

**September 25, 2018**

**Notebook:** Computers and Programming I

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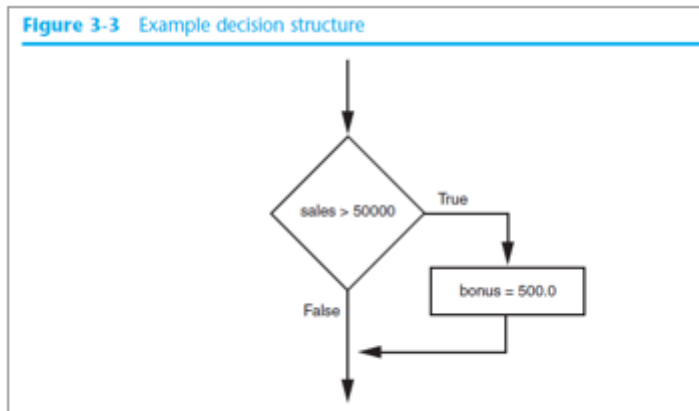
- Expressions tested by if statement to determine if it is true or false
- Boolean Expression
- Boolean Variables
  - Variables that can only hold two variables.
  - 1 or 0
- Python Syntax
  - if condition
    - Statement
    - Statement
  - First line is known as the if clause
    - includes the word "if" followed by a condition
    - The condition can be true or false
    - When the if statement executes, the condition is tested, and if it is true the block statement are executed. otherwise, block statements are skipped
- The if Statement
  - Control Structure: logical design that controls order in which set of statement execute
  - Sequence Structure: set of statements that execute in the order they appear
  - Decision Structure: specific actions performed only if a condition exists
    - Also known as selection structure
  - In a flow chart, a diamond represents true/ false condition that must be tested
  - Actions can be conditionally executed
    - Performed only when a condition is true
  - Single alternative decision structure: provides only one alternative path of execution
    - If condition is not true, exit the decision structure
- ```
num1 = int(input("Please enter an integer?"))
num2 = int(input("Please enter another integer?"))
new = (num1+num2)/2

print (new)
```
- Example of program:
- - `x = 0`
  - `if (x>1):`
    - `print "Hello"`
- Relational Operator
  - Determines whether a specific relationship exists between two values
    - `<`
    - `>`
    - `<=`
    - `>=`
    - `!=` (not equal to)
    - `==` (used when launching a query in Boolean Expression)
      - DO NOT USE `X = 10`, ONLY `X == 10`
  - `>=` AND `<=` operators test one or more relationship
  - `==` determines where the two operands are equal to one another

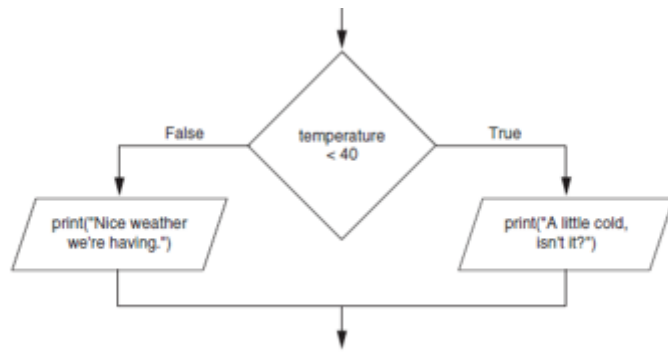
- != operators determines whether the two operands are not equal

**Table 3-2** Boolean expressions using relational operators

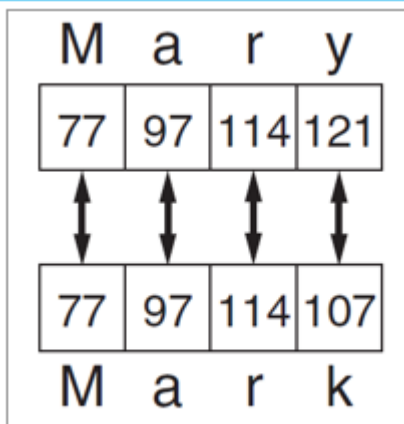
| Expression | Meaning                               |
|------------|---------------------------------------|
| $x > y$    | Is $x$ greater than $y$ ?             |
| $x < y$    | Is $x$ less than $y$ ?                |
| $x \geq y$ | Is $x$ greater than or equal to $y$ ? |
| $x \leq y$ | Is $x$ less than or equal to $y$ ?    |
| $x == y$   | Is $x$ equal to $y$ ?                 |
| $x != y$   | Is $x$ not equal to $y$ ?             |



- Try this program in Python
- `x = 3`  
if `(x>2)`:  
    print "Hello"
- `x = 1`  
if `(x>2)`:  
    print "Hello"
- Any relational operator can be used in a decision block
  - Example: if `balance == 0`
  - Example: if `payment != balance`
- It is possible to have a block inside another block
  - Example: if statement inside a function
  - Statement in inner block must be with respect to the outer block
- The if-else Statement
  - Dual alternative decision structure: two possible paths of extension
    - One is taken if the condition is true, and the other condition is false.
    - Syntax
      - if condition:
      - statement
      - else:
      - other statements
  - If clause and else clause must be aligned.
  - Statements must be consistently indented
  - `x = 0`  
if `(x>1)`:  
    print "Hello"  
else:  
    print "Bye"
  -



- Strings can be compared using the == and != operators
- Strings comparisons are case sensitive
- Strings can be compared using >, <, >= or <=
  - Compared character by character based on the ASCII value for each character
  - If the shorter word is substring of the longer word, longer word is greater than the shorter word
    - "hello" would be greater than "Hello"
    - " Hello ..." would be greater than "Hello"
- 



- else if = elif
  - A decision structure can be nested inside another decision structure
    - if ( ):
      - -----
    - elif ( ):
      - -----
    - else:
      - -----