Programming in Java

Assignment – 3

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Problem statement:

Design a typewriter game applet where the user needs to type the displayed alphabet within a time limit. The game should keep track of the score, display the high score, and provide an option to restart the game.

Description:

The typewriter game applet is a simple game where the player has to type the alphabet displayed on the screen within a specified time. The game keeps track of the score and displays the high score achieved. When the user types the correct alphabet, the score increases, and a new alphabet is displayed. If the user types the wrong alphabet, the game ends, and the user can restart the game to try again.

Concepts used:

1. **Java Applet:** The game is implemented as a Java applet, which allows interactive graphics and user input within a web browser.
2. **User Interface:** The applet uses various UI components such as labels, text fields, and buttons to display information and receive user input.
3. **Event Handling:** The applet handles keyboard events to capture user input and button clicks to respond to user actions.
4. **Random Number Generation:** The applet generates a random alphabet for each round of the game using random number generation techniques.
5. **Timer:** The applet uses a timer to track the remaining time for each round of the game. When the time is up, the game ends.
6. **Score Tracking:** The applet keeps track of the player's score and updates it accordingly when the user types the correct alphabet.
7. **Restarting the Game:** The applet allows the user to restart the game after it ends. The game resets the score, time, and target alphabet for a fresh start.
8. **High Score Tracking:** The applet maintains a high score record and updates it when the user achieves a new high score.

Program Code:

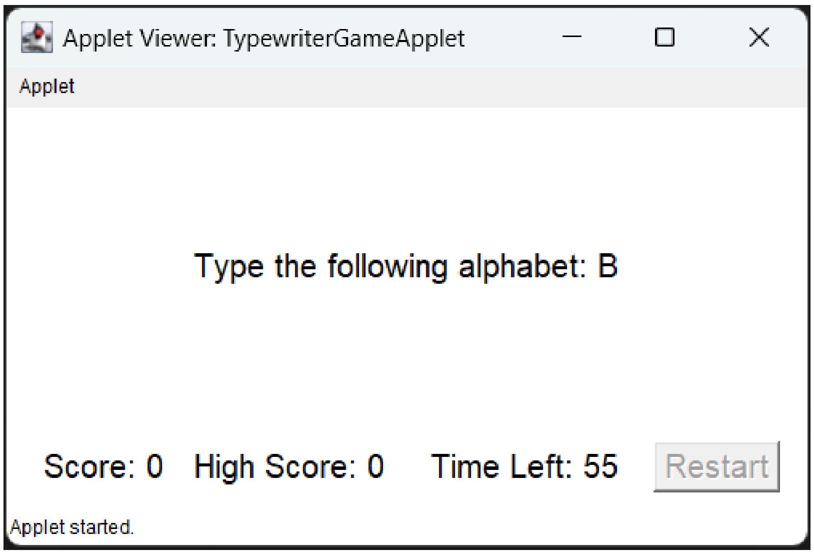
```
import java.applet.Applet;

import java.awt.*;

import java.awt.event.ActionEvent;

import java.awt.event.ActionListener;

import java.awt.event.KeyAdapter;

import java.awt.event.KeyEvent;

import javax.swing.Timer;


/*

<Applet code=TypewriterGameApplet width=500 height=250>

</Applet>

*/


public class TypewriterGameApplet extends Applet {

    private char targetAlphabet;

    private char wrongAlphabet;

    private int score;

    private int highScore;

    private boolean gameEnded;

    private TextField userInputField;

    private Label targetLabel;

    private Label scoreLabel;

    private Label highScoreLabel;

    private Label timerLabel;

    private Button restartButton;

    private Timer timer;

    private int timeLeft;

    private String correctWord;


    public void init() {

        targetAlphabet = generateRandomAlphabet();

        wrongAlphabet = ' ';

        score = 0;
```

```
highScore = 0;
gameEnded = false;
timeLeft = 60;
correctWord = "";

setSize(400, 250);
setBackground(Color.WHITE);
setFont(new Font("Arial", Font.PLAIN, 20));
setLayout(new BorderLayout());

targetLabel = new Label();
targetLabel.setFont(new Font("Arial", Font.PLAIN, 20));
targetLabel.setAlignment(Label.CENTER);

userInputField = new TextField(10);
userInputField.setFont(new Font("Arial", Font.PLAIN, 20));
userInputField.addKeyListener(new KeyAdapter() {
  public void keyPressed(KeyEvent e) {
    handleKeyPress(e);
  }
});

scoreLabel = new Label("Score: " + score);
scoreLabel.setFont(new Font("Arial", Font.PLAIN, 20));

highScoreLabel = new Label("High Score: " + highScore);
highScoreLabel.setFont(new Font("Arial", Font.PLAIN, 20));

timerLabel = new Label("Time Left: " + timeLeft);
timerLabel.setFont(new Font("Arial", Font.PLAIN, 20));

restartButton = new Button("Restart");
restartButton.setFont(new Font("Arial", Font.PLAIN, 20));
restartButton.addActionListener(new ActionListener() {
    public void actionPerformed(ActionEvent e) {
        restartGame();
    }
});
restartButton.setEnabled(false);

Panel centerPanel = new Panel();
centerPanel.setLayout(new BorderLayout());
centerPanel.add(targetLabel, BorderLayout.CENTER);

Panel inputPanel = new Panel();
inputPanel.setLayout(new FlowLayout(FlowLayout.CENTER));
inputPanel.add(userInputField);

Panel scorePanel = new Panel();
scorePanel.setLayout(new FlowLayout(FlowLayout.CENTER));
scorePanel.add(scoreLabel);
scorePanel.add(highScoreLabel);

Panel timerPanel = new Panel();
timerPanel.setLayout(new FlowLayout(FlowLayout.CENTER));
timerPanel.add(timerLabel);

Panel bottomPanel = new Panel();
bottomPanel.setLayout(new FlowLayout(FlowLayout.CENTER));
bottomPanel.add(scorePanel);
bottomPanel.add(timerPanel);
bottomPanel.add(restartButton);

add(centerPanel, BorderLayout.CENTER);
add(inputPanel, BorderLayout.SOUTH);
add(bottomPanel, BorderLayout.SOUTH);

setTargetLabel();
```

```
    startTimer();
}

private void setTargetLabel() {
    if (gameEnded) {
        targetLabel.setText("Oops! Game Over. The word is: " + correctWord);
    } else {
        targetLabel.setText("Type the following alphabet: " + targetAlphabet);
    }
}

private void handleKeyPress(KeyEvent e) {
    if (gameEnded) {
        return;
    }

    char typedChar = Character.toUpperCase(e.getKeyChar());

    if (typedChar == targetAlphabet) {
        score++;
        scoreLabel.setText("Score: " + score);
        targetAlphabet = generateRandomAlphabet();
    } else {
        gameEnded = true;
        wrongAlphabet = typedChar;
        userInputField.setEnabled(false);
        userInputField.setText("");
        restartButton.setEnabled(true);
        if (score > highScore) {
            highScore = score;
            highScoreLabel.setText("High Score: " + highScore);
        }
        correctWord = targetAlphabet + "";
        targetLabel.setText("Oops! Game Over. The word is: " + correctWord);
```

```
            timer.stop();
        }

        setTargetLabel();
    }

    private char generateRandomAlphabet() {
        return (char) ('A' + (int) (Math.random() * 26));
    }

    private void restartGame() {
        targetAlphabet = correctWord.charAt(0);
        wrongAlphabet = ' ';
        score = 0;
        gameEnded = false;
        userInputField.setEnabled(true);
        userInputField.setText("");
        userInputField.requestFocus();
        restartButton.setEnabled(false);
        scoreLabel.setText("Score: " + score);
        setTargetLabel();
        startTimer();
    }

    private void startTimer() {
        timeLeft = 60;
        timer = new Timer(1000, new ActionListener() {
            public void actionPerformed(ActionEvent e) {
                timeLeft--;
                timerLabel.setText("Time Left: " + timeLeft);
                if (timeLeft <= 0) {
                    timer.stop();
                    gameEnded = true;
                    userInputField.setEnabled(false);
                restartButton.setEnabled(true);

                targetLabel.setText("Time's up! Game Over.");

            }

        }

    });

    timer.start();

  }

}
```

Screenshots:



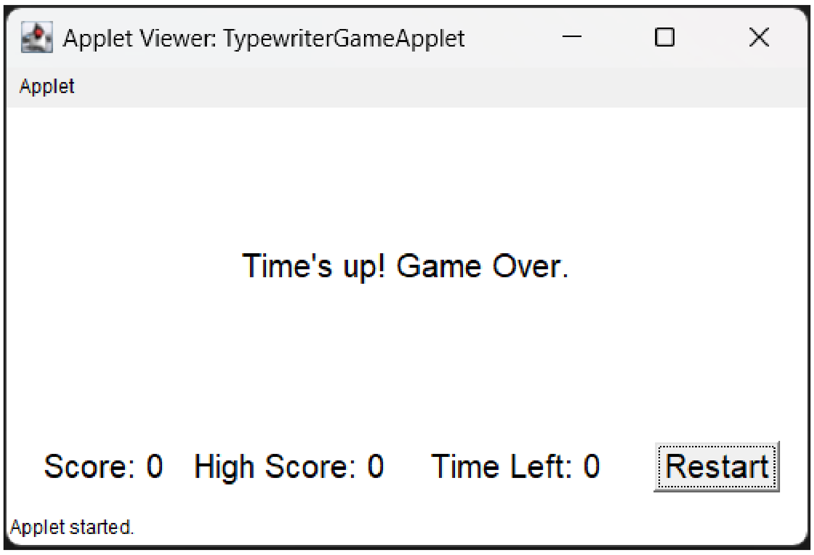
Applet Viewer: TypewriterGameApplet

Applet

Type the following alphabet: B

Score: 0   High Score: 0   Time Left: 55

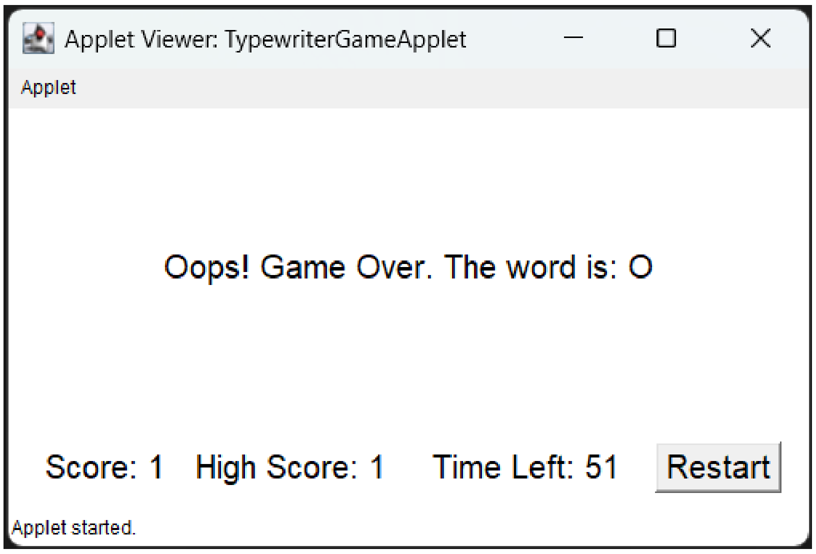
Applet started.



Time's up! Game Over.

Score: 0 High Score: 0 Time Left: 0

Applet started.



Oops! Game Over. The word is: O

Score: 1 High Score: 1 Time Left: 51

Applet started.