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Documentation: Student Grade Checker (Swing GUI) – WGUI

1. Ideas / Problem Statement

The goal is to create a **GUI-based Java program** that inputs student grades for two classes (ITC I21 and ITC 122), calculates **final grades** using the formula:

Final Grade=(Midterm×0.40)+(Finals×0.60)\text{Final Grade} = (\text{Midterm} \times 0.40) + (\text{Finals} \times 0.60)Final Grade=(Midterm×0.40)+(Finals×0.60)

and determines if a student **PASSED** or **FAILED** based on a **minimum passing grade of 75**. The program must track **total passed/failed students**, **percentage**, and **ratios**, while being **user-friendly** and **validating inputs**.

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2. Decomposing the Problem

Step 1: Select Class and Number of Students

- The program allows the user to select between:
    - ITC I21 → required passing rate = 70%
    - ITC 122 → required passing rate = 40%
- User enters the **total number of students** (0–99).

Step 2: Input Student Grades

- For each student:
    - Input **Midterm grade**

    - Input **Finals grade**
    - **Validate** that input is numeric
- Calculate **final grade** using the weighted formula.
- Determine **status (PASSED / FAILED)** based on final grade ≥ 75.

Step 3: Track Totals

- Keep counters:
    - `passed` → number of students who passed
    - `failed` → number of students who failed
    - `enteredStudents` → number of students already entered

Step 4: Display Results

Display **table-like output** showing each student:

```
Student | Midterm | Finals | Final | Status
```

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- Display **summary**:
    - Failed students
    - Passed students
    - Number of students passed out of total
    - Percentage of students passed/failed (formatted to 2 decimals)
    - Ratio (passed : failed)
    - Whether class meets the required passing rate

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3. Identify Inputs

Input	Constraints
Selection	21" or "ITC 122"
er of Students	
m Grade (per student)	
Grade (per student)	

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4. Process / Logic

1. **Validate class selection**
    - If invalid → show error
2. **Set total students**
    - Must be between 0–99
    - Initialize counters `passed`, `failed`, `enteredStudents`
    - Determine `requiredPassingRate` (70% for ITC I21, 40% for ITC 122)
3. **For each student**:
    - Input Midterm and Finals grades
    - Validate numeric input

Compute final grade:

```
finalGrade = (midterm * 0.4) + (finals * 0.6)
```

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- Determine status:
    - `PASSED` if finalGrade ≥ 75

        - `FAILED` if finalGrade < 75
    - Update counters
    - Display student info in table format
4. **After all students entered**:

Calculate percentages:

```
      passPercent = (passed / totalStudents) * 100
failPercent = (failed / totalStudents) * 100
```

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    - Display summary and ratio
    - Check if class meets required passing rate

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5. Constraints / Validation

- **Number of students:** 0–99
- **Grades:** only numeric (int or double), 0–100
- **Final grade passing threshold:** 75
- **Required class passing rate:**
    - ITC I21 = 70%
    - ITC 122 = 40%
- **All student grades must be entered before showing summary**
- **No negative values**

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6. Output

Per student (table format):

```
Student | Midterm | Finals | Final | Status
1       80.00    78.00    79.20  PASSED
2       60.00    70.00    66.00  FAILED
...
```

Summary after all entries:

```
===== RESULT SUMMARY =====
Failed students: 3, Passed students: 7
There are 7 students passed out of 10
The % value of students passed is: 70.00%
The value of students failed is: 30.00%
The Ratio is 7 : 3
Class PASSED the required passing rate
```

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7. Edge Cases / Special Scenarios

Edge Case	Handling
ıdents entered	t shows 0 passed/failed, percentages = 0%
umeric input for grades	error message and ask again
s < 0 or > 100	error message and ask again
ding total number of students	ı disables adding more students or shows warning
ıg rate exactly at threshold	still counts as PASSED
al grades	led to 2 decimal places in output