Review Lectures 1-11

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CMPT140
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Problem Solving in Software

- Software development as servant leadership
- Computer scientists as toolsmiths
- Relationships: Programmer ↔ User
  - Client ↔ Designer ↔ Coder ↔ Computer
- Team roles: producer vs. director, architect vs. engineer
- Top-down problem solving: WADES
- Hardware: input, storage, proc, control, output
- Control/flow: seq., select, repet., comp., parallel

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Python Basics (ch1-3)

- Types: int, float, str, bool, tuple, list
  - ADT vs. real-world implementation
- Identifiers, variables, literals, constants, operators, operands, expressions, evaluation
- Ops: + - * / % // ** < > == !=
  - Boolean ops: and, or, not, shortcut
  - Operator precedence
  - Assignment ops: +=, *=, etc.
- Static vs. dynamic typing, declaring/initializing
- Importing libraries: math, string

Strings (ch4)

- Strings: 'hi', "hi", """hi"""
- Output: print(), comma, newline, sys.stdout.write()
- Getting input from user: input() vs. raw_input()
- String operations: +, *, len()
  - String library: string.upper()
- Formatting strings: %d, %f, %s
- ASCII: chr(), ord()

Programs Are More Than Code

- **Design** Before You Code
- **Documentation**:
  - **External**: design, pseudocode, user manual
  - **Internal**: comments, docstring, identifiers, online help, prompts to user
- **Top-down** design: **stub** programs

If (§7.1-7.3) and Loops (ch8)

- Selection: if, elif, else
- Repetition:
  - while: continue, break, else
  - Sentinel loops and sentinel variables
  - Common errors with loops
  - for: iterating over a list
  - range()

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Functions (ch6)

- Defining functions, invoking functions
- Return value
- Local vs. global vars (why avoid globals?)
- Formal vs. actual parameters
- Call-by-value vs. call-by-reference
- Docstring, pre/post-conditions
  - Input validation: type checking, etc.

Lists (§11.2)

- C arrays: limitations?
- Python lists:
  - Insert/delete
  - Elements may have different types
  - Dynamically typed
  - +, *, in, del, [], [:]
  - Aliasing
  - Multidimensional lists, nested for loops