Lesson 2 Principles of coding

# Learning goals

1. Distinguish usage of the equals sign in math (a statement of fact) from the equals sign in programming (an assignment command)
2. Explain how compilers evaluate the RHS of an assignment statement first, then assign that value to the variable on the LHS.
3. Use increment statements such as x = x + 1 in programs for both numeric and string variables, and explain what the compiler is actually doing when it executes that line.
4. Explain what a *Boolean expression* is: a mathematical expression that evaluates to either True or False
5. Use if-elseIf-else statements in programs and explain how they work in terms of Boolean expressions.
6. Use nested if-statements in programs and explain how they work.

# Agenda

1. **Equals in math vs. Equals in programming**
   1. Equals sign in math is a statement of fact
   2. Equals sign in programming is a command: evaluate the RHS, then assign its value to the variable on the LHS
2. **Increment statements**
   1. In math, x = x + 1 is an equation that has no solution.
   2. In programming, x = x + 1 is a command: it says, first evaluate x + 1 at the current value of x, then overwrite the current value of x with that new value.   
        
      score = 0  
      score = score + 100 #increase the score by 100
   3. s = “hello”  
      s = s + “ bob”  
      print(s) 🡪 “hello bob”
3. **If-Elif-Else statements**
   1. Boolean expressions:
      1. age == 8
      2. age < 8
      3. age <= 8
      4. age > 8
      5. age >= 8
      6. age != 8
      7. 5 <= age <= 12
   2. Boolean expressions are mathematical expressions that evaluate to True or False
   3. Example: Movie prices. Python searches the if-statement until it finds the first Boolean expression that evaluates to True. Then it executes that block of code, and stops. It then ignores the rest of the if-clauses. If none of the expressions evaluates to true, Python executes the “else” block.  
        
      if age <= 12:  
       price = 8.50  
        
      elif age <= 64:  
       price = 12.00  
        
      else:  
       price = 10.00
4. **Nested if-statements. What if we offered a $5-off coupons to adults?**

if age <= 12:  
 price = 8.50  
  
elif age <= 64:

hasCoupon = input(“Do you have a coupon?”)

if hasCoupon == “yes”:  
 price = 7.00

else:

price = 12.00  
  
else:  
 price = 10.00

**Begin Practice #2-2** M