CS 115 Lecture 3
A first look at Python

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Getting Python and WingIDE

Instructions for installing Python and WingIDE 101 are on the web page:
http://www.cs.uky.edu/~keen/help/installingpython.html

We’ll use WingIDE today.
Changing the font in WingIDE

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    - Consolas, Lucida Console, Courier New, …
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    # 1. Repeat as long as b is not zero:
    while b != 0:
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        if a > b:
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    # 2. Output a as the answer.
    print("The GCM of your numbers is", a)
main()
Structure of a Python program

- def main():
  - This is the “main function” where the program does all its work
    - (for now)
  - More about functions in chapter 5.
  - Python doesn’t need a main function, but use one in this class!
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  - Code is arranged in indented blocks.
  - The **body** of main is one block.
  - It has several blocks inside.
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- **Syntax:** Comments in Python start with a `#` character and extend to the end of the line.
  - A variant of comments starts and ends with three single quotes.
  - This version can include multiple lines, paragraphs, pages.
- **Semantics:** Does nothing: ignored by Python entirely.
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If the comment is long, put it on a line of its own before the statement.

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- Name, email, section number
- Purpose of program
- Date completed
- Preconditions: inputs to the program
  - And what you assume about the inputs.
- Postconditions: outputs of the program.
  - And what you guarantee about the outputs.
Kinds of errors

Back to our program... it has several errors right now.

- Syntax errors
- Semantic errors
- Run-time errors
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Properties of a variable

- Name – what to call the variable?
  - Also called an “identifier”.

- Value – what is in the variable?
  - In Python, the value of a variable is an object.

- Type — what kind of value?
  - Integer, string, floating-point number, ...

- Scope – where in the program is the name valid?
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    * user_list, name_str, ...
    ```

- In “pure functional” languages like Haskell, the value cannot change!
  - So maybe “variable” is not the right word there!
Assignment

- Syntax: `variable = expression`
- Semantics:
  Calculates the value of (evaluates) the right hand side (RHS), then changes the value of the variable on the left hand side (LHS).

- In a later class we’ll see other things that can go on the LHS.
- Not an equation!
  - In math, `x = x + 1` has no solution.
  - But in Python, `x = x + 1` means “add one to `x`”.
- “Assign `x` + 1 to `x`” or “Assign `x` with/from `x` + 1”.
- Order matters!
- Performs the calculation on the right.
- Changes only the variable on the left.
- `x + 1 = x` # Syntax error!
- If the LHS variable doesn’t already exist in this scope, creates it.
- “Initialization”: giving a variable its initial value.
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Using assignment: swapping

Suppose we have two variables and want to swap their values.

- So each variable’s new value is the other variable’s old value.
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  x = 10
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Simple arithmetic

- The **expression** on the right hand side can be an arithmetic expression.

- Arithmetic operators in Python are:
  - +, − (add and subtract: a + b, c − d)
  - * (multiply), / (divide)
  - ** (exponentiate, “to the”)

Order of operations:
- ** first (highest precedence)
- Then *, / (multiply, divide)
- Then +, − (lowest precedence)

Can use parentheses to make the order explicit:

```
    total = price * (tax + 100) / 100
```

We'll see more details about these operators next time when we talk about types.
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Next time

- Data types in Python.
- More about arithmetic.
- Getting input.
- Printing.
- Testing.