Creative Computing for Engineers

Lecture 7:
Computer Programming using Python (5)

DRAGON REALM GAME 1

Invent Your Own Computer Games with Python

Orientation

- “Dragon Realm”
  - Function definition
  - Function call

Orientation

- A function is a small program.
- A program consists of several functions.

Dragon Realm”

- Sample Run

Python Shell

File Edit Shell Debug Options Windows Help

```
Python 2.7.2 (default, Jun 12 2011, 15:08:59) [MSC v.1500 32 bit (Intel)] on win
32
Type "copyright", "credits" or "license()" for more information.
>>> ========================================== RESTART ==========================================
>>>
You are in a land full of dragons. In front of you,
you see two caves. In one cave, the dragon is friendly
and will share his treasure with you. The other dragon
is greedy and hungry, and will eat you on sight.

Which cave will you go into? (1 or 2)
1
You approach the cave...
It is dark and spooky...
A large dragon jumps out in front of you! He opens his jaws and...

Gives you his treasure!
Do you want to play again? (yes or no)
no
```

Ln: 18 Col: 2

Dragon Realm”

```
import random
import time

def displayIntro():
    print('You are in a land full of dragons. In front of you,')
    print('You see two caves. In one cave, the dragon is friendly')
    print('and will share his treasure with you. The other dragon')
    print('is greedy and hungry, and will eat you on sight.')
    print('\n')
```

Code Explanation

- Where to Put Function Definitions

```
sayGoodBye()

def sayGoodBye():
    print('Good bye!')
```

```
Traceback (most recent call last):
  File "<pyshell#3>", line 2, in <module>
    sayGoodBye()
NameError: name 'sayGoodBye' is not defined
```

Code Explanation

- Where to Put Function Definitions

```
def sayGoodBye():
    print('Good bye!')

sayGoodBye()
```

```
Good bye!
```

Dragon Realm”

```
def chooseCave():
    cave = ''
    while cave != '1' and cave != '2':
        print('while cave will you go into? (1 or 2)')
        cave = input()
return cave
```

Code Explanation

- Experimenting with the *and* and *or* Operators

and operator

```
>>> True and True
True
>>> True and False
False
>>> False and True
False
>>> False and False
False
```

or operator

```
>>> True or True
True
>>> True or False
True
>>> False or True
True
>>> False or False
False
```

Code Explanation

- Experimenting with the *not* Operators

```
>>> not True
False
>>> not False
True
>>> True not
SyntaxError: invalid syntax
```

- use both the *and* and *not* operators in a single expression

```
>>> True and not False
True
```

Code Explanation

Evaluating an Expression

- The steps of how the interpreter evaluates the condition.

```
def chooseCave():
    cave = ''
    while cave != '1' and cave != '2':
        print('while cave will you go into? (1 or 2)')
        cave = input()
    return cave
```

```
while cave != '1' and cave != '2':
        ⬇
while '' != '1' and cave != '2':
        ⬇
while True and cave != '2':
        ⬇
while True and '' != '2':
        ⬇
while True and True:
        ⬇
while True:
```

Code Explanation

- Getting the Player's Input

```
while cave != '1' and cave != '2':
    print('while cave will you go into? (1 or 2)')
    cave = input()
```

- If this condition evaluates to *True*
  - enter the **while-block again.**

- But if the player typed in 1 or 2
  - This causes the condition to evaluate to *False*.
  - the program execution will continue on **past the while loop.**

Code Explanation

- Return Values
  - return keyword

```
return cave
```

  - It **returns the string** that is stored in cave.

  - Once the return statement is executed

    » we immediately jump out of the def-block.

Things Covered In This Chapter

- Creating our own functions with the *def* keyword
- The *and* and *or* and *not* boolean operators
- The *return* keyword

DRAGON REALM GAME 2

Invent Your Own Computer Games with Python

Orientation

- If – else
- return
- parameters and arguments

Dragon Realm

- Sample Run

```
*Python Shell*
File  Edit  Shell  Debug  Options  Windows  Help
Python 2.7.2 (default, Jun 12 2011, 15:08:59) [MSC v.1500 32 bit (Intel)] on win
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A large dragon jumps out in front of you! He opens his jaws and...

Gives you his treasure!
Do you want to play again? (yes or no)
no
                                                                          Ln: 18 Col: 2
```

Dragon Realm

```
import random
import time

def displayIntro():
    print('You are in a land full of dragons. In front of you,')
    print('You see two caves. In one cave, the dragon is friendly')
    print('and will share his treasure with you. The other dragon')
    print('is greedy and hungry, and will eat you on sight.')
    print('\n')

def sayGoodBye():
    print('Good bye!')

def chooseCave():
    cave = ''
    while cave != '1' and cave != '2':
        print('while cave will you go into? (1 or 2)')
        cave = input()
    return cave
```

Dragon Realm

```
def checkCave(chosenCave):
    print('You approach the cave...')
    time.sleep(2)
    print('It is dark and spooky...')
    time.sleep(2)
    print('A large dragon jumps out in front of you! He opens his jaws and...')
    print('\n')
    time.sleep(2)

    friendlyCave = random.randint(1, 2)

    if chosenCave == str(friendlyCave):
        print('gives you his treature!')
    else:
        print('Gobbles you down in one bit!')

    sayGoodBye()
```

Code Explanation

- Quiz: Argument

```
def sayHello(name):
    print('Hello, ' + name)

print('Say hello to Alice,')
sayHello('Alice')
print('Do not forget to say hello to Bob.')
fizzy = 'Bob'
sayHello(fizzy)
```

- f(x) = 3x + 1,
- f(5) = 3*5 + 1 = 16

Code Explanation

- Local Variables and Global Variables with the Same Name

```
def spam(myName):
    print('Hello, ' + myName)
    myName = 'Waffles'
    print('Your new name is ' + myName)

myName = 'Albert'
spam(myName)
print('Howdy, ' + myName)
```

Code Explanation

- Deciding Which Cave has the Friendly Dragon
  - check if the **integer 1 or 2** is equal to the cave randomly selected.

```
if chosenCave == str(friendlyCave):
    print('gives you his treature!')
```

  - we could have also had this line instead

```
if int(chosenCave) == friendlyCave:
```

Things Covered In This Chapter

- The time module
- The time.sleep() function
- Parameters and Arguments
- if-else statement
- Variable scope (Global and Local)

Acknowledgement

- This course material was prepared for “Creative Computing for Engineers” in the College of Engineering by Professor Heejin Park and was slightly modified for Python 3.