**Exercise**

Write a simple computer program in Julia that reads or accepts input from the command line to accomplish the following tasks.

* 1. Add two numbers.
  2. Subtract two numbers.
  3. Multiply two numbers
  4. Divide two numbers.
  5. Calculate the GC content given a short DNA sequence.

Each of these tasks should be implemented as functions that are then grouped as a module. You can give the module a name such as calculator or as you see fit.

***module Calculator***

***# Function to add two numbers***

***export add***

***function add(a::Float64, b::Float64)::Float64***

***return a + b***

***end***

***# Function to subtract two numbers***

***export subtract***

***function subtract(a::Float64, b::Float64)::Float64***

***return a - b***

***end***

***# Function to multiply two numbers***

***export multiply***

***function multiply(a::Float64, b::Float64)::Float64***

***return a \* b***

***end***

***# Function to divide two numbers***

***export divide***

***function divide(a::Float64, b::Float64)::Float64***

***if b == 0***

***throw(ArgumentError("Division by zero is not allowed."))***

***end***

***return a / b***

***end***

***# Function to calculate GC content in a DNA sequence***

***export calculate\_gc\_content***

***function calculate\_gc\_content(dna::String)::Float64***

***gc\_count = count(c -> c in ['G', 'C'], uppercase(dna))***

***sequence\_length = length(dna)***

***return gc\_count / sequence\_length \*100.0***

***end***

***end***

***## Save this as main.jl (which will be executed)***

***# Include the Calculator module***

***include("calculator.jl")***

***# Perform arithmetic operations***

***result\_add = Calculator.add(5.0, 3.0)***

***result\_subtract = Calculator.subtract(8.0, 2.0)***

***result\_multiply = Calculator.multiply(4.0, 6.0)***

***result\_divide = Calculator.divide(10.0, 2.0)***

***# Calculate GC content***

***gc\_content = Calculator.calculate\_gc\_content("AGCTAGCTAGCT")***

***println("Addition: $result\_add")***

***println("Subtraction: $result\_subtract")***

***println("Multiplication: $result\_multiply")***

***println("Division: $result\_divide")***

***println("GC Content: $gc\_content")***

**Documentation Resources**

1. <https://docs.julialang.org/en/v1/manual/types/>
2. <https://docs.julialang.org/en/v1/manual/methods/>

**PDF books and resources**

<https://www.sas.upenn.edu/~jesusfv/Chapter_HPC_8_Julia.pdf>

**Courses**

<https://www.coursera.org/learn/julia-programming>

<https://www.youtube.com/watch?v=0oChN11wf_4&list=PLhQ2JMBcfAsi_3g2AFJ6B84d8c5jw5kXp>