

MA 151: Homework #1

due Tuesday September 13

Written problems

These problems should be written on paper and handed in during class on the due date.

In each of these, simplify the expressions step-by-step to get the final value. If there is an error, say exactly what the problem is. You should show enough detail to make it clear that you know what is going on. In all cases, you should be able to check your answer by typing the expressions into GHCi.

Assume that the following definition has been loaded into GHCi: `f x = 2 * (x + 1)`

Now evaluate:

1. `(4 <= 2) && (True || (8^2 == 3))`
2. `8 * (succ 3) + (max 40 15)`
3. `5 + (succ 2 4)`
4. `"I have " ++ (f 2) ++ " dogs"`
5. `f (max (f 3)) 8`

Programming problems

- Create a function called `fToC` which converts a temperature in Fahrenheit to Celcius. Do this by subtracting 32, then multiplying by 5/9.
- Create a function called `cToF` which converts Celcius to Fahrenheit. Do this by multiplying by 9/5, then adding 32.
- Create a function called `banger` which takes a string and returns the same string, but with an exclamation mark stuck on the beginning and the end.
- Create a function called `sayWhat` which takes a string and repeats it twice. So `sayWhat "hi mom"` is `"hi momhi mom"`
- Create a function called `tallEnough` which takes two integers and gives Bool answer as follows: `tallEnough x y` will interpret the `x` as feet and `y` as inches, and return True if the total number of inches is greater than 50, and False otherwise.
For example `tallEnough 6 5` is True, since 6 feet 5 inches adds up to 77 inches, which is more than 50.
- Create a function called `boxVolume` which takes 3 parameters, interpreted as the length, width, and height of a rectangular box. The function should return the volume of the box.
- Create a function called `max3` which takes 3 parameters and gives the largest of all of them. (You'll want to use `max` in a clever way.)

Here's another “built-in” Haskell function: `head` takes a string and gives the first character (if the string is empty you get an error). `tail` takes a string and throws away the first character and gives you the rest of the string. Play around with these in GHCi until they make sense to you.

- Create a function called `stutter` which takes a string and repeats the first letter three times, followed by the rest of the string. So `stutter "hi mom"` is `"hhhi mom"`
- Create a function called `ekzer` which takes a string and inserts an “x” after the first character. So `ekzer "robert"` is `"rxobert"`