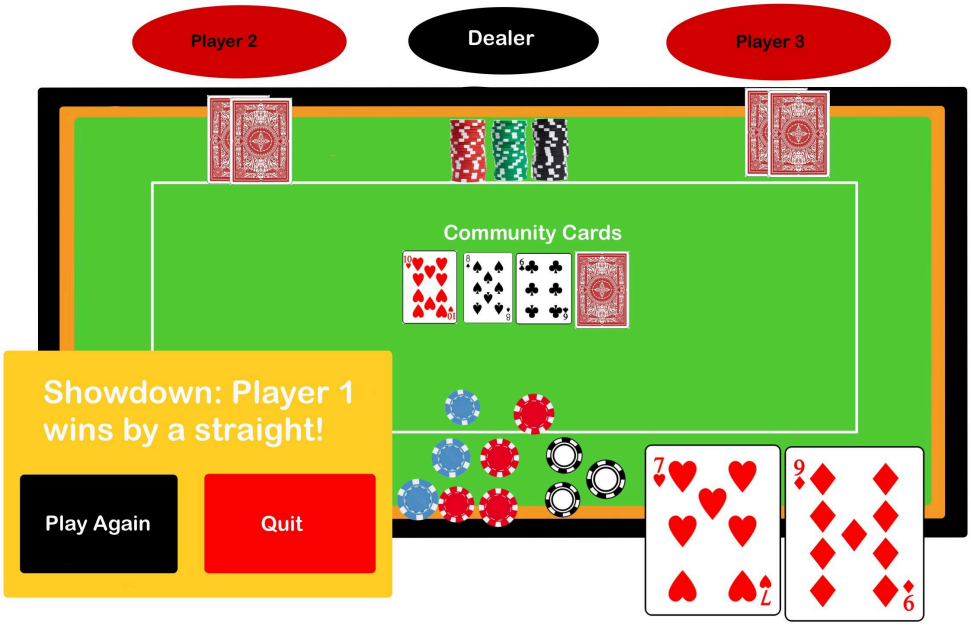

Figure 3.4: Concept Sketch of end game screen.

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Error Messages

In Esthergen Poker, error checking will be meticulously implemented throughout the program to ensure a seamless and fair gaming experience. A set of assertion and abstract error checking functionalities will cover every aspect of gameplay, including:

- Player Actions: Error checking will occur for turn-based actions, ensuring that players follow the correct sequence of play.
- Card Selection: Players' card selections will be validated to prevent invalid moves.
- Valid Movement Check: The program will verify the legality of moves, troubleshooting any potential issues with movement.
- Chip Handling: Error checks will be in place to handle chip movements and prevent any inconsistencies or errors.
- Endgame Validity: The program will verify the endgame state to ensure it aligns with the rules of poker.

The standard rules of poker will be implemented within our program, with multiple error checks and troubleshooting steps to validate the game's integrity.

In terms of data structure, Esthergen Poker will utilize Object-Oriented Programming (OOP) fundamentals to provide users with the highest quality experience. Memory pointers within the C language will be used to structure data in a way that is easily manipulated and troubleshooted, ensuring smooth gameplay.

Regarding piece moves, our program utilizes algorithms to list and organize the available actions for each player. Each move will undergo a unique function and error checking process to enforce the standard rules of poker and provide players with a seamless experience.

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