Project Description: Student Selection System

Overview

Imagine an educational institution determined to provide opportunities for every aspiring student. The institution receives applications from thousands of qualified candidates and must fill a limited number of vacancies for a prestigious course. With a vision to honor academic excellence while promoting diversity and inclusion, the institution developed this system. It carefully evaluates each student's performance using multiple tie-breaker rules and then allocates seats according to both open competition and reservation criteria.

In our story, the project is seen as a bridge between raw talent and a fair chance at success. The goal is to empower every student—whether from a reserved category or not—by giving them a transparent and just opportunity to secure a seat. This initiative ensures that no deserving candidate is overlooked and that the institution’s standards of excellence and inclusivity are upheld.

Your task is to automate the selection of students for academic vacancies by strictly adhering to both merit and reservation criteria. In today’s competitive academic environment, every mark matters, and fairness is paramount. The system not only ranks candidates based on their performance but also ensures that reserved category seats are filled according to government policies while maintaining overall merit.

Input and Output Formats

Input Format

1. **First Line:** An integer `N` representing the number of qualified students.
2. **Second Line:** An integer representing the total number of vacancies.
3. **Third Line:** An integer representing the number of unreserved category vacancies.
4. **Fourth Line:** An integer representing the number of BC category vacancies.
5. **Fifth Line:** An integer representing the number of SC category vacancies.
6. **Sixth Line:** An integer representing the number of ST category vacancies.
7. **Next N Lines:** Each line contains the following student information separated by commas:
    - Student Name
    - Date of Birth
    - Subject 1 Marks
    - Subject 2 Marks

    - Subject 3 Marks
    - Total Marks
    - Reservation Category

Output Format

1. **First Section:** List of all student records sorted in descending merit order, showing:
    - Student Name
    - Total Marks
    - Reservation Category
2. **Blank Line:** A separator.
3. **Second Section:** List of the selected students (those who filled the vacancies) in descending merit order, displaying the same details.

Merit Order Criteria

To rank students fairly, the system uses a multi-level comparison:

- **Primary:** Higher Total Marks.
- **Secondary:** In the event of a tie in total marks, higher marks in Subject 3 are considered.
- **Tertiary:** If still tied, marks in Subject 2 break the tie.
- **Quaternary:** Finally, if Subject 2 marks are also equal, the system gives priority to the younger student (determined by the Date of Birth).

This layered approach ensures a robust and unbiased ranking system where every additional criterion refines the selection process.

Reservation Criteria

The system allocates vacancies based on two main streams:

1. **Unreserved Category:**
    - **Eligibility:** All candidates, regardless of their reservation status, are eligible.
    - **Selection:** Filled strictly by descending merit order.
2. **Reserved Categories (BC, SC, ST):**
    - **Eligibility:** Only candidates belonging to the respective reserved category are initially considered.
    - **Selection:** These seats are filled by candidates from each reserved category in

descending merit order.

- **Fallback Mechanism:** If there are not enough reserved candidates to fill their allocated seats, the remaining vacancies are filled by the next best candidates in overall merit, ensuring that no seat remains vacant.

System Flow

1. **Data Input:** The system reads the total number of students, the available vacancies, and detailed student records.
2. **Merit Calculation:** It computes the merit order based on total marks, followed by subject-specific marks and age.
3. **Sorting:** All student records are sorted in descending order of merit using the defined criteria.
4. **Seat Allocation:**
   - **Step 1:** Fill unreserved seats with top-ranking candidates.
   - **Step 2:** Allocate reserved category seats from the respective candidate pools.
   - **Step 3:** Any remaining reserved vacancies are filled by candidates from the overall merit list.
5. **Output Generation:** The system outputs the complete list of candidates sorted by merit and then the final list of selected students.