## Individual Project 1: Grade Calculator

AI Prompts and generated code (In chronological order):

* “Write a line of JAVA code that adds a double grade\_num to an ArrayList grades.”
  + grades.add(grade\_num);
* “Thanks! Could you now generate a for loop in JAVA that takes each entry of an ArrayList called grades and adds them to a double named grade\_avg”
  + double grade\_avg = 0.0;
  + for (double grade : grades) {

grade\_avg += grade;

}

* + grade\_avg = grade\_avg / grades.size();
* “In JAVA code, using JOptionPane, create a textbox that takes in a double averageGrade and an ArrayList grades, that displays the formatted average, with grades in the ArrayList grades above averageGrade being colored lime green and grades in the ArrayList grades below averageGrade being colored red.”

import javax.swing.\*;

import java.awt.\*;

import java.text.DecimalFormat;

import java.util.ArrayList;

import java.util.Arrays;

public class GradeDisplay {

public static void displayGrades(double averageGrade, ArrayList<Double> grades) {

// Create a JTextPane for rich text formatting

JTextPane textPane = new JTextPane();

textPane.setContentType("text/html");

textPane.setEditable(false);

// Format the average grade to 2 decimal places

DecimalFormat df = new DecimalFormat("#.##");

String formattedAverage = df.format(averageGrade);

// Build HTML content with colored grades

StringBuilder htmlContent = new StringBuilder();

htmlContent.append("<html><body style='font-family: Arial; font-size: 14px;'>");

htmlContent.append("<h3>Grade Report</h3>");

htmlContent.append("<p><strong>Average Grade: ").append(formattedAverage).append("</strong></p>");

htmlContent.append("<p><strong>Individual Grades:</strong></p>");

htmlContent.append("<ul>");

for (Double grade : grades) {

String color = grade >= averageGrade ? "lime" : "red";

String formattedGrade = df.format(grade);

htmlContent.append("<li style='color: ").append(color).append(";'>");

htmlContent.append(formattedGrade).append("</li>");

}

htmlContent.append("</ul>");

htmlContent.append("<p><small>Green grades are at or above average, red grades are below average.</small></p>");

htmlContent.append("</body></html>");

// Set the HTML content

textPane.setText(htmlContent.toString());

// Create a scroll pane in case there are many grades

JScrollPane scrollPane = new JScrollPane(textPane);

scrollPane.setPreferredSize(new Dimension(400, 300));

// Display in JOptionPane

JOptionPane.showMessageDialog(

null,

scrollPane,

"Grade Display",

JOptionPane.INFORMATION\_MESSAGE

);

}

// Example usage

public static void main(String[] args) {

// Sample data for testing

ArrayList<Double> sampleGrades = new ArrayList<>(Arrays.asList(

85.5, 92.0, 78.3, 95.7, 88.1, 76.9, 91.4, 83.6, 89.2, 77.8

));

double sampleAverage = 85.85;

// Display the grades

displayGrades(sampleAverage, sampleGrades);

// Exit the program

System.exit(0);

}

}

* “This is nice, but could you rewrite this code to use JOptionPane instead of JTextPane, JScrollPane, and HTML?”

import javax.swing.\*;

import java.awt.\*;

import java.text.DecimalFormat;

import java.util.ArrayList;

import java.util.Arrays;

public class GradeDisplay {

public static void displayGrades(double averageGrade, ArrayList<Double> grades) {

// Create a custom JPanel for the colored display

JPanel panel = new JPanel();

panel.setLayout(new BoxLayout(panel, BoxLayout.Y\_AXIS));

panel.setBackground(Color.WHITE);

// Format the average grade to 2 decimal places

DecimalFormat df = new DecimalFormat("#.##");

String formattedAverage = df.format(averageGrade);

// Add title and average grade

JLabel titleLabel = new JLabel("Grade Report");

titleLabel.setFont(new Font("Arial", Font.BOLD, 16));

titleLabel.setAlignmentX(Component.CENTER\_ALIGNMENT);

panel.add(titleLabel);

panel.add(Box.createVerticalStrut(10));

JLabel averageLabel = new JLabel("Average Grade: " + formattedAverage);

averageLabel.setFont(new Font("Arial", Font.BOLD, 14));

averageLabel.setAlignmentX(Component.CENTER\_ALIGNMENT);

panel.add(averageLabel);

panel.add(Box.createVerticalStrut(15));

JLabel gradesLabel = new JLabel("Individual Grades:");

gradesLabel.setFont(new Font("Arial", Font.BOLD, 12));

gradesLabel.setAlignmentX(Component.CENTER\_ALIGNMENT);

panel.add(gradesLabel);

panel.add(Box.createVerticalStrut(5));

// Add individual grades with colors

for (Double grade : grades) {

String formattedGrade = df.format(grade);

JLabel gradeLabel = new JLabel(formattedGrade);

gradeLabel.setFont(new Font("Arial", Font.PLAIN, 12));

gradeLabel.setAlignmentX(Component.CENTER\_ALIGNMENT);

// Set color based on comparison to average

if (grade >= averageGrade) {

gradeLabel.setForeground(Color.GREEN);

} else {

gradeLabel.setForeground(Color.RED);

}

panel.add(gradeLabel);

}

panel.add(Box.createVerticalStrut(10));

// Add legend

JLabel legendLabel = new JLabel("Green: At/Above Average, Red: Below Average");

legendLabel.setFont(new Font("Arial", Font.ITALIC, 10));

legendLabel.setForeground(Color.GRAY);

legendLabel.setAlignmentX(Component.CENTER\_ALIGNMENT);

panel.add(legendLabel);

// Display using JOptionPane

JOptionPane.showMessageDialog(

null,

panel,

"Grade Display",

JOptionPane.INFORMATION\_MESSAGE

);

}

// Example usage

public static void main(String[] args) {

// Sample data for testing

ArrayList<Double> sampleGrades = new ArrayList<>(Arrays.asList(

85.5, 92.0, 78.3, 95.7, 88.1, 76.9, 91.4, 83.6, 89.2, 77.8

));

double sampleAverage = 85.85;

// Display the grades

displayGrades(sampleAverage, sampleGrades);

// Exit the program

System.exit(0);

}

}

* “Can you generate some Java code, importing only java.text.DecimalFormat, java.util.ArrayList, and javax.swing.JOptionPane, and create a JOptionPane message that displays the formatted average, given the double averageGrade and the ArrayList grades?”

import java.text.DecimalFormat;

import java.util.ArrayList;

import javax.swing.JOptionPane;

public class GradeDisplay {

public static void displayGrades(double averageGrade, ArrayList<Double> grades) {

// Format the average grade to 2 decimal places

DecimalFormat df = new DecimalFormat("#.##");

String formattedAverage = df.format(averageGrade);

// Build the message string

StringBuilder message = new StringBuilder();

message.append("Grade Report\n\n");

message.append("Average Grade: ").append(formattedAverage).append("\n\n");

message.append("Individual Grades:\n");

for (Double grade : grades) {

String formattedGrade = df.format(grade);

if (grade >= averageGrade) {

message.append("✓ ").append(formattedGrade).append(" (Above/At Average)\n");

} else {

message.append("✗ ").append(formattedGrade).append(" (Below Average)\n");

}

}

// Display using JOptionPane

JOptionPane.showMessageDialog(

null,

message.toString(),

"Grade Display",

JOptionPane.INFORMATION\_MESSAGE

);

}

// Example usage

public static void main(String[] args) {

// Sample data for testing

ArrayList<Double> sampleGrades = new ArrayList<>();

sampleGrades.add(85.5);

sampleGrades.add(92.0);

sampleGrades.add(78.3);

sampleGrades.add(95.7);

sampleGrades.add(88.1);

sampleGrades.add(76.9);

sampleGrades.add(91.4);

sampleGrades.add(83.6);

sampleGrades.add(89.2);

sampleGrades.add(77.8);

double sampleAverage = 85.85;

// Display the grades

displayGrades(sampleAverage, sampleGrades);

}

}