CompSci 101
Introduction to Computer Science

Sept. 7, 2017

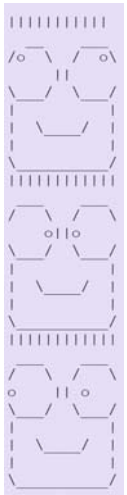
Prof. Rodger

Announcements

- Reading and RQ 4 due next time
- Asgn 2 out, APT 1 is due Tuesday
- Add class/change sections? – see forms tab on
  www.cs.duke.edu/courses/compsci101/fall17
- Today - FTIS
  - functions, parameters
  - Names, types and values

Assignment 2 out

- Totem poles
  - printing heads
  - Functions
- Note: You have different requirements



REVIEW: Solving APT BMI

- Write your code in Eclipse
  - Create python file - with Module:Main
  - Name of file important – case matters
  - name of function important – cut and paste this
  - Write your code
  - Test a few examples in Eclipse
- Run online on using APT Tester
  - Test on examples, Debug, fix, get all GREEN
- Submit on APT page
  - must run again, then check score
  - Fill out REFLECT form too

Organization matters

- https://www.youtube.com/watch?v=1ve57l3c19g

APT organization, Code organization

- You've written the BMI.py APT
  - Where is that module? How do you test it?
  - PyDev console, but then must import it
  - Adding print statements in BMI.py to test
- Putting sentences together in order…
  - "Once upon a time…" "It was the best of times…" "Aujord'hui ma maman est morte"
- Putting code together in order
  - Takes judgment and experience

Running and Understanding Code

- Need Python compiler/interpreter
  - We're using Canopy, includes libraries
- Need an editor development environment
  - We use Eclipse and PyDev, open source and widely used, Ambient is Duke Plugin
- You need experience thinking and coding and debugging ideas and code:
  - Installing the suite of tools can be cumbersome
    - Persist, Perservere, Get Help, start over ☹

Understanding terminology: code

- Move from "Hello World" to "Hello Around the World"
  - Look at Python, code, libraries
  - Learning (reviewing) terminology about Python

```
print "hello world"
```

```
f = open("hello.txt")
for line in f:
    print line
```

Hello around world code

http://bit.ly/101f17-0907-1

Hello from the web
bit.ly/101f17-0907-2

```
import urllib2
if __name__ == '__main__':
    url = "http://www.cs.duke.edu/courses/compsci101/fall17/data/hello.txt"
    f = urllib2.urlopen(url)
    for line in f:
        print line
```


Hello from the Web in Python

- We open a file, and we open a URL
  - Syntax slightly different, concept is similar
  - Real-world differences between files and URLs?

```
f = open("hello.txt")
```

- Must adhere to syntactic rules of Python
  - Naming, whitespace, : or . or (or) or [or]
- Must adhere to semantic rules of Python
  - Can't loop over anything, more rules to follow

Hello from the Web in Python

- We open a file, and we open a URL
  - Syntax slightly different, concept is similar
  - Real-world differences between files and URLs?

```
f = open("hello.txt")
```

```
f = urllib2.urlopen("http://nytimes.com")
```

- Must adhere to syntactic rules of Python
  - Naming, whitespace, : or . or (or) or [or]
- Must adhere to semantic rules of Python
  - Can't loop over anything, more rules to follow

Functions return values

- Most functions return values
  - Sometimes used to make things simpler, but returning values is a good idea

```
def inch2centi(inches):
    answer = 2.54*inches
    return answer

xh = inch2centi(72)
```

```
def pluralize(word):
    return word + "es"

pf = pluralize("fish")
```


Functions can print info

- Some functions only print info
- Note there is no return statement in the function

```
def helloPerson(name):
    print "hello" + name

helloPerson("Susan")
helloPerson("Ademola")
```


Simple Python Functions

http://bit.ly/101f17-0907-3

- Answer these questions based on thinking, don't run any code

- Why do we need functions?
  - Manage complexity of large programs
  - Test and develop code independently
  - Reuse code in new contexts: create APIs!

Function – return or print?

bit.ly/101f17-0907-4

- Example function that returns a value

```
def sum(a, b):
    return a+b
```

- Example function that prints

```
def hw(name):
    print "Hello " + name
```

- Call Functions

```
print sum(4,7)
answer = sum(4,7)
sum(4, 7)
```

```
name = hw("Sue")
hw("Sue")
print hw("Jo")
```

Function – return or print?

bit.ly/101f17-0907-4

- Example function that returns a value

```
def sum(a, b):
    return a+b
```

- Example function that prints

```
def hw(name):
    print "Hello " + name
```

- Call Functions

```
print sum(4,7)
answer = sum(4,7)
sum(4, 7)
```

```
name = hw("Sue")
hw("Sue")
print hw("Jo")
```

Function Detective

- http://bit.ly/101f17-0907-5

Results of Code Analysis

- For details on plurals: http://bit.ly/1N49u6b
- How did we call `pluralize` many times?
  - Loop. What is an alternative?
- What does the 'if' statement do?
  - Selects a code block to execute (more next week)
- If you have a question? Write and run code!