GroupGenius: The Automated Student Groups Allocator

Documentation & User Guide

Release Date: December 2025

Platform: Universal (HTML5/JavaScript) - Client-Side Only

1. Introduction

GroupGenius is a lightweight, browser-based application designed to automate student group allocations. It operates in two distinct modes:

1. **Random Allocation:** Quickly sorts students into groups of a specific size without supervisor assignment.
2. **Supervisor Matching (Merit-Based):** Assigns students to supervisors based on GPA (Highest GPA gets priority preference), checks supervisor capacity limits, and ensures group sizes meet minimum/maximum requirements.

2. Getting Started

System Requirements

- **Device:** PC, Mac, or Tablet.
- **Software:** A modern web browser (Google Chrome, Microsoft Edge, Safari, or Firefox).
- **Internet:** Required initially to load the application libraries (React & Tailwind).

Installation

GroupGenius is a single-file application.

1. Open the file from acadexailabub.com
2. No server installation or database is required.

3. Interface Overview

A. The Toolbar

Located at the top, this bar contains:

- **Clear:** A reset button that wipes all current data (Students, Supervisors, and Settings) to start a fresh session immediately.
- **Demo:** Loads sample data to help you understand how the app works.
- **Save:** Downloads your current session (settings, students, supervisors) as a .json file.
- **Load:** Restores a previously saved session.

B. Allocation Mode

Choose between **Random** (pure grouping) or **Supervisors** (preference matching). Changing modes changes the available settings below it.

C. Global Settings

- **Global Group Size:**
  - In *Random Mode*, this determines the target size of every group.
  - In *Supervisor Mode*, this is used *only* for students who could not be matched to a supervisor (Unassigned pool).

D. Supervisors (Mode 2 Only)

Here you can define faculty members manually or upload them in bulk.
- **CSV Upload:** A button to upload a .csv file containing supervisor data (Format: `Name, Capacity, Min Size, Max Size`).
- **Manual Entry:** Use the **+** button to add supervisors one by one.
- **Settings**
  - **Capacity:** The total number of *groups* this supervisor can manage.
  - **Min Size:** The minimum number of students required to form a valid group.
  - **Max Size:** The maximum number of students allowed in a group.

E. Student Pool

The data entry section. You can populate this list using three methods:

- **Paste CSV:** Copy and paste text data directly into the box.
- **Upload CSV:** Click the upload button to select a `.csv` file from your device.
- **Manual Entry:** Add students one by one using the form builder.

4. How to Use: Random Allocation

Use this mode when you simply need to divide a class into groups (e.g., "Groups of 4") without assigning faculty.

1. **Select Mode:** Click the **Random** button in the *Allocation Mode* section.
2. **Set Size:** Enter your desired number in **Global Group Size** (e.g., 4).
3. **Enter Students:** Paste your student list into the CSV box (Format: ID, Name, GPA). *Note: Preferences are ignored in this mode.*
4. **Run:** Click **Run Allocation**.
5. **Result:** The system shuffles students and chunks them into groups.

5. How to Use: Supervisor Matching

Use this mode for Capstone projects or Thesis allocations where students have preferences and GPAs matter.

Step 1: Define Supervisors

- **Option A (Manual):** Click the + button, enter the Name, Capacity, and Min/Max group sizes.

- **Option B (Bulk Upload):** Click the **Upload CSV** icon in the Supervisors header to load a list. The CSV format should be: `Name, Capacity, Min Size, Max Size` (e.g., `Dr. Sahar, 2, 3, 5`).

Step 2: Import Students

The most efficient way is **CSV Upload**. Create a file with the following columns: `ID, Name, GPA, Pref1, Pref2, Pref3`. Click **Upload CSV** to load it or paste the text directly into the box.

Example CSV:

Code snippet

```
101, Ashraf Thabet, 3.8, Dr. Hany, Dr. Dixon, Dr. Sahar
102, Hanan Mamdouh, 3.5, Dr. Dixon, Dr. Sahar, Dr. Hany
```

Step 3: Run Allocation

Click **Run Allocation**. The algorithm follows this logic:

1. Sorts all students by **GPA (High to Low)**.
2. Iterates through students. For each student, it checks their Preference 1.
3. If the supervisor has space (Total Capacity > Current Students), the student is assigned.
4. If Preference 1 is full, it checks Preference 2, etc.
5. Once assigned to a supervisor pool, students are grouped into chunks based on the Supervisor's **Max Size**.

Step 4: Supervisor Utilization & Smart Fill

Once allocation is complete, a new **Dashboard** appears above the results:

- **Utilization Bar:** Shows the total number of groups filled vs. total supervisor capacity.
- **Open Supervisors:** Lists specific faculty members who still have empty slots.
- **Smart Fill (Auto-Assign):** If unassigned students remain AND supervisors have open slots, a purple banner will appear offering to **"Auto-Assign Remaining"**.
  - Clicking this will distribute leftover students to open supervisors using a merit-based, round-robin logic.
  - These groups will be marked with a **Purple "Auto-Filled" tag** in the report to distinguish them from matched preferences.

6. Interpreting Results & Printing

The Results Grid

- **Blue Header:** Successfully matched to a supervisor based on preferences.
- **Purple Header:** Students auto-assigned to an open supervisor (via Smart Fill) because their preferred choices were full.
- **Red Header:** Unassigned/Unmatched group.
- **Yellow Warning Box:** Appears inside a group card if specific constraints were violated (e.g., Group size is 2, but Supervisor requires Min 3).

Printing

At the top of the results section, you will see two print buttons:

1. **Print List:** Generates a standard continuous report (compact view).
2. **Print (1 Group/Page):** Forces a page break after every group card. This is ideal for printing physical handouts to give to each group separately.

7. Troubleshooting & Error Messages

Below is a guide to common warnings and errors you might encounter.

A. "No students to allocate!"

- **Cause:** The student list is empty.
- **Fix:** Ensure you have clicked "Add" (Manual mode) or that your CSV text is pasted into the box before clicking Run.

B. Warning: "Group size (X) is below supervisor's minimum (Y)"

- **Cause:** A supervisor had enough students to form a group, but the *last* group formed was too small.
  - *Example:* Supervisor has 7 students. Max size is 4. Group A = 4 students. Group B = 3 students. If Min size is 4, Group B triggers this warning.
- **Fix:**

  1. Manually adjust the Supervisor's **Min Size** to be lower.
  2. Or, add more students who prefer this supervisor to fill the gap.

C. Warning: "X students unmatched" / "Unassigned Group"

- **Cause:** These students listed preferences, but the supervisors they chose were already full (Capacity reached).
- **Fix:**
  1. Increase the **Capacity (Groups)** of the popular supervisors.
  2. Ask the unassigned students for alternative preferences and update their data.

D. Supervisor Name Not Matching

- **Symptom:** A student lists `"Dr. Sahar"` as a preference, but ends up Unassigned even though `Dr. Sahar` has space.
- **Cause:** Spelling mismatch. `"Dr Sahar"` (no dot) vs `"Dr. Sahar"` (with dot).
- **Fix:** Ensure the name in the **Supervisors** configuration block matches the CSV text exactly.

E. CSV Not Parsing Correctly

- **Symptom:** Students appear with name "Unknown" or GPA "0".
- **Cause:** Using semicolons (;) instead of commas (,) or missing columns.
- **Fix:** Ensure your data is comma-separated.
  - *Correct:* `101, Ali, 3.5`
  - *Incorrect:* `101; Ali; 3.5`

F. Print Layout looks broken

- **Cause:** Browser print settings.
- **Fix:** When the print window opens, ensure **"Background Graphics"** is checked in the printer settings (usually under "More Settings"). This ensures the colors (Red/Blue headers) appear on paper.

G. Why were students assigned to supervisors they didn't choose?

- **Cause**: You clicked the "**Auto-Assign Remaining**" button in the dashboard. This feature places unassigned students into any available slot to ensure everyone has a supervisor.
- **Identification:** These groups have a **Purple** header and an "AUTO-FILLED" tag.
- **Fix:** If you prefer students to remain Unassigned rather than be placed with non-preferred supervisors, do not click the "Auto-Assign" button after running the allocation.

8. Technical Specifications

- **Architecture:** Single-Page Application (SPA).

- **Language:** HTML5, CSS3, Vanilla JavaScript (ES6).

- **Dependencies:** Chart.js (via CDN) for visualization.

- **Privacy:** No server-side processing. No cookies. Local Storage is not used (data persists only in RAM or via manual JSON save).

- **Browser Compatibility:** Chrome, Edge, Firefox, Safari (Desktop & Mobile).

- **Concept & Logic:** Dr. Muhammad AlShorbagy, Dean, College of Pharmacy, GMU.

- **Technical Implementation:** AI-Assisted Development (Code generation).

- **Methodology:** "This single-file HTML application demonstrates a 'No-Code/Low-Code' development approach. The domain expertise, algorithm logic, and user experience design were provided by Dr. Muhammad AlShorbagy, while the source code was generated via prompt engineering using Large Language Models (LLMs)."