# Transition to Code

## CS 1111
## Introduction to Programming

## Spring 2019

# Pseudocode

review

- 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

review

## 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

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

rewrite

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

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

# Python

- Interpreted programming language
- Has simple 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

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

code (.py)

```
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

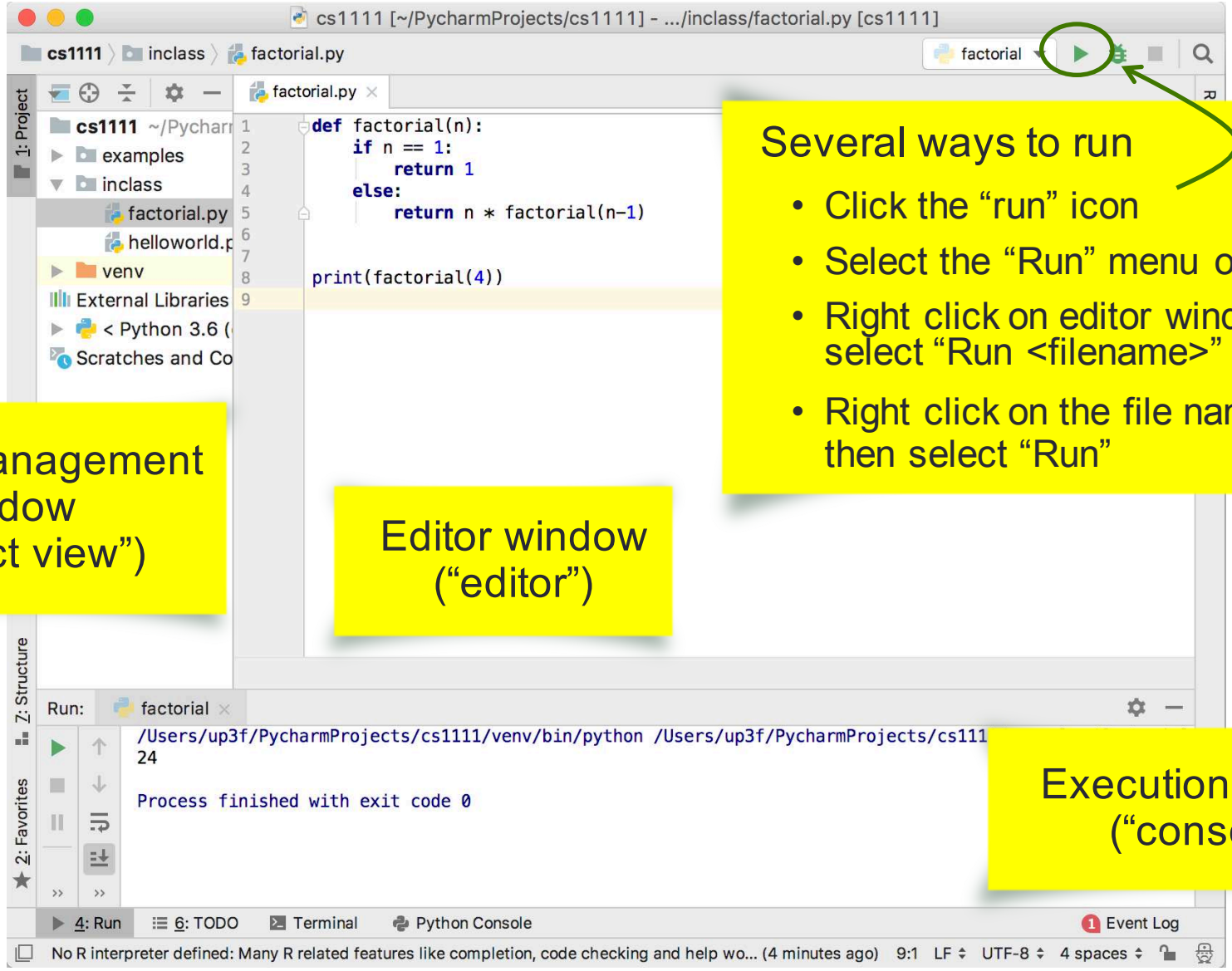
Python interpreter
(Python 3.6)
Interpret at runtime

Executable version (.pyc)

**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)

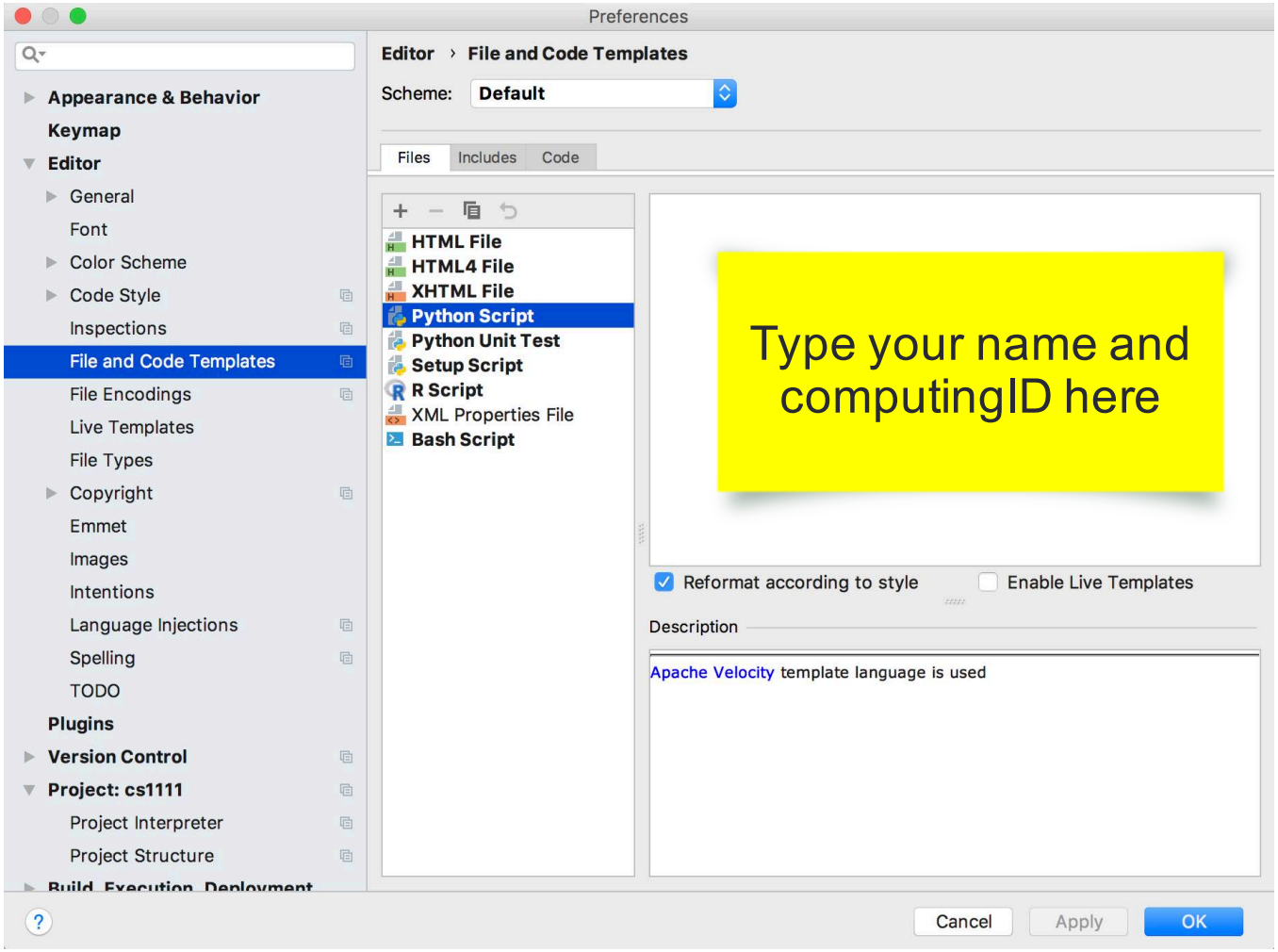


# Include Name and ComputingID

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

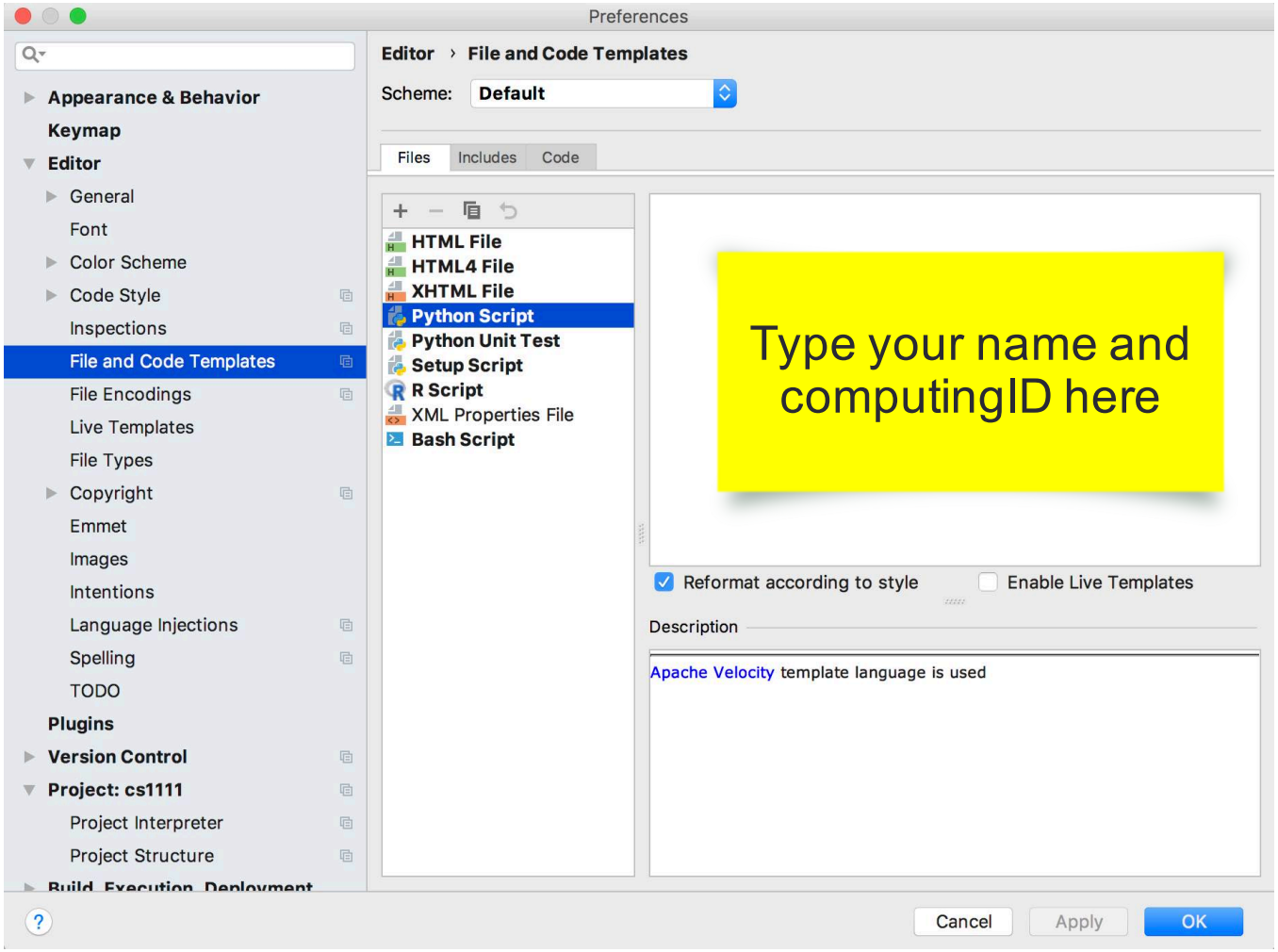


# Include Name and ComputingID

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