# Java Programming Project

## Quiz Game with Timer (JavaFX Implementation)

Organization: ARTTIFAI TECH

## 🎯 AIM

To develop an engaging and interactive quiz game using JavaFX, where players must answer each question within a set time limit. The game promotes quick decision-making and enhances user engagement through a well-structured UI and real-time feedback. The goal is to provide a customizable, adaptive learning experience, accommodating various difficulty levels and topics, while maintaining a user-friendly design.

## 🔍 Key Focus Areas

- User Experience (UX) Design: Craft an intuitive, visually engaging interface with animations and enhancements.  
- Real-time Interaction: Manage user input and feedback using JavaFX event handling.  
- Time Management: Add countdown timers to increase challenge and urgency.  
- Data Handling: Store and retrieve scores and quiz history.  
- Customization & Adaptability: Allow users to choose difficulty levels and topics.

## 🎯 Objectives

### ✅ Game Functionality

- Create a JavaFX-based quiz with appealing UI and timed responses.  
- Present multiple-choice questions dynamically.  
- Use JavaFX Timeline for countdown timers.  
- Auto-skip to next question after timeout for a smooth experience.

### ✅ User Interaction and Experience

- Utilize JavaFX components (buttons, labels, progress bars).  
- Provide instant feedback for answers.  
- Display performance summary and incorrect answers.  
- Ensure smooth navigation and user-friendly animations.

### ✅ Customization and Adaptability

- Offer options like:  
 - Difficulty selection  
 - Category selection  
 - Varying time limits

### ✅ Data Handling and Storage

- Save scores using database or file-based storage.  
- Enable accessibility features:  
 - Text-to-speech  
 - Adjustable text sizes  
- Track performance history for improvement.

## 📤 Expected Output

- Display MCQs using JavaFX.  
- Users select answers via buttons.  
- Correct answers update score and show visual feedback.  
- Auto-transition on timeout.  
- Display final score and feedback at the end.

## 💡 Sample Output

Welcome to the JavaFX Timed Quiz Game!  
  
[Question Panel]  
1. What is the capital of France?  
( ) Berlin  
( ) Madrid  
(X) Paris  
( ) Rome  
[Timer: 10 seconds left]  
[Feedback: Correct Answer!]  
  
2. Who invented Java?  
(X) James Gosling  
( ) Dennis Ritchie  
( ) Bjarne Stroustrup  
( ) Guido van Rossum  
[Timer: 7 seconds left]  
[Feedback: Correct Answer!]  
  
3. What is the extension of Java bytecode files?  
( ) .java  
( ) .exe  
(XX) .class  
( ) .jar  
[Timer: 0 seconds left]  
[Feedback: Time's up! Moving to the next question.]  
  
[Results Screen]  
Quiz Over! Your final score is: 2/3  
Review Incorrect Answers: (if applicable)

# JavaFX Quiz Game with Timer - Implementation Guide

Import javafx.animation.KeyFrame;

Import javafx.animation.Timeline;

Import javafx.application.Application;

Import javafx.geometry.Insets;

Import javafx.geometry.Pos;

Import javafx.scene.Scene;

Import javafx.scene.control.\*;

Import javafx.scene.layout.\*;

Import javafx.scene.paint.Color;

Import javafx.scene.text.Font;

Import javafx.stage.Stage;

Import javafx.util.Duration;

Import java.util.\*;

Public class QuizGame extends Application {

Private int currentQuestionIndex = 0;

Private int score = 0;

Private int timeLeft = 10;

Private Timeline timer;

Private List<Question> questions = new ArrayList<>();

Private Label questionLabel = new Label();

Private ToggleGroup optionsGroup = new ToggleGroup();

Private RadioButton[] optionButtons = new RadioButton[4];

Private Label timerLabel = new Label();

Private Label feedbackLabel = new Label();

Private ProgressBar timerProgress = new ProgressBar(1.0);

Private Button nextButton = new Button(“Next”);

Private VBox quizPane = new VBox(15);

Private StackPane root = new StackPane();

Public static void main(String[] args) {

Launch(args);

}

@Override

Public void start(Stage primaryStage) {

initializeQuestions();

setupUI();

Scene scene = new Scene(root, 800, 600);

primaryStage.setTitle(“JavaFX Timed Quiz Game”);

primaryStage.setScene(scene);

primaryStage.show();

showQuestion(currentQuestionIndex);

}

Private void initializeQuestions() {

Questions.add(new Question(

“What is the capital of France?”,

New String[]{“Berlin”, “Madrid”, “Paris”, “Rome”},

2));

Questions.add(new Question(

“Who invented Java?”,

New String[]{“James Gosling”, “Dennis Ritchie”, “Bjarne Stroustrup”, “Guido van Rossum”},

0));

Questions.add(new Question(

“What is the extension of Java bytecode files?”,

New String[]{“.java”, “.exe”, “.class”, “.jar”},

2));

}

Private void setupUI() {

// Question label setup

questionLabel.setFont(Font.font(20));

questionLabel.setWrapText(true);

// Options setup

For (int I = 0; I < 4; i++) {

optionButtons[i] = new RadioButton();

optionButtons[i].setToggleGroup(optionsGroup);

optionButtons[i].setFont(Font.font(16));

}

// Timer setup

timerLabel.setFont(Font.font(18));

timerLabel.setTextFill(Color.RED);

// Feedback label

feedbackLabel.setFont(Font.font(16));

feedbackLabel.setTextFill(Color.GREEN);

// Timer progress bar

timerProgress.setPrefHeight(20);

timerProgress.setStyle(“-fx-accent: #FF5722;”);

// Next button

nextButton.setPrefSize(100, 40);

nextButton.setFont(Font.font(16));

nextButton.setOnAction(e -> nextQuestion());

// Layout setup

VBox optionsBox = new VBox(10, optionButtons);

optionsBox.setPadding(new Insets(0, 0, 20, 0));

HBox timerBox = new HBox(10, new Label(“Time Left:”), timerLabel, timerProgress);

timerBox.setAlignment(Pos.CENTER);

quizPane.getChildren().addAll(

new Label(“Welcome to the JavaFX Timed Quiz Game!”),

questionLabel,

optionsBox,

timerBox,

feedbackLabel,

nextButton

);

quizPane.setAlignment(Pos.CENTER);

quizPane.setPadding(new Insets(20));

root.getChildren().add(quizPane);

}

Private void showQuestion(int index) {

If (index >= questions.size()) {

showResults();

return;

}

Question current = questions.get(index);

questionLabel.setText((index + 1) + “. “ + current.getQuestion());

String[] options = current.getOptions();

For (int I = 0; I < 4; i++) {

optionButtons[i].setText(“(“ + (char)(I + 65) + “) “ + options[i]);

}

optionsGroup.selectToggle(null);

feedbackLabel.setText(“”);

// Start timer

timeLeft = 10;

timerProgress.setProgress(1.0);

updateTimerDisplay();

if (timer != null) {

timer.stop();

}

Timer = new Timeline(

New KeyFrame(Duration.seconds(1), e -> {

timeLeft--;

updateTimerDisplay();

if (timeLeft <= 0) {

timer.stop();

feedbackLabel.setText(“Time’s up! Moving to the next question.”);

feedbackLabel.setTextFill(Color.RED);

nextQuestion();

}

})

);

Timer.setCycleCount(Timeline.INDEFINITE);

Timer.play();

}

Private void updateTimerDisplay() {

timerLabel.setText(timeLeft + “ seconds”);

timerProgress.setProgress(timeLeft / 10.0);

}

Private void nextQuestion() {

checkAnswer();

currentQuestionIndex++;

showQuestion(currentQuestionIndex);

}

Private void checkAnswer() {

RadioButton selected = (RadioButton)optionsGroup.getSelectedToggle();

If (selected != null) {

Int selectedIndex = Arrays.asList(optionButtons).indexOf(selected);

Question current = questions.get(currentQuestionIndex);

If (selectedIndex == current.getCorrectIndex()) {

Score++;

feedbackLabel.setText(“Correct Answer!”);

feedbackLabel.setTextFill(Color.GREEN);

} else {

feedbackLabel.setText(“Incorrect! The correct answer was: “ +

current.getOptions()[current.getCorrectIndex()]);

feedbackLabel.setTextFill(Color.RED);

}

}

}

Private void showResults() {

VBox resultsPane = new VBox(20);

resultsPane.setAlignment(Pos.CENTER);

resultsPane.setPadding(new Insets(20));

Label title = new Label(“Quiz Results”);

Title.setFont(Font.font(24));

Label scoreLabel = new Label(“Your final score: “ + score + “/” + questions.size());

scoreLabel.setFont(Font.font(20));

Button restartButton = new Button(“Play Again”);

restartButton.setOnAction(e -> {

currentQuestionIndex = 0;

score = 0;

root.getChildren().remove(resultsPane);

showQuestion(currentQuestionIndex);

});

resultsPane.getChildren().addAll(title, scoreLabel, restartButton);

root.getChildren().add(resultsPane);

}

Private class Question {

Private String question;

Private String[] options;

Private int correctIndex;

Public Question(String question, String[] options, int correctIndex) {

This.question = question;

This.options = options;

This.correctIndex = correctIndex;

}

Public String getQuestion() { return question; }

Public String[] getOptions() { return options; }

Public int getCorrectIndex() { return correctIndex; }

}

}

**Expected Output**

The quiz game will display the following screens during execution:

**Welcome Screen**

Welcome to the JavaFX Timed Quiz Game!

1. What is the capital of France?

(A) Berlin

(B) Madrid

© Paris

(D) Rome

Time Left: 10 seconds

[Progress Bar]

[Next Button]

During Quiz

2. Who invented Java?

(A) James Gosling

(B) Dennis Ritchie

© Bjarne Stroustrup

(D) Guido van Rossum

Time Left: 7 seconds

[Progress Bar]

Feedback: Correct Answer!

[Next Button]

Time Expired

Text

3. What is the extension of Java bytecode files?

(A) .java

(B) .exe

© .class

(D) .jar

Time Left: 0 seconds

[Progress Bar]

Feedback: Time’s up! Moving to the next question.

[Next Button]

**Results Screen**

Quiz Results

Your final score: 2/3

[Play Again Button]