Project Design for Multitool Menu

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What does it do?

1. Finds the factorial of a number
2. Finds the sum of either two or as many numbers as the end user wants
3. Finds the product of either two or as many numbers as the end user wants
4. Finds the *n* power of a number
5. Determines if a year is a leap year or not.
6. Generate a random number from 1 to 6, 1 to 20, or 0 to 10,000

How does it do this? (Factorials)

For the factorial calculator, I have the user input a number. The number is then used as a sentinel value to end a “for” loop that goes from 1 to the number, multiplying the loop counter into an accumulator each time the loop is triggered.

How does it do this? (Sums and products)

- For the sum or product of two, the program simply takes the two inputs and sums or multiplies them at the output.
- For the multiple numbers summed, the user inputs a sentinel value for a “for” loop that constantly asks for the next input and adds the input to an accumulator until the user has inputted as many numbers as they set out to.

How does it do this? (Power)

- For raising an inputted number to an inputted power, I used the “cmath” library to give me access to the “pow” function. This function works on the syntax pow(base, power). This menu option simply feeds the inputs into that function and gives the result.

How does it do this? (Leap Year)

- The program uses if, else if, and else block to determine if an inputted year is a leap year
  - IF divisible by 400, yes
  - Else if divisible by 100, no
  - Else if divisible by 4, yes
  - Else, no

How does it do this? (Random Numbers)

- For the random number generator, I used the rand() function. This function has a unique syntax that lets you set the minimum and maximum numbers in the format “rand() % max + min”. I used this to set the range for the appropriate menu function.

State Diagram (Simple)