CSCI 305 Homework 3

Due Date: March 9, 2018 @ Beginning of Class

Name:_____

Types

1. Give the ML type corresponding to each of the following sets:

    a. {true, false}

    b. {(true, true), (true, false), (false, true), (false, false)}

2. Suppose there are three variables `X`, `Y`, and `Z` with these types:

    ```
    X: integer that is divisible by 3
    Y: integer that is divisible by 12
    Z: integer
    ```

    For each of the following assignments, knowing nothing about the values of the variables except their types, answer whether a language system can tell before running the program whether the assignment is safe? Why or why not?

    a. `X := Y`

    b. `Z := X`

    c. `X := X + 3`

3. Investigate the following type: *Associative Arrays in Perl.* Describe your findings fully, and don't forget to discuss representation issues and supported operations.

Polymorphism

1. Consider an unknown language with a left-associative `+` operator that is overloaded to have the following types: `int*real->real`, `int*int->int`, `real*int->real`, and `real*real->real`. Suppose the variable `i` has type `int` and the variable `r` has type `real`. For each `+` operator in each of the following expressions, say which type of `+` is used:

   a. `i + (r + i)`

   b. `i + i + r + (r + i)`

2. Consider an unknown language with integer and real types in which `1 + 2`, `1.0 + 2`, `1 + 2.0`, and `1.0 + 2.0` are all legal expression:

   a. Explain how this could be the result of overloading, using no coercion.

   b. Explain how this could result from subtype polymorphism, with no overloading or coercion.