CSC301 Assignment #5
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Exercise 2 Give the ML type corresponding to each of the following sets:

a. **{true, false}**
   bool
   This set is precisely the set of booleans true and false. Hence the ML type is bool.

b. **{true, false} → {true, false}**
   fn: bool->bool
   This set is the set of functions from bool to bool i.e functions that take in a bool variable and return true or false.

c. **{(true, true),(true, false), (false, true), (false, false)}**
   bool*bool
   This set is the set of variables that are tuples of the form (bool, bool). These are written in ML as bool*bool.

Exercise 4 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 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?

d. Z:= X

This assignment is safe as Z can hold a general integer while X holds an integer divisible by 3. Since any integer divisible by 3 is also an integer, this assignment is safe.

e. X:= Z

This assignment can not be predicted to be safe or unsafe by any language as any integer (Z) may not be divisible by 3 (X).

f. X:=X+3

This assignment is safe as if X is divisible by 3 then so is X+3. (adding 3 will still make it divisible by 3).

g. X:=X+Z

This assignment can not be predicted to be safe or unsafe by any language as Z is any integer and adding Z and X may produce an integer not divisible by 3.