Northern Michigan University (Marquette Co, MI)
CS 556-01-24W: Functional Programming

Assignment 1
Due: Wednesday 14 January 2024 11:00 A.M. EST

Create a folder called "HW1" in the top level of your CS556-01-24W folder. Place all files pertaining to this assignment into the top level of your PG1 folder. Place a (possibly empty) file called "DONE" into this folder when you are ready to have your programs graded. The only files you need to turn in are the .c and .h files. Please don't turn in any files other than these!!

1. Design a lambda expression LESSTHAN so that

λx.λy.((LESSTHAN x) y) evaluates to TRUE if x < y, FALSE otherwise. x and y are nonnegative integers.

Also define GREATERTHAN similarly.

2. Design lambda expressions for

λx.λy.((SUBTRACT x) y)
λx.λy.((MULT x) y)
λx.λy.((DIV x) y)
λx.λy.((MOD x) y)

Subtracting a larger number from a smaller should evaluate to ZERO. Likewise, DIV or MOD by ZERO should also evaluate to ZERO.

3. Design a lambda expression ORDEREDTRIPLE

λx.λy.λz.(((ORDEREDTRIPLE x) y) z) results in some representation of the mathematical triple (x,y,z), the exact details of which I'll leave to you.

Also, design EXTRACT:

λx.λy.((EXTRACT x) y)

where x is an ordered triple and y is either ZERO, ONE, or TWO. This should evaluate to the proper element of the triple.

NONE of these problems are overly long. You are free to use the shorthands we discussed in class; you do not have to write the fully expanded lambda expressions. If you find you're dealing with a complicated mess, consider that you may not be doing it quite right.