Review lectures 1-12, ch1-4

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CMPT14x
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Ch1-4 overview

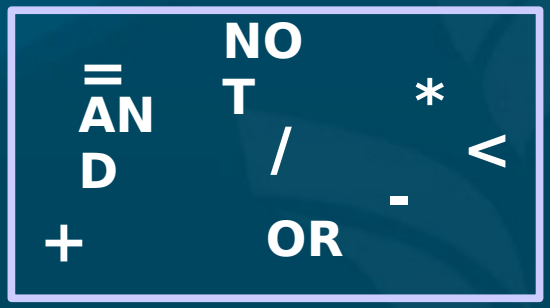
- Ch1: Problem solving
  - Top-down, WADES
- Ch2: Your first Python program
  - Modules, variables, expressions, type
- Ch3: Program Structure
  - Sequences, if, loops
- Ch4: Procedures
  - Parameters, return values, recursion

Ch1: Problem solving

- Computing scientists as toolsmiths
- Top-down vs. bottom-up; WADES
- Client --> Designer --> Implementer
  - Requirements doc, Design spec, Code
- Abstract data types
  - Atomic vs. compound
  - What's the difference: 5, 5.0, '5', (5), {5}
- 5 hardware abstractions
- 5 control/flow abstractions

Review §1.5-1.7

- Operators, operands, ADTs, implementations
- Variables vs. constants
- Logical operators: not, and, or



Review: §1.8-2.1

- Expressions and precedence

  http://docs.python.org/ref/summary.html
- Five abstract components of hardware
- Software: instructions, languages, programs, OS
- Designer -> coder -> compiler -> assembler/linker
- Five control/structure abstractions of programs
- Pseudocode
- Importing library functions

Review: §2.2, 2.5, 2.11

- Components of a baby Python program
- Modules
- Library tools (what are some we know already?)
- Literals, identifiers and reserved words (examples?)
- Strings, quoting, newlines
- Statically-typed vs. dynamically-typed
- Declaring and initializing variables
  - (what is needed in C? In Python?)
- Keyboard input: input(), raw_input()

Review: §2.3-2.4

- Documentation
  - External documentation: design, manuals
  - Internal documentation:
    - Comments
    - Docstrings
  - Preconditions / postconditions
- Style guidelines

Review: §2.7-2.10

- Expressions, operators, operands
  - Binary arithmetic: + - * / % // **
  - Comparison: == < > <= => != <> is, is not
  - Boolean: and or not (shortcut semantics)
- Type conversions
- Precedence rules
- Formatted output
  - %d, %f, %s

Sample quiz ch2

- Name the five software control/flow abstractions
- Evaluate the following Python expressions:
  - **3.0 >= 1 and 3.0 <= 10**
  - **True and (3 <> 5.7)**
  - **not False or (12 % 0)**
  - **3 + 32 // 5.0**
- Show the output of this Python code:
  - **print “I have %04d %s.” % (23.7, “apples”)**
- Assume that the variable numApples has integer type. Write a line of pseudocode that would work in a dynamically typed language like Python but would fail in a statically typed language like C.

Review: §3.1-3.8

- Selection: if, if..else.., if..elif..else
- Loops: while
- Sentinel variables
- Loop counters
- Using mathematical closed forms instead of loops
- abs(), += etc., string.capitalize()

Review: §3.4-3.10, 5.4

- String concatenation (+), repetition (*)
- Qualified import
- while loops: continue, break, else
- Common mistakes in loops
- for loops
- range()

Sample quiz ch3

- **Evaluate** as Python, or explain the error: [9]
  - (2**4 > 10) or (7 % 3 == 2)
  - 9.0 // 2 == 4.5 and 9 / 0 != 0
  - 'y' + 3 * 'a' + 'y'
- Show the **output** of this loop: [5]

```
for x in range(4):
    for y in range(4):
        if x == y:
            break
        print "(%d, %d)" % (x, y),
```

- Write **pseudocode** to convert inches to cm or vice versa, depending on the user's choice [6]

Review: §4.1-4.3

- Procedures (functions, subroutines)
  - No parameters
  - With parameters
  - Formal vs. actual parameters
  - Scope
  - Global variables (why not to use them)
  - Call-by-value vs call-by-reference