Calculator Challenge

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Introduction

• In this world, you will be able to use Alice as a calculator to evaluate expressions. However, it is not complete. It is your job to create the functions that you want your calculator to be able to accomplish so that when you enter the values and click a button on the calculator, the program will know what to do. You will be able to enter the numbers that you want to use, and click on “CE” to clear the screen and “ENT” to compute the final answer when you are finished.
1. Starting Functions Challenge

- Functions are chunks of code that return a value when they are called. All of the functions that you need have already been built, but right now they don’t do anything except return the value 1. Finish the program by filling in these functions using Alice built-in functions so that they will return the correct values and make the calculator run correctly!
2. Log Challenge

- If you look through the Alice world advanced math functions, you will see that there is not a function to calculate the logarithm of a number in base 10 (natural log is base $e$). You will need to find a formula to calculate the log base 10 to put into this function.
3. Exponents Challenge

• Right now, our calculator does not do exponents. You will need to add a button, so that when it is clicked the calculator will know to raise the value to a certain power. The button can be a new billboard object, and you will have to create a new function with parameters as well as an event to run the function when the button is clicked.
4. General Function Challenge

• Create a special button, \( y \), that computes the value of a function you specify and you can plug in any value for \( x \) to solve for \( y \). For example, if you specify in `world.y` the function \( y = x^2 - 3x + 10 \) and set the value of \( x \) to be 5, this function computes 20, which means \( y = 20 \).
Other Challenge Ideas

• Use loops to implement the exponent challenge, rather than the “a raised to the b power” function.
• Pretend that multiplication does not exist. Use loops and addition to create the same affects of multiplying two numbers together.
• Make a function to calculate the factorial of a number. (6 factorial = 6! = 6*5*4*3*2*1)
• Build a +/- button to easily switch between positive and negative numbers.
• Create other buttons to go with all of the Alice’s advanced math functions (cos, sin, tan,…) and add to your calculator.