Lesson 3 Getting unreasonably good at   
if-statements

# Learning goals

1. Use if-statements to format familiar mathematical expressions such as trinomials and equations of lines.
2. Plan programs by thinking through test cases before starting to code.
3. Use string variables to reduce the number of cases to be tested inside if-statements, and to reduce the amount of reptitive typing.

# Agenda

1. Formatting equations of lines given *m* and *b* as inputs (on board)  
   1. What can go wrong with just using **print( “y = “ + str(m) + “x + “ + str(b))**
   2. Identifying the cases for *m* and *b* and what to output for each case
   3. Coding the solution using two separate if-statements (still on the board)
   4. This will be similar to Problem 2 on Assignment 2.
2. Take up the solutions to all 6 problems in Practice 2-1 and Practice 2-2   
   (ON BROADCAST), emphasizing these points:  
   1. Using string variables (like **badNews = “Sorry, you can’t graduate yet because you ”**) to reduce reptitive typing
   2. How nested if-statements look and function
3. Introduction to Assignment 2
   1. We’ll take 1-2 days to work on each of the 3 problems.

## Formatting equations of lines given *m* and *b* as inputs

**m = int(input( “Enter the slope: “))**

**b = int(input( “Enter the slope: “))**

#Naive approach

**print(“The EOL is y = “ + str(m) + “x + “ + str(b))**

|  |  |  |  |
| --- | --- | --- | --- |
| **m** | **b** | **Desired output** | **Actual output** |
| 3 | 2 | y = 3x + 2 | y = 3x + 2 |
| 3 | 0 | y = 3x | y = 3x + 0 |
| 1 | -2 | y = x – 2 | y = 1x +- 2 |
| 0 | 4 | y = 4 | y = 0x + 4 |

**Clearly we’ll need if-statements to break out these cases. Let’s plan them all before we start coding**

|  |  |
| --- | --- |
| **m-cases** | **b-cases** |
| m = 1 🡪 “x” | b < 0 🡪 str(b) (with no plus-sign!) |
| m = 0 🡪 “” | b = 0 🡪 “” |
| m = -1 🡪 “-x” | b > 0 🡪 “+” + str(b) |
| m > 1 🡪 str(m) + “x” |  |

**Python code**

if m==0:

mOutput = “”

elif m == 1:

mOutput = “x”

elif m == -1:

mOutput = “-x”

else:

mOutput = str(m) + “x”

if b==0:

bOutput = “”

elif b < 0:

bOutput = str(b)

else:

bOutput = “+” + str(b)

print( “The EOL is y = “ + mOutput + bOutput )

**Assignment 2 will ask you to do something similar for quadratic expressions, given a, b and c.**