**Part 2: Software Design Document**

**Application Name:** Project Week 2 - Simple Calculator  
**Developer:** Eric Martinez

**What classes will the program use?**

* **CalculatorApp** – This is the main part of the program that runs everything. It shows the menu, takes user choices, and uses other classes to do the work.
* **Calculator** – Handles the math. It performs addition, subtraction, multiplication, division, and modulus.
* **InputValidator** – Makes sure the user types in valid numbers or menu options.

**What functions are in the program?**

**In CalculatorApp**

* Main() – Starts the program and keeps it running
* ShowMenu() – Displays the math options
* HandleChoice() – Uses the user’s input to pick the right calculation

**In Calculator**

* Add(int a, int b) – Adds two whole numbers
* Subtract(double a, double b) – Subtracts two decimal numbers
* Multiply(int a, int b) – Multiplies two whole numbers
* Divide(double a, double b) – Divides two decimal numbers (includes divide-by-zero check)
* Modulus(int a, int b) – Finds the remainder (also checks for divide-by-zero)

**In InputValidator**

* ReadInt(prompt) – Asks for a whole number and checks it's valid
* ReadDouble(prompt) – Asks for a decimal number and checks it's valid
* ReadMenuChoice() – Makes sure the user picks a number between 1–6

**How does the program flow?**

1. It shows a welcome message and the menu.
2. The user picks an operation (1–6).
3. Based on the choice, it asks for one or two numbers.
4. It does the math using the Calculator class.
5. It shows the result.
6. The user is asked if they want to go again.
7. If yes, it loops. If not, it exits.

**Controls and Error Handling**

* Uses switch to pick the operation.
* Uses while loop to keep the program running until user picks exit.
* Catches bad input (letters instead of numbers).
* Catches divide-by-zero.
* Shows clear messages if something breaks.

A screenshot of a computer program

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