**Technical Design Document Template**

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**Program Description:**

This program analyzes a dataset of student exam grades stored in a CSV file. It calculates key statistics such as mean, median, standard deviation, and overall pass percentage. The program also determines the number of students who passed and failed each exam.

**Functions used in the Program (list in order as they are called):**

1. **Function Name:** load\_csv\_data

**Description:** Loads the CSV file and verifies the data structure.

**Parameters:** file\_path: The file path to the CSV file.

**Variables:** data: Contains the loaded CSV data.

**Logical Steps:**

1. Use np.genfromtxt to load the CSV file.
2. Print and check the data dimensions.

**Returns:** Dataset as a NumPy array

2. **Function Name:** calculate\_exam\_statistics

**Description:** Computes mean, median, standard deviation, min, and max for each exam.

**Parameters:** numeric\_data: A 2D array containing the numeric exam scores.

**Variables:** exam\_means, exam\_medians, exam\_std\_devs, exam\_mins, exam\_maxs

**Logical Steps:**

1. Compute statistics for each column using NumPy functions.
2. Print the results.

**Returns:** None

3**. Function Name**: calculate\_overall\_statistics

**Description**: Computes overall statistics for the entire dataset.

**Parameters**: numeric\_data: A 2D array containing the numeric exam scores.

**Variables**: all\_grades: Flattened array combining all exam scores.

**Logical Steps**:

1. Flatten the dataset.
2. Compute mean, median, standard deviation, min, and max.
3. Print the results.

**Returns**: None

4. **Function** **Name**: calculate\_pass\_fail\_statistics

**Description**: Determines the number of students who passed and failed each exam.

**Parameters**:

numeric\_data: A 2D array containing the numeric exam scores.

**Variables**:

passed\_per\_exam, failed\_per\_exam: Arrays counting passed and failed students per column.

**Logical** **Steps**:

1. Compare scores to the passing threshold.
2. Count the number of passes and failures.
3. Print the results.

**Returns**: None.

5. **Function** **Name**: calculate\_overall\_pass\_percentage

**Description**: Computes the overall pass percentage across all exams.

**Parameters**:

numeric\_data: A 2D array containing the numeric exam scores.

**Variables**:

total\_grades, total\_passed: Total number of scores and total passes.

**Logical** **Steps**:

1. Count total scores and total passes.
2. Compute the percentage of passing grades.
3. Print the results.
4. Returns: None

**Logical Steps:**

1. Load the CSV file using load\_csv\_data.
2. Verify the dataset structure.
3. Calculate exam statistics using calculate\_exam\_statistics.
4. Compute overall dataset statistics using calculate\_overall\_statistics.
5. Determine the pass/fail count using calculate\_pass\_fail\_statistics.
6. Compute the overall pass percentage using calculate\_overall\_pass\_percentage.

**Link to your repository:** https://github.com/AsianInvasion00/COP2373