COMP 141

if, if-else, relational operators

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Announcements

- Reminders:
  - Program #1 due on 9/7 by 11:55pm
  - Briggs computer labs are up!
    - Look for an email early next week about if/when our class will move over to Briggs.
  - Tutors will be available starting Sept. 4th
    - Sun-Thurs 7-10pm in Briggs 019
  - Keep up with the Zybooks assignments
    - Posted on course website

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Demo

- Code in Box.com folder – link on website
- For more information about string formatting, see Section 7.2 and 7.4 in Zybook

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Terminology

- A ***literal*** is a piece of data that you type directly into your program's code.
  - Ex: 6, 9.25, "Blah blah blah"
- A ***variable*** is a placeholder for a piece of data.
- Every literal and variable in a program has a data type.

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Comments

- Lines that Python ignores completely.
- Used to tell a reader of your program what the program is doing.
- For any line that has a # sign, Python will ignore everything to the right of the #.

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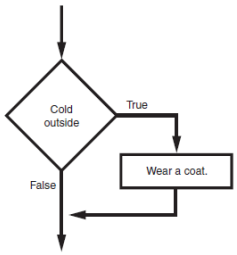
End of Introductory Stuff!

- Key concepts: algorithms, variables, data types (int/float/string), comments, literals
- Python statements you should understand:
  - `print`
  - `input`
  - math calculations

The `if` Statement

Figure 4-1 A simple decision structure



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The `if` Statement

- **Python syntax:**

```
if condition:
    Statement
    Statement
```

- **First line known as the `if` clause**
  - Includes the keyword `if` followed by condition
    - The condition can be true or false
    - When the `if` statement executes, the condition is tested, and if it is true the block statements are executed. Otherwise, block statements are skipped

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`if` Statement Examples

```
if a < b:
    print("a is less than b")

if a > b:
    print("a is greater than than b")

if a <= b:
    print("a is less than or equal to b")

if a >= b:
    print("a is greater than or equal to b")
```


Boolean Expressions and Relational Operators

- **Boolean expression:** expression tested by if statement to determine if it is true or false
  - Example: a > b
    - `true` if a is greater than b; `false` otherwise
- **Relational operator:** determines whether a specific relationship exists between two values
  - Example: greater than (>)

Boolean Expressions and Relational Operators

Table 4-2 Boolean expressions using relational operators

Expression	Meaning
`x > y`	Is x greater than y?
`x < y`	Is x less than y?
`x >= y`	Is x greater than or equal to y?
`x <= y`	Is x less than or equal to y?
`x == y`	Is x equal to y?
`x != y`	Is x not equal to y?

== operator determines whether the two operands are equal to one another

Do not confuse with assignment operator (=)

Boolean Expressions and Relational Operators

Any relational operator can be used in a decision block

- Example: `if balance == 0:`
- Example: `if payment != balance:`

Code with an if-Statement

```
# This program calculates your exam average.

exam1 = int(input("What is your first exam score? "))
exam2 = int(input("What is your second exam score? "))
exam3 = int(input("What is your third exam score? "))
average = (exam1 + exam2 + exam3) / 3

choice = input("Did you do the extra assignment? (yes or no)")
if choice == "yes":
  average = average + 5

print("Your exam average is", average)
```

Saved as exam-if.py in my code directory

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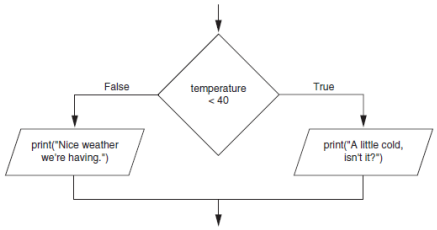
The `if-else` Statement

Figure 4-6 A dual alternative decision structure



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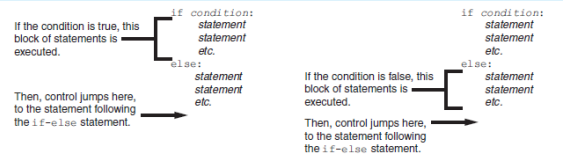
The `if-else` Statement

Figure 4-7 Conditional execution in an `if-else` statement



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if-else Example

```
# This program calculates your exam average.

exam1 = int(input("What is your first exam score? "))
exam2 = int(input("What is your second exam score? "))
exam3 = int(input("What is your third exam score? "))
average = (exam1 + exam2 + exam3) / 3

choice = input("Did you do the extra assignment? ")
if choice == "yes":
  print("Your exam average is", average + 5)
else:
  print("Your exam average is", average)
```

Saved as exam-if-else.py in my code directory

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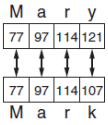
Comparing Strings

- Strings can be compared using the == and != operators
- String comparisons are **case sensitive**
- Strings can be compared using >, <, >=, and <=
  - Compared character by character based on the ASCII values for each character
  - If shorter word is substring of longer word, longer word is greater than shorter word



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Using String Comparisons

```
#This program takes in 2 names and prints them out
#in alphabetical order

name1 = input("Enter name 1: ")
name2 = input("Enter name 2: ")

print("Here are the names, listed alphabetically.")

if name1 < name2:
    print(name1)
    print(name2)
else:
    print(name2)
    print(name1)
```

Saved as compareNames.py in my code directory

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Practice

- Write a program that prompts a user for his or her age and prints out whether or not they are (legally) allowed to drink alcohol.

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Next Time

- Nested Decision Structures
- if-elif-else Statement
- Do zybooks assignment
  - On course website

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