CSE 2050 – Programming in a Second Language

Fall 2023

Final Project: DMV Driver's Test UI

Total Points: 30

Date Assigned: Monday, Nov 13, 2023 **Due Date:** Sunday, Dec 2, 2023

Instructions: Please submit your work on Canvas as a zipped file named `cse2050_group_x_final_project.zip`. Make sure to include a main.py file as the driver for testing your program and organize all classes into separate files. Do not use global variables, packages outside of the Python Standard Library (except lxml), or concepts not covered in class, to complete this assignment.

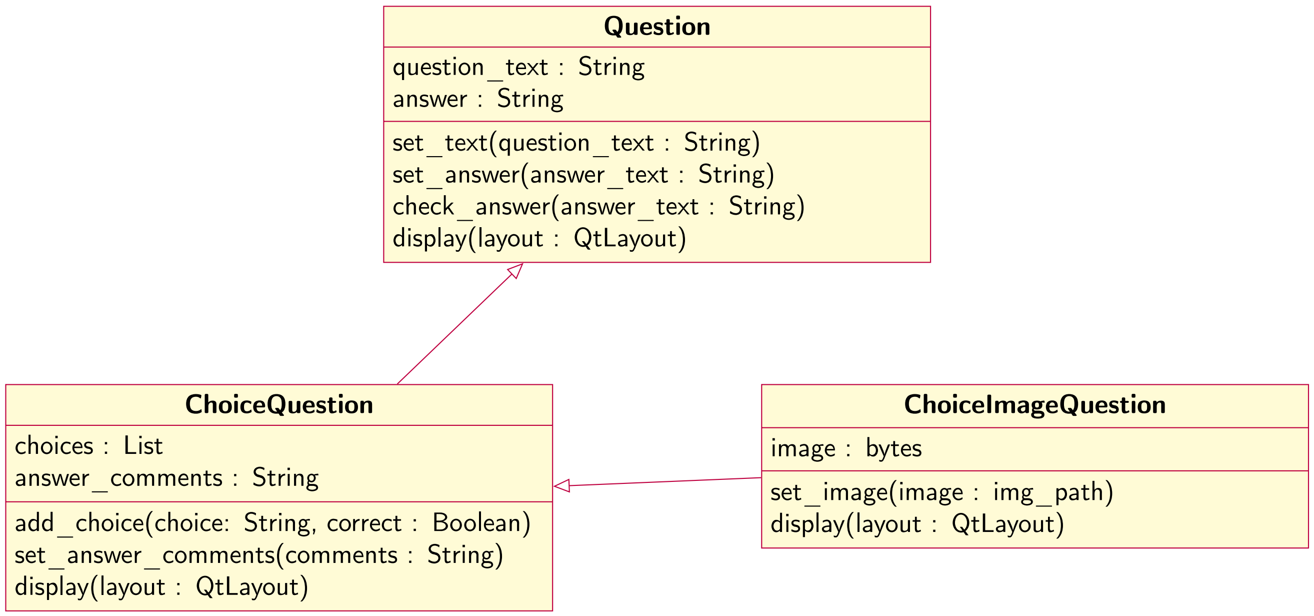
Key Concepts Demonstrated

- Writing GUI programs based on the Objected Oriented Programming (OOP) Paradigm
  - Writing code that uses objects that interact with each other
- Parsing XML files and creating objects from the data
- Solving a real-world problem
- Interpreting UML diagrams and writing code based on the contents

1. (30 points) **DMV Driver's Test UI**

Given an XML file named `florida_drivers_test.xml` and a folder of images located on Canvas, containing mock questions for a driver's test, which is typically given in Florida, complete the following:

Write an OOP PyQt program based on the following UML class diagram and requirements listed below



Question
question_text : String
answer : String
set_text(question_text : String)
set_answer(answer_text : String)
check_answer(answer_text : String)
display(layout : QtLayout)
ChoiceQuestion
choices : List
answer_comments : String
add_choice(choice: String, correct : Boolean)
set_answer_comments(comments : String)
display(layout : QtLayout)
ChoiceImageQuestion
image : bytes
set_image(image : img_path)
display(layout : QtLayout)

Requirements:
Your project should have the following as a minimum:

Question, ChoiceQuestion, ChoiceImageQuestion - (8pts)
These classes should be based on the UML diagram above. The sub-question objects should override the methods from the super class. For example, a choice question without an image should be instantiated as a `ChoiceQuestion` object whereas one with an image should be instantiated as a `ChoiceImageQuestion`.

XMLParser - (10pts)
This class has a method that parses the given XML file and creates question objects based on the question elements in the file.

DMVDriverTestUI - (8pts)
This is the main UI that will accept a list of question objects in its constructor and display them one question at a time. See an image of the expected UI in Figure 1 with a `ChoiceImageQuestion`. Figure 2 shows an example layout for a `ChoiceQuestion` and Figure 3 provides tips on how to layout your UI.

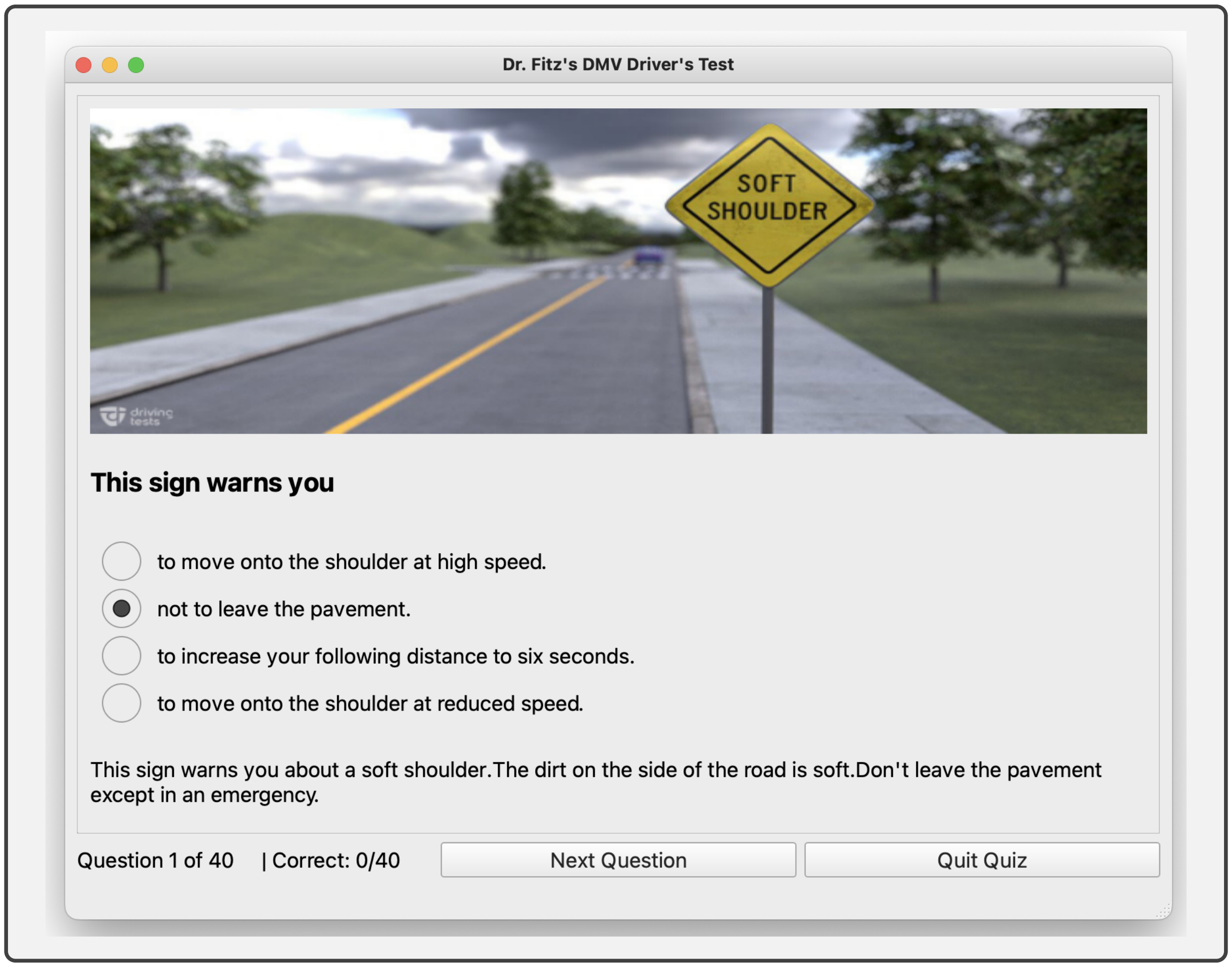
When the user clicks on a radio-button, this should disable all radio buttons (`btn.setDisbled(True)`) and display the answer-comments in a widget such as a label below the question section of the UI.

Clicking the *next-question* button should update the UI with a message showing the index of the current question and the number of correct answers the user has gotten so far. The `check_answer` method, which is part of the question object, should be used to check if a user got a question right, and the UI should be updated accordingly.

main() method - (4pts)
- creates an instance of the XMLParser that reads the XML file and stores question objects in a list
- creates an instance of the DMVDriverTestUI and displays one question at a time allowing the user to click a *next-question* button to advance to the next question (see image overleaf)

Hints:

- See slides 12 - 20 (UI Design) for a discussion on different concepts related to the `Question` class.
- See slide 77 for code related to adding an image to a PyQt UI
- See slide 80 - 82 for tips on making a quiz UI and clearing a layout in order to add new items



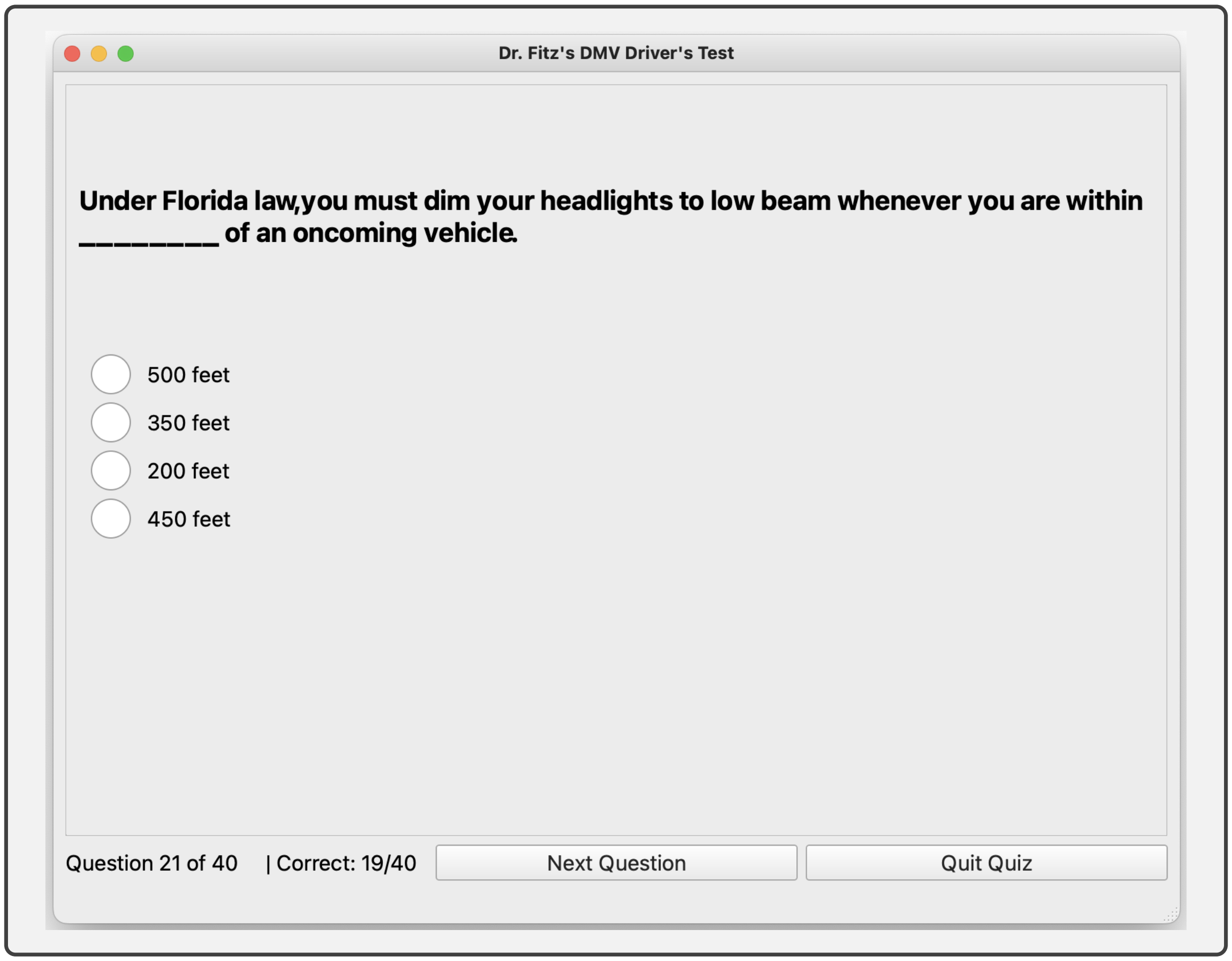
This sign warns you

- ( ) to move onto the shoulder at high speed.
- [✓ not to leave the pavement.]
- ( ) to increase your following distance to six seconds.
- ( ) to move onto the shoulder at reduced speed.

This sign warns you about a soft shoulder.The dirt on the side of the road is soft.Don't leave the pavement except in an emergency.

Question 1 of 40 | Correct: 0/40

Figure 1: Expected UI for the DMV Driver's Test


Dr. Fitz's DMV Driver's Test

Under Florida law,you must dim your headlights to low beam whenever you are within _________ of an oncoming vehicle.

- 500 feet
- 350 feet
- 200 feet
- 450 feet

Question 21 of 40 | Correct: 19/40

Figure 2: Example DMV Driver's Test UI showing a `ChoiceQuestion` (i.e., a question without an image)

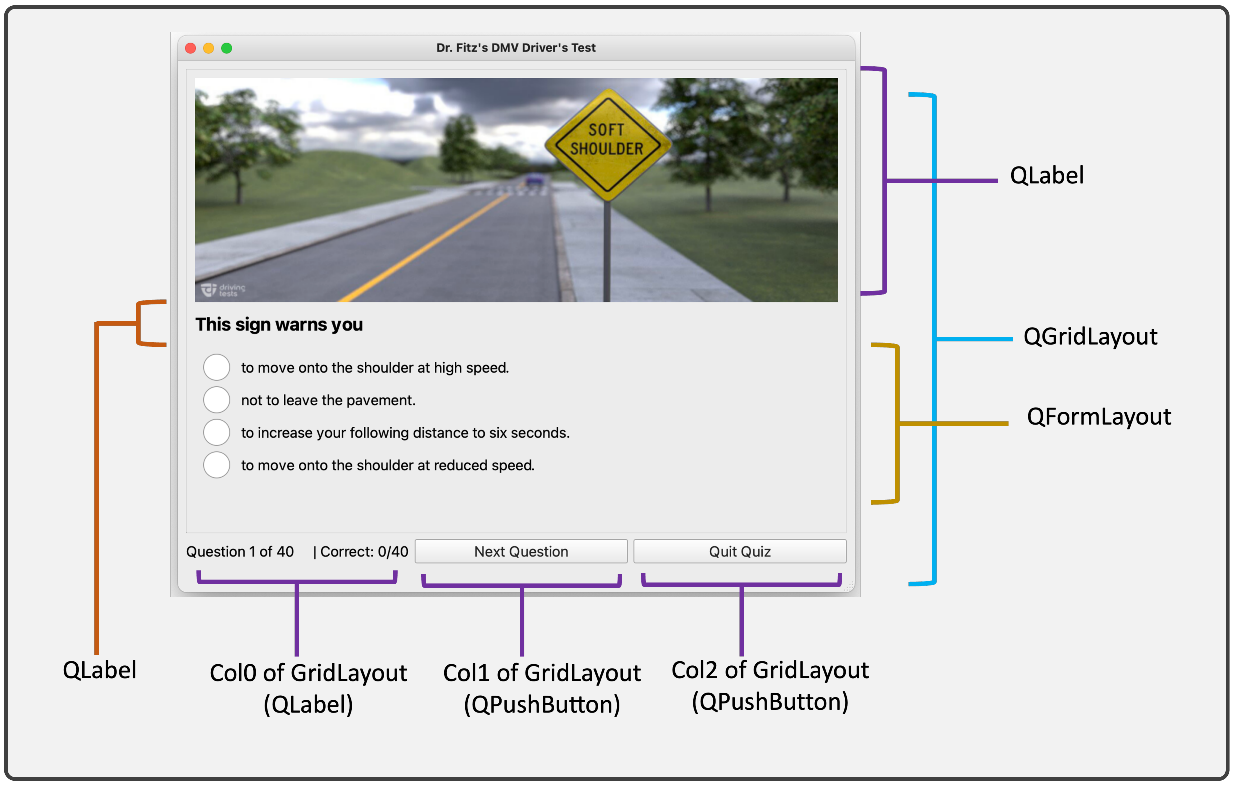

Dr. Fitz's DMV Driver's Test
SOFT SHOULDER
This sign warns you
to move onto the shoulder at high speed.
not to leave the pavement.
to increase your following distance to six seconds.
to move onto the shoulder at reduced speed.
Question 1 of 40
| Correct: 0/40
Next Question
Quit Quiz
QLabel
QGridLayout
QFormLayout
QLabel
Col0 of GridLayout (QLabel)
Col1 of GridLayout (QPushButton)
Col2 of GridLayout (QPushButton)

Figure 3: Design Tips for your UI. To set the font-size and weight of a label, use `label.setStyleSheet("font-size:20px;font-weight:600"))`