CMPE 230 PROJECT 3, SPRING 2020

Description

Card Match Game is played by finding pairs of matching cards in 5x6 table of cards. Player can turn over and see the values of card by clicking it. At most two cards' values can be visible to player.

In this implementation, values of cards are chosen from popular author's surname. Camus, London, Tolstoy, Márquez, Kundera, Flaubert, Zweig, Hugo, Hesse, Saramago, Kafka, Hawking, Dostoyevski, Foucault, Atılgan are options.

Card can have three texts:

1. **"?"** : not clicked currently, its value is invisible.
2. **"<surname_of_author>"** : clicked, its value is visible.
3. **""** : it is matched, disabled.

While "Time(secs)" section shows the passed time, "Score" section keeps the number of matched cards by the player.
"New Game" button restarts the game, "Quit" button terminates the game.

Implementation

Classes

- Timer

  Handles timer operations. It has properties such as QLabel *label for displaying the time that has passed, QTimer *timer to send signal every second, QMessageBox *mb to display a message box when time is out, it has "Close" button as a standart button. QPushButton *pa as an extra button texted "Play again!" in message box, int cnt to count the number of signals that timer sends.
  It has a slot as void inc_timer() which increments the cnt and changes label according to cnt. Also gives a message after 180 seconds since time runs out.

- Restarter

  A class that has a slot named restart() functions as restarter for game.

- CardButton

  This class represents a card in game.
  It takes const QString& value, int num, QWidget* parent as parameters. value keeps the card's text value, for instance "Camus", num is a unique integer given to the card ,parent is zero as default.

Initially a card's text is **"?"**. It means it has not been clicked to see its value. When card is clicked, change_value() slot sets this button's text to its value. This means card is turned over, and its value is visible now.

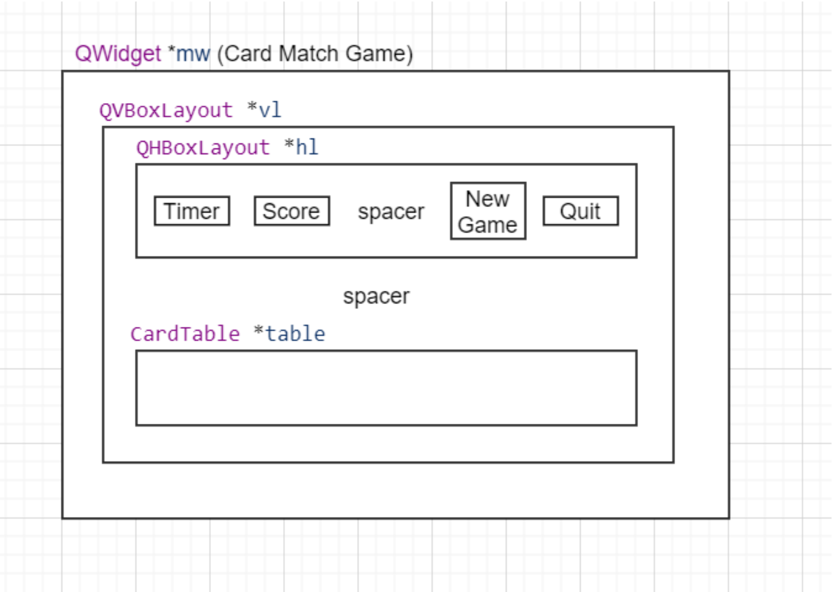
- CardTable

  This class represents a grid of cards in one game.
  Takes a QTimer *timer as parameter in order to stop timer if player wins the game.
  It keeps the score of matched cards via int score and displays this score with QLabel *score_lbl.
  If player matches all cards and wins, message box will pop up with "Play Again" and "Close" options.
  int i keeps track of the number of visible cards at the moment, its maximum value is 2, and CardButton *cur_cards[2] stores these visible card buttons. It has *nullptr* value initially.
  void delay() waits 0.8 seconds while executing events.
  This class has a slot named check_clicks() which updates i and cur_cards[2].
  When first button is clicked, it stores the button in array.
  When a card is clicked to turn over and is made visible, it cannot be turned over until the player clicks different card.*
  When two different cards are clicked by the player, this slot will disable all other cards except the two buttons that have been clicked. After disabling cards, there is void delay() to display secondly clicked card's value.
  Now, slot controls if two cards have matching values.
  //matching cards
  If so, increments game score and controls whether game continues or not. If player wins, message box will appear with its two options. In case game continues, matching two cards are also disabled and their text is set to **""** (empty string).
  //non-matching cards
  Set values of two clicked cards to **"?"**.
  In the end of the function, information of clicked cards are erased from storage array, values are set to *nullptr*. i is assigned to zero since no cards are visible at the moment. Also, all cards are enabled again except the matched ones(**""**).

MainGame

Handles execution of app.
Restart *r, Timer *tm, QPushButton *newgame, QPushButton *quitb, CardTable *table are declared.
Connects "Close" button to quit, "Play Again!" to r(restart) in tm and table's message boxes, newgame to r(restart), quitb to quit.
void set_button_clr(QPushButton *b) thickens edges of the passed button.
cardValues[30] holds surname of authors, two for each surname.
For 5x6 array of cards, there are two for loops; one for rows, one for columns. In each iteration, a CardButton object is declared. Its value is decided by randomly chosen index from array of cardValues. Unique number of a card is 6*(row-1) + col.
Each card is added to the grid table at the end of the iteration.

Game’s layout is shown below. Finally, MainGame constructs it and executes the app.


QWidget *mw (Card Match Game)
QVBoxLayout *vl
QHBoxLayout *hl
Timer
Score
spacer
New Game
Quit
spacer
CardTable *table