Transition to Code

CS 1111
Introduction to Programming

Spring 2019
Pseudocode

• Pseudocode is one of the methods that can be used to represent / describe an algorithm (usually in English)

• Not use specific programming language syntax

• Can be easily translated into a high-level programming language

• Usually include terms specifying a sequence of actions the a program will take

• Each line does one thing -- must be executable
Control Structures

Sequence
• A series of statements that execute one after another

Condition ( if )
• To decide which of the two or more different statements to execute depending on a certain condition

Repetition ( loop )
• To repeat statements while certain conditions are true

Subprogram / named action
• A small part of another program solving a certain problem
• A collection of subprograms solves the original problem
Example

Problem:
• A company is planning to have a storewide sale of 20%
• Sales tax is 5%
• You enter the price of an item based on the price tag
• Calculate the final sale price of an item after applying the discount and the sales tax
• Display the final sale price

Pseudocode
Get item price
Apply 20% discount
Add 5% sales tax
Display final sale price

Flowcharts
Example: Rewrite Pseudocode

Test the pseudocode with some simple inputs

Let item price = 100
Does the pseudocode work as expected?

- final sale price = 84

If yes, let’s test with more inputs
- item price = 0
- item price = -100
Does it still work?

Always test the pseudocode and rewrite until it works properly

1. Get item price
2. Check if price is <= 0, then repeat step 1
3. Apply 20% discount
4. Add 5% sales tax
5. Display final sale price

1. Get item price
2. Apply 20% discount
3. Add 5% sales tax
4. Display final sale price
Python

- Interpreted programming language
- Has simply syntax – easy to read
- Has most of the features of traditional programming languages
- Supports a wide range of programs: games, web apps, system administration
- Used by many successful companies: Google, IBM, Disney, EA Games
- Open source
- Three types: console, GUI, web app
How Python Compiles and Runs Source Code

Step 1: Programmer uses an editor to write source code

```python
price = 0
while price <= 0:
    price = int(input("Enter item price: "))
price *= 0.8
price *= 1.05
print(price)
```

Step 2: Source is compiled by the interpreter into bytecode

Step 3: Bytecode is translated by the Python virtual machine into instructions that can interact with the operating system of the computer
PyCharm

Integrated Development Environment (IDE)

Several ways to run
- Click the “run” icon
- Select the “Run” menu option
- Right click on editor window and select “Run <filename>”
- Right click on the file name and then select “Run”

Project management window (“project view”)

Editor window (“editor”)

Execution window (“console”)
Include Name and ComputingID

To automatically include your name and computingID when creating a new Python file

For Mac

- Select PyCharm menu
- Select Preferences
- Select Editor option
- Select File and Code Templates option
- Select Python Script
- Type your name and computingID
- Click OK
Include Name and ComputingID

To automatically include your name and computingID when creating a new Python file

For Window

- Select File menu
- Select Setting
- Select Editor option
- Select File and Code Templates option
- Select Python Script
- Type your name and computingID
- Click OK
Additional Resources

PythonTutor
http://pythontutor.com/visualize.html#mode=edit