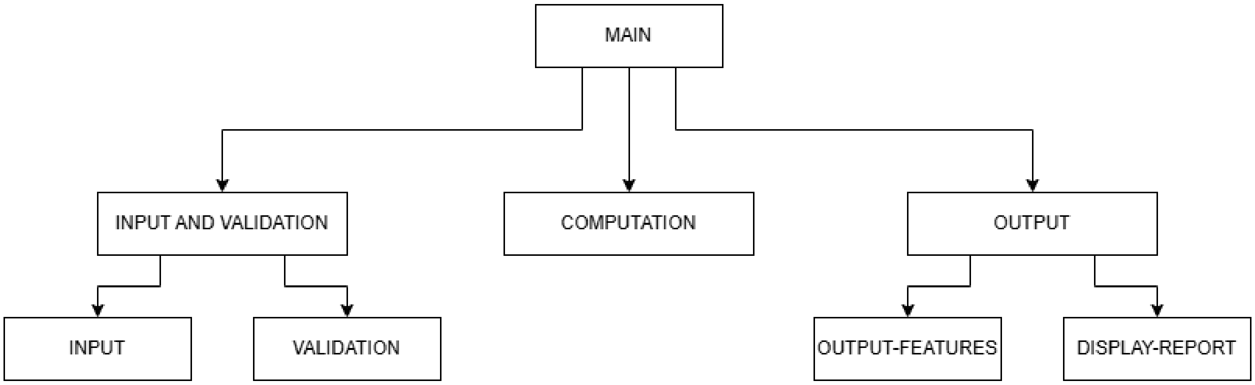
Documentation - Student Result Processing System

System Modules:



- Module: **MAIN**
  - Inputs: student_details_filename, student_results_filename.
  - Pre-Condition: None
  - Logic: Implement the modules of **INPUT**, **VALIDATION**, **COMPUTATION**, **OUTPUT-FEATURES**, and **DISPLAY-REPORT**.
  - Output: Results stored in student_results file.

- Module: **INPUT**
  - Inputs: student_id, student_name, marks_list.
  - Pre-Condition: None
  - Logic: Stores the student information in the student's record structure.
  - Output: None

- Module: **VALIDATION**
  - Inputs: student_id, student_name, marks_list.
  - Pre-Condition: Implemented after the **INPUT** module.
  - Logic:

    -
      ```
      Algorithm ValidateID(student_id) {
              for each character c in student_id do {
                      if c is not alphanumeric then return as fail
                      else {
                              for id in the list of remaining student_id do {
                                      if student_id = id then return as fail
                              }
                      }
              }
              return as pass
      }
      ```

        -
          ```
          Algorithm ValidateName(student_name) {
                  for each character c in student_name do {
                          if c is not alphanumeric then return fail
                  }
                  return as pass
          }
          ```

        -
          ```
          Algorithm ValidateMarks(marks_list) {
                  for each index in the marks_list do {
                          minor_marks:= marks_list[index]
                          major_marks:= marks_list[index + 1]
                          if minor_marks > 40 or minor_marks < 0 then
                                  return index
                          if major_marks > 60 or major_marks < 0 then
                                  return index
                  }
                  return as pass
          }
          ```

- Module: **COMPUTATION**
    - Input: Student Information, taken from the student's record structure.
    - Pre-Condition: Implemented after the **INPUT** and **VALIDATION** modules.
    - Logic:
        - ComputePercentages(): Computes the percentage of individual students.
        - ComputeGrades(): Computes the total marks for each subject, for every student, and assigns the necessary grade category.
        - ComputeCGPA(): Computes the CGPA for each student, for the given 5 subjects.
    - Output: Stores the Computed Results into the record structure.

- Module: **OUTPUT-FEATURES**
    - Input: Student Information, extracted from the student's record structure.
    - Pre-Condition: Implemented after the **INPUT**, **VALIDATION**, and **COMPUTATION** modules.
    - Logic:
        - ClassAverage(): Computes the cumulative average of the average percentages of all the provided students.
        - LowestPercentage(): Lowest percentage among all the students.
        - HighestPercentage(): Highest percentage among all the students.
        - GradeCategoryCounts(): Computes the number of students belonging to each subject, for each grade category.
    - Output: Stores the Output Features in the respective grading structures.

- Module: **DISPLAY-REPORT**
    - Input: Student Information, obtained from the student's record structure.
    - Pre-Condition: Implemented after the **INPUT**, **VALIDATION**, **COMPUTATION**, and **OUTPUT-FEATURES** modules.
    - Logic:
      Writes the student_results with the following columns:
        1. ID
        2. NAME
        3. SUBJECT - 1
            a. MINOR MARKS
            b. MAJOR MARKS
            c. TOTAL MARKS
            d. GRADE
        4. SUBJECT - 2
            a. MINOR MARKS
            b. MAJOR MARKS
            c. TOTAL MARKS
            d. GRADE
        5. SUBJECT - 3
            a. MINOR MARKS
            b. MAJOR MARKS
            c. TOTAL MARKS
            d. GRADE
        6. SUBJECT - 4
            a. MINOR MARKS
            b. MAJOR MARKS
            c. TOTAL MARKS
            d. GRADE
        7. SUBJECT - 5
            a. MINOR MARKS
            b. MAJOR MARKS
            c. TOTAL MARKS
            d. GRADE
        8. CGPA

      Writes the Output Features such as the:
        - Class-Average.
        - Lowest-Percentage in the class.
        - Highest-Percentage in the class.
        - Number of students in each grade category of 5 subjects.