StakeFree Digital Casino: Sprint1

EECS Team 6

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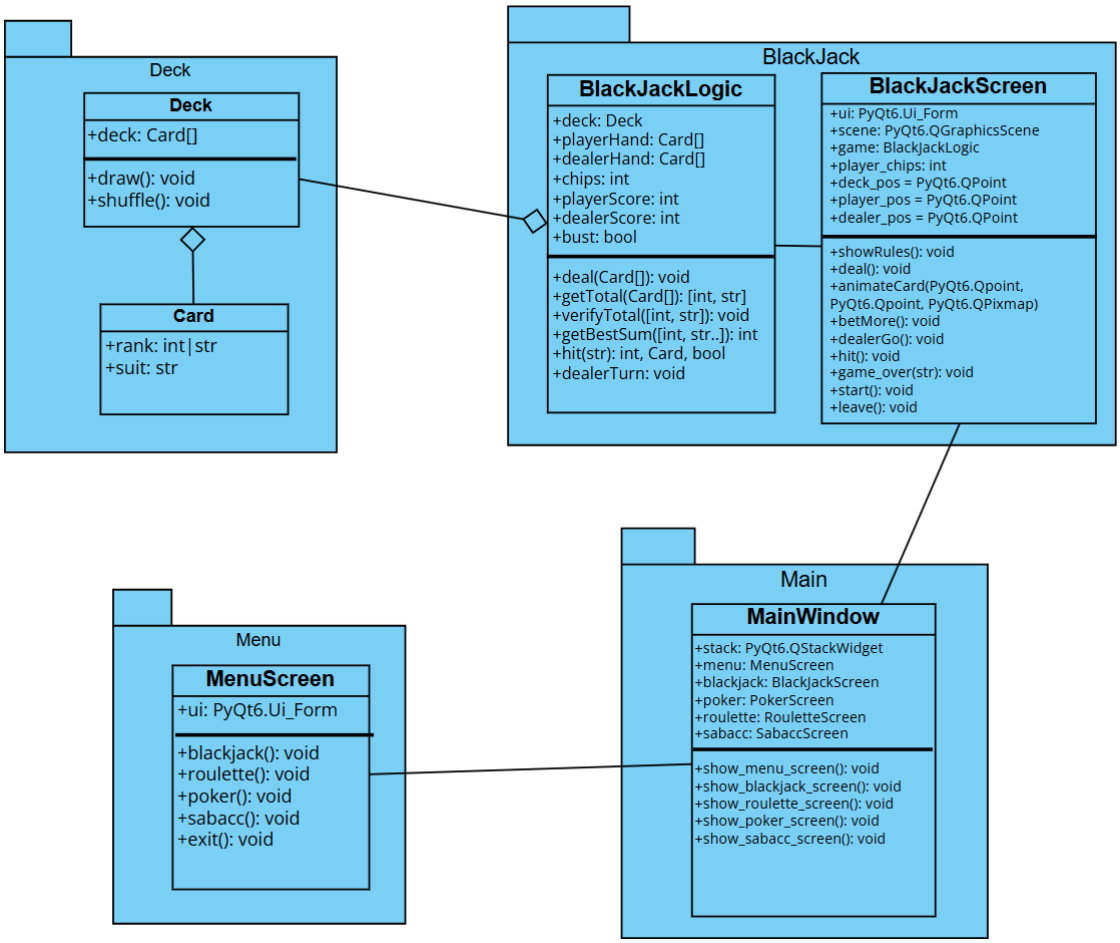
Project Synopsis

StakeFree Digital Casino provides gamblers with the opportunity to play games such as Roulette, Blackjack, Poker, and Sabacc without the risk of financial loss.

Architecture Description

The UML Class Diagram for the Sprint 1 architecture of StakeFree Digitial Casino is shown below.



Dependencies

This project utilizes the PyQt6 libraries to implement GUIs. To install all required libraries, enter “pip install pyqt6-tools". This library provides a designer program that allows for the customization of a GUI in a user-friendly manner, saving the resulting GUI as a .ui file. This project also takes advantage of another tool provided by PyQt6, pyuic6, which converts a .ui file into a Python class for ease of use. Each element in the GUI is made available as a class attribute.

Components

MainWindow

- Description:
    - Core skeleton of the project. Manages switching between the menu GUI and game GUIs, as well as ultimate program termination.
- Attributes:
    - stack: A PyQt6.QStackedWidget instance that will store all of the GUI handlers, allowing switching.
    - menu: A MenuScreen instance which handles the main menu GUI.
    - blackjack: A BlackJackScreen instance which handles the blackjack GUI.
    - poker: A PokerScreen instance which handles the poker GUI.
    - roulette: A RouletteScreen instance which handles the roulette GUI.
    - sabacc: A SabaccScreen instance which handles the sabacc GUI.
- Methods:
    - show_[screen]_screen():
        - Simply switches to the desired screen (menu, blackjack, poker, sabacc, or roulette).

Card

- Description:
    - Basic representation of a playing card.
- Attributes:
    - rank: The integer value for a numbered card, the string name for a face card or ace.
    - suit: A string name of the suit of the card (spade, club, heart, diamond).

Deck

- Description:

    - A representation for a deck of cards.
- Attributes:
    - deck: An array of Card instances.
- Methods:
    - draw():
        - Randomly selects a Card instance and removes it from the deck attribute, returning the Card as well.
    - shuffle():
        - Reinitializes the deck attribute, clearing it and replacing every Card instance.

BlackJackScreen

- Description:
    - Manages the GUI displayed while playing Blackjack. Connects actions on GUI elements to blackjack moves.
- Attributes:
    - ui: A PyQt6.Ui_Form that generates the initial state of the blackjack GUI.
    - scene: A PyQt6.QGraphicsScene that enables the addition of animated sprites to the GUI.
    - game: The BlackJackLogic instance handling the actual moves of the game.
    - deck_pos: A PyQt6.QPoint that represents the card deck's position on the GUI. Used for draw animations.
    - player_pos: A PyQt6.QPoint that represents the player's position on the GUI. Used for draw animations.
    - dealer_pos: A PyQt6.QPoint that represents the dealers's position on the GUI. Used for draw animations.
    - player_chips: An integer representing the player's inital chip balance.
- Methods:
    - showRules():
        - Displays a form describing the rules of the game.
    - deal():
        - Requests hand generation from BlackJackLogic and generates the initial sprites for the player's and dealer's hands.
    - animateCard(PyQt6.QPoint, PyQt6.QPoint, PyQt6.QPixmap):
        - Handles the actual animating of a dealt Card instance.
    - betMore():
        - Connects with a button on the GUI to allocate some of the player's chip balance towards a game. Inaccessible after the game begins.
    - hit():

        - Connects with button on the GUI to simulate a player requesting a hit. Has the BlackJackLogic class handle the card generation, requests the animation, and calls game_over() if there was a bust.
    - dealerGo():
        - Triggered by clicking the "stand" button on the GUI. Disables gameplay buttons and passes control to the BlackJackLogic class, which generates the dealer's hand. After this, each of the dealer's new cards is animated.
    - start():
        - Disables buttons for betting, enables gameplay buttons, and calls for the initial deal.
    - game_over():
        - Either adds to or deletes from the player_chips attribute based on the outcome of the game. Enables optional resetting and mandatory removal if there are no more chips.
    - leave():
        - Connects with a GUI button to return to the main menu. Ensures that any chips bet before finishing a game are lost.

BlackJackLogic

- Description:
    - Handles the actual game logic for blackjack.
- Attributes:
    - deck: A Deck instance representing the deck in blackjack.
    - dealerHand: An array of Card instances representing the dealer's hand.
    - playerHand: An array of Card instances representing the player's hand.
    - chips: An integer representing the number of chips **bet**.
    - playerScore: An integer representing the player's final score.
    - dealerScore: An integer representing the dealer's final score.
    - bust: A boolean denoting if the player's hand is a bust(> 21).
- Methods:
    - deal():
        - Initializes the hand for both the player and dealer.
    - getTotal(Card[]):
        - Takes in a hand, and typically returns a list, in which index 0 is a tentative total. If the hand contains an ace, which could still be either 11 or 1 without the score going over 21, an 'ace' string is appended to the list.
    - verifyTotal([int, str]):
        - Takes in the result of something like getTotal and "sorts out" the aces. It eliminates any aces that absolutely could not be worth 11 without busting. It returns the updated result.

- getBestSum([int, str]):
  - Takes in the previous result and applies aces towards the final score. It returns an integer, which should be considered the best possible score for the hand.
- hit():
  - Adds a Card instance to the player's hand. Returns the best possible score of the hand, the Card added, and a boolean denoting whether a bust has occurred.
- dealerTurn():
  - Implements the dealer's hitting until reaching/passing 17 or until busting.