3 Conditionals

Jin Wang, MSIS, Rutgers

1. Boolean expressions

Boolean expressions

```
>>> 5 == 5
True
>>> 5 ==6
False
```

Relational operators

- Python has a set of "**Operators**" that can be used to ask mathematical questions.

Symbol	meaning
> and <	larger and smaller
>=	greater than or equal to
<=	less than or equal to
==	equals
!=	not equal to

2. Logical operators

`and` operator

- Format <boolean expression A> and <boolean expression B>
- It is `True` if *both* boolean expressions are `True`.

`or` operator

- Format: `<boolean expression A> or <boolean expression B>`.
- It is `True` if *either or both* of the boolean expressions is `True`.

`not` operator

- `not` operator negates a boolean expression. `not <boolean expression>` is `True` only is the boolean expression is `False` .

number as boolean value

- Strictly speaking, the operands of the logical operators should be boolean expressions, but Python is not very strict.
- Any nonzero number is interpreted as `True`

```
>>> 2 and True
True

>>> 0 and True
False
```

3. Conditional statement: `if` statement

- `if` statements have the same structure as function definitions: a header followed by an *indented body*.
- **Number of statements in the indented bodies**

4. Alternative execution: Control Flow, `else`, and `elif`

From `if`s to `if-else`

From `if`s to `if-elif` and `if-elif-else`

5. `and`, `or` in `if` statement

6. Pythonic `if`

7. Application: recursion

Practice questions

1. Create a function named `is_even`, which returns `True` if inputting a even number; return `False`.

2. In a right triangle, the lengths of the sides are a, b and the hypotenuse is c. Pythagoras theorem says that $a^2 + b^2 = c^2$. Write a function named *check_pythagoras* that takes parameters, a, b and c, and checks to see if Pythagoras theorem holds. If it holds, the program should print "Pythagoras theorem is satisfied.". Otherwise, the program print, "No, Pythagoras theorem isn't satisfied."

3. Use `if-elif-else` statements to finish this question. Professors give letter grade based on the score a student gets in an exam. Write `Python` code which can print a letter grade given a score value.

Score	Letter grade
90-100	A
80-89	B
70-79	C
60-69	D
<60	F

Summing up

- Conditionals
- Logical operators: `or`, `and`, `not`
- `if` statements
- Control flow, `elif`, `else`
- Pythonic coding

End