

# Decision Statements

CAC 180

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# Decision Statements

- Also called **branching**
- Refers to the program executing one branch or another depending on a specific condition



# if Statement

- One condition to be met, path only differs for that one condition

*if expression:*  
*task to do*

- Notice colon and indention
- Example:

```
if needGas == True:  
    stopForGas  
driveToSchool
```

# if-else Statement

- The tasks to be accomplished differ depending on a specific condition
- Example: Coffeehouse members are charged \$2.00 for a cup of coffee, non-members are charged \$3.00

```
if member == True:  
    coffee = 2.00  
else:  
    coffee = 3.00
```

A person is either  
a member or not  
a member, there is  
no other option



# Relational and Equality Operators

- Comparison operators

Relation and equality operators	Description
$a < b$	a is <b>less-than</b> b
$a > b$	a is <b>greater-than</b> b
$a \leq b$	a is <b>less-than-or-equal-to</b> b
$a \geq b$	a is <b>greater-than-or-equal-to</b> b
$a == b$	a is <b>equal to</b> b
$a != b$	a is <b>not-equal to</b> b

# Comparisons

- Python supports operator chaining
- Ex:  $a < b < c$
- Typically written as  
 $a < b$  and  $b < c$
- Evaluates left to right
- Numbers are compared arithmetically
- Strings are compared alphabetically (based on ASCII value)
- Lists and tuples are compared element by element
- Dictionaries are sorted and then the keys and values are compared as lists

# if-elif Statements

- Sometimes you need to test more than one condition
- Classic example:  
if grade  $\geq$  90 and grade  $\leq$  100:  
    letterGrade = 'A'  
else:  
    letterGrade = 'Not an A'
- Will just an else suffice? How would you solve it?

# if-elif Statement

- Syntax:

```
if expression:  
    task  
elif expression:  
    task  
else:  
    task
```

Can have as  
many elif statements  
as necessary



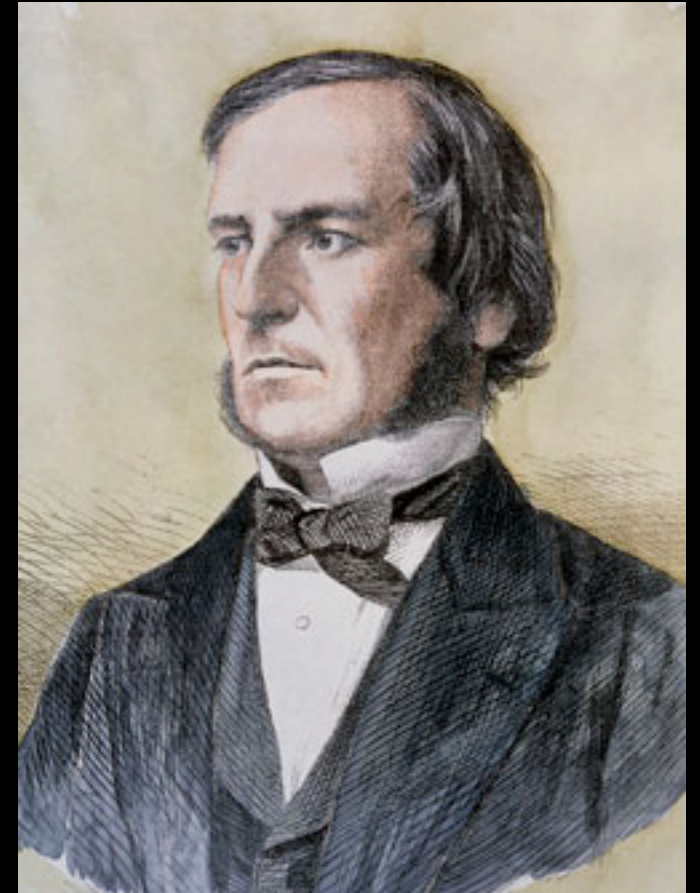
# if-elif Statements

- Let's write the grade example together

Will a sequence of just if  
statements work the  
same way?

# Boolean Operators

- A boolean is a true or false value
- Used in Boolean Logic (Boolean Algebra)
- Created by George Boole in 1850's - *The Laws of Thought* (1854)
- “No general method for the solution of questions in the theory of probabilities can be established which does not explicitly recognize, not only the special numerical base of the science, but also those universal laws of thought which are the basis of all reasoning, and which, whatever they may be as to their essence, are at least mathematical as to their form.”



# Boolean Operators

Boolean operator	Description
a <b>and</b> b	Boolean AND: True when both operands are True
a <b>or</b> b	Boolean OR: True when at least one operand is True.
<b>not</b> a	Boolean NOT (opposite): True when the single operand is False (and False when operand is True).

- Truth Table

# Helpful Operators

- Membership operator: in/not in
  - Can be used to test if a value is **in** or **not in** a list, tuple, or dictionary
- Identity operator: is/is not
  - Do not confuse with equality
  - This tests to see if two variable names are pointing to the same object

# Next Class

- Finish reading Chapter 4 from ZyBooks