Creative Computing for Engineers

Lecture 8:
Computer Programming using Python (6)

DRAGON REALM GAME 3

Invent Your Own Computer Games with Python

Orientation

- Code Explanation
- Step by Step, One More Time
- Flow chart

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”

```
playAgain = 'yes'
while playAgain == 'yes' or playAgain == 'y':

    displayIntro()

    caveNumber = chooseCave()

    checkCave(caveNumber)

    print('Do you want to play again? (yes or no)')
    playAgain = input()
```

Code Explanation – step by step

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

    return cave
```

Code Explanation – step by step

```
import random
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def displayIntro():
    print('You are in a land full of dragons. In front of you.')
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        print('Which cave will you go into? (1 or 2)')
        cave = input()

    return cave
```

Code Explanation – step by step

```
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 treasure!')
else:
    print('Gobbles you down in one bite!')
```

Code Explanation – step by step

```
playAgain = 'yes'
while playAgain == 'yes' or playAgain == 'y':

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Global Scope

playAgain == 'yes'

Code Explanation – step by step

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Global Scope

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Code Explanation – step by step

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Code Explanation – step by step

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

    return cave
```

Global Scope

playAgain == 'yes'

Local Scope

cave == ''

Code Explanation – step by step

```
import random
import time

def displayIntro():
    print('You are in a land full of dragons. In
    print('You see two caves. In one cave, the dragon is friendly
    print('and will share his treasure with you. The other dragon')
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    cave = ''
    while cave != '1' and cave != '2':
        print('Which cave will you go into? (1 or 2)')
        cave = input()

    return cave
```

Global Scope

playAgain == 'yes'

Local Scope

cave == ''

Code Explanation – step by step

```
import random
import time

def displayIntro():
    print('You are in a land full of dragons. In
    print('You see two caves. In one cave, the dragon is friendly')
    print('and will share his treasure with you. The other dragon')
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def chooseCave():
    cave = ''
    while cave != '1' and cave != '2':
        print('Which cave will you go into? (1 or 2)')
        cave = input()

    return cave
```

Global Scope

playAgain == 'yes'

Local Scope

cave == ''

Code Explanation – step by step

```
import random
import time

def displayIntro():
    print('You are in a land full of dragons. In
    print('You see two caves. In one cave, the dragon is friendly')
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    print('\n')

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

    return cave
```

Global Scope

playAgain == 'yes'

Local Scope

cave == '3'

Code Explanation – step by step

```
import random
import time

def displayIntro():
    print('You are in a land full of dragons. In
    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 chooseCave():
    cave = ''
    while cave != '1' and cave != '2':
        print('Which cave will you go into? (1 or 2)')
        cave = input()

    return cave
```

Global Scope

playAgain == 'yes'

Local Scope

cave == '3'

Code Explanation – step by step

```
import random
import time

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

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

    return cave
```

Global Scope

playAgain == 'yes'

Local Scope

cave == '3'

Code Explanation – step by step

```
import random
import time

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

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

    return cave
```

Global Scope

playAgain == 'yes'

Local Scope

cave == '2'

Code Explanation – step by step

```
import random
import time

def displayIntro():
    print('You are in a land full of dragons. In
    print('You see two caves. In one cave, the dragon is friendly
    print('and will share his treasure with you. The other dragon')
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def chooseCave():
    cave = ''
    while cave != '1' and cave != '2':
        print('Which cave will you go into? (1 or 2)')
        cave = input()

    return cave
```

Global Scope

playAgain == 'yes'

Local Scope

cave == '2'

Code Explanation – step by step

```
playAgain = 'yes'
while playAgain == 'yes' or playAgain == 'y':

    displayIntro()

    caveNumber = chooseCave()

    checkCave(caveNumber)

    print('Do you want to play again? (yes or no)')
    playAgain = input()
```

Global Scope
playAgain == 'yes'
caveNumber == '2'

Code Explanation – step by step

```
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 treasure!')
else:
    print('Gobbles you down in one bite!')
```

Global Scope
playAgain == 'yes'
caveNumber == '2'

Code Explanation – step by step

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def checkCave(chosenCave):
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Global Scope

playAgain == 'yes'

caveNumber == '2'

Local Scope

chosenCave == '2'

Code Explanation – step by step

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def checkCave(chosenCave):
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Global Scope

playAgain == 'yes'

caveNumber == '2'

Local Scope

chosenCave == '2'

Code Explanation – step by step

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Global Scope

playAgain == 'yes'

caveNumber == '2'

Local Scope

chosenCave == '2'

Code Explanation – step by step

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Global Scope

playAgain == 'yes'

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Local Scope

chosenCave == '2'

Code Explanation – step by step

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Global Scope

playAgain == 'yes'

caveNumber == '2'

Local Scope

chosenCave == '2'

Code Explanation – step by step

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Global Scope

playAgain == 'yes'

caveNumber == '2'

Local Scope

chosenCave == '2'

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Global Scope

playAgain == 'yes'

caveNumber == '2'

Local Scope

chosenCave == '2'

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Global Scope

playAgain == 'yes'

caveNumber == '2'

Local Scope

chosenCave == '2'

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Global Scope

playAgain == 'yes'

caveNumber == '2'

Local Scope

chosenCave == '2'

friendlyCave == 2

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def checkCave(chosenCave):
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Global Scope

playAgain == 'yes'

caveNumber == '2'

Local Scope

chosenCave == '2'

friendlyCave == 2

Code Explanation – step by step

```
playAgain = 'yes'
while playAgain == 'yes' or playAgain == 'y':

    displayIntro()

    caveNumber = chooseCave()

    checkCave(caveNumber)

    print('Do you want to play again? (yes or no)')
    playAgain = input()
```

Global Scope
playAgain == 'yes'
caveNumber == '2'

Code Explanation – step by step

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Global Scope
playAgain == 'y'
caveNumber == '2'

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Global Scope
playAgain == 'y'
caveNumber == '2'

Code Explanation – step by step

Global Scope
playAgain == 'y'
caveNumber == '2'

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import time

def displayIntro():
    print('You are in a land full of dragons. In front of you.')
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def chooseCave():
    cave = ''
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Global Scope
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caveNumber == '2'

Code Explanation – step by step

Global Scope
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    print('is greedy and hungry, and will eat you on sight.')
    print('\n')

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

    return cave
```

Code Explanation – step by step

Global Scope
playAgain == 'y'
caveNumber == '2'

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

    return cave
```

Code Explanation – step by step

Global Scope
playAgain == 'y'
caveNumber == '2'

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

    return cave
```

Code Explanation – step by step

```
playAgain = 'yes'
while playAgain == 'yes' or playAgain == 'y':

    displayIntro()

    caveNumber = chooseCave()

    checkCave(caveNumber)

    print('Do you want to play again? (yes or no)')
    playAgain = input()
```

Global Scope
playAgain == 'y'
caveNumber == '2'

Code Explanation – step by step

Global Scope
playAgain == 'y'
caveNumber == '2'

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

    return cave
```

Code Explanation – step by step

Global Scope
playAgain == 'y'
caveNumber == '2'

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

    return cave
```

Code Explanation – step by step

```
import random
import time

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

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

    return cave
```

Global Scope

playAgain == 'y'

caveNumber == '2'

Local Scope

cave == ' '

Code Explanation – step by step

```
import random
import time

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

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

    return cave
```

Global Scope

playAgain == 'y'

caveNumber == '2'

Local Scope

cave == ' '

Code Explanation – step by step

```
import random
import time

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

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

    return cave
```

Global Scope

playAgain == 'y'

caveNumber == '2'

Local Scope

cave == ' '

Code Explanation – step by step

```
import random
import time

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

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

    return cave
```

Global Scope

playAgain == 'y'

caveNumber == '2'

Local Scope

cave == '1'

Code Explanation – step by step

```
import random
import time

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

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

    return cave
```

Global Scope

playAgain == 'y'

caveNumber == '2'

Local Scope

cave == '1'

Code Explanation – step by step

```
playAgain = 'yes'
while playAgain == 'yes' or playAgain == 'y':

    displayIntro()

    caveNumber = chooseCave()

    checkCave(caveNumber)

    print('Do you want to play again? (yes or no)')
    playAgain = input()
```

Global Scope
playAgain == 'y'
caveNumber == '1'

Code Explanation – step by step

```
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 treasure!')
else:
    print('Gobbles you down in one bite!')
```

Global Scope
playAgain == 'y'
caveNumber == '1'

Code Explanation – step by step

```
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 oper
print('\n')
time.sleep(2)

friendlyCave = random.randint(1,2)

if chosenCave == str(friendlyCave):
    print('Gives you his treasure!')
else:
    print('Gobbles you down in one bite!')
```

Global Scope

playAgain == 'y'

caveNumber == '1'

Local Scope

chosenCave == '1'

Code Explanation – step by step

```
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 oper
print('\n')
time.sleep(2)

friendlyCave = random.randint(1,2)

if chosenCave == str(friendlyCave):
    print('Gives you his treasure!')
else:
    print('Gobbles you down in one bite!')
```

Global Scope

playAgain == 'y'

caveNumber == '1'

Local Scope

chosenCave == '1'

Code Explanation – step by step

```
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 oper
print('\n')
time.sleep(2)

friendlyCave = random.randint(1,2)

if chosenCave == str(friendlyCave):
    print('Gives you his treasure!')
else:
    print('Gobbles you down in one bite!')
```

Global Scope

playAgain == 'y'

caveNumber == '1'

Local Scope

chosenCave == '1'

Code Explanation – step by step

```
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 oper
print('\n')
time.sleep(2)

friendlyCave = random.randint(1,2)

if chosenCave == str(friendlyCave):
    print('Gives you his treasure!')
else:
    print('Gobbles you down in one bite!')
```

Global Scope

playAgain == 'y'

caveNumber == '1'

Local Scope

chosenCave == '1'

Code Explanation – step by step

```
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 oper
print('\n')
time.sleep(2)

friendlyCave = random.randint(1,2)

if chosenCave == str(friendlyCave):
    print('Gives you his treasure!')
else:
    print('Gobbles you down in one bite!')
```

Global Scope

playAgain == 'y'

caveNumber == '1'

Local Scope

chosenCave == '1'

Code Explanation – step by step

```
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 oper
    print('\n')
    time.sleep(2)

    friendlyCave = random.randint(1,2)

    if chosenCave == str(friendlyCave):
        print('Gives you his treasure!')
    else:
        print('Gobbles you down in one bite!')
```

Global Scope

playAgain == 'y'

caveNumber == '1'

Local Scope

chosenCave == '1'

Code Explanation – step by step

```
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 oper
    print('\n')
    time.sleep(2)

    friendlyCave = random.randint(1,2)

    if chosenCave == str(friendlyCave):
        print('Gives you his treasure!')
    else:
        print('Gobbles you down in one bite!')
```

Global Scope

playAgain == 'y'

caveNumber == '1'

Local Scope

chosenCave == '1'

Code Explanation – step by step

```
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 oper
    print('\n')
    time.sleep(2)

    friendlyCave = random.randint(1,2)

    if chosenCave == str(friendlyCave):
        print('Gives you his treasure!')
    else:
        print('Gobbles you down in one bite!')
```

Global Scope

playAgain == 'y'

caveNumber == '1'

Local Scope

chosenCave == '1'

Code Explanation – step by step

```
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 oper
    print('\n')
    time.sleep(2)

    friendlyCave = random.randint(1,2)

    if chosenCave == str(friendlyCave):
        print('Gives you his treasure!')
    else:
        print('Gobbles you down in one bite!')
```

Global Scope

playAgain == 'y'

caveNumber == '1'

Local Scope

chosenCave == '1'

friendlyCave == 2

Code Explanation – step by step

```
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 oper
    print('\n')
    time.sleep(2)

    friendlyCave = random.randint(1,2)

    if chosenCave == str(friendlyCave):
        print('Gives you his treasure!')
    else:
        print('Gobbles you down in one bite!')
```

Global Scope

playAgain == 'y'

caveNumber == '1'

Local Scope

chosenCave == '1'

friendlyCave == 2

Code Explanation – step by step

```
playAgain = 'yes'
while playAgain == 'yes' or playAgain == 'y':

    displayIntro()

    caveNumber = chooseCave()

    checkCave(caveNumber)

    print('Do you want to play again? (yes or no)')
    playAgain = input()
```

Global Scope
playAgain == 'y'
caveNumber == '1'

Code Explanation – step by step

```
playAgain = 'yes'
while playAgain == 'yes' or playAgain == 'y':

    displayIntro()

    caveNumber = chooseCave()

    checkCave(caveNumber)

    print('Do you want to play again? (yes or no)')
    playAgain = input()
```

Global Scope
playAgain == 'y'
caveNumber == '1'

Code Explanation – step by step

```
playAgain = 'yes'
while playAgain == 'yes' or playAgain == 'y':

    displayIntro()

    caveNumber = chooseCave()

    checkCave(caveNumber)

    print('Do you want to play again? (yes or no)')
    playAgain = input()
```

Global Scope
playAgain == 'n'
caveNumber == '1'

Code Explanation – step by step

```
playAgain = 'yes'
while playAgain == 'yes' or playAgain == 'y':

    displayIntro()

    caveNumber = chooseCave()

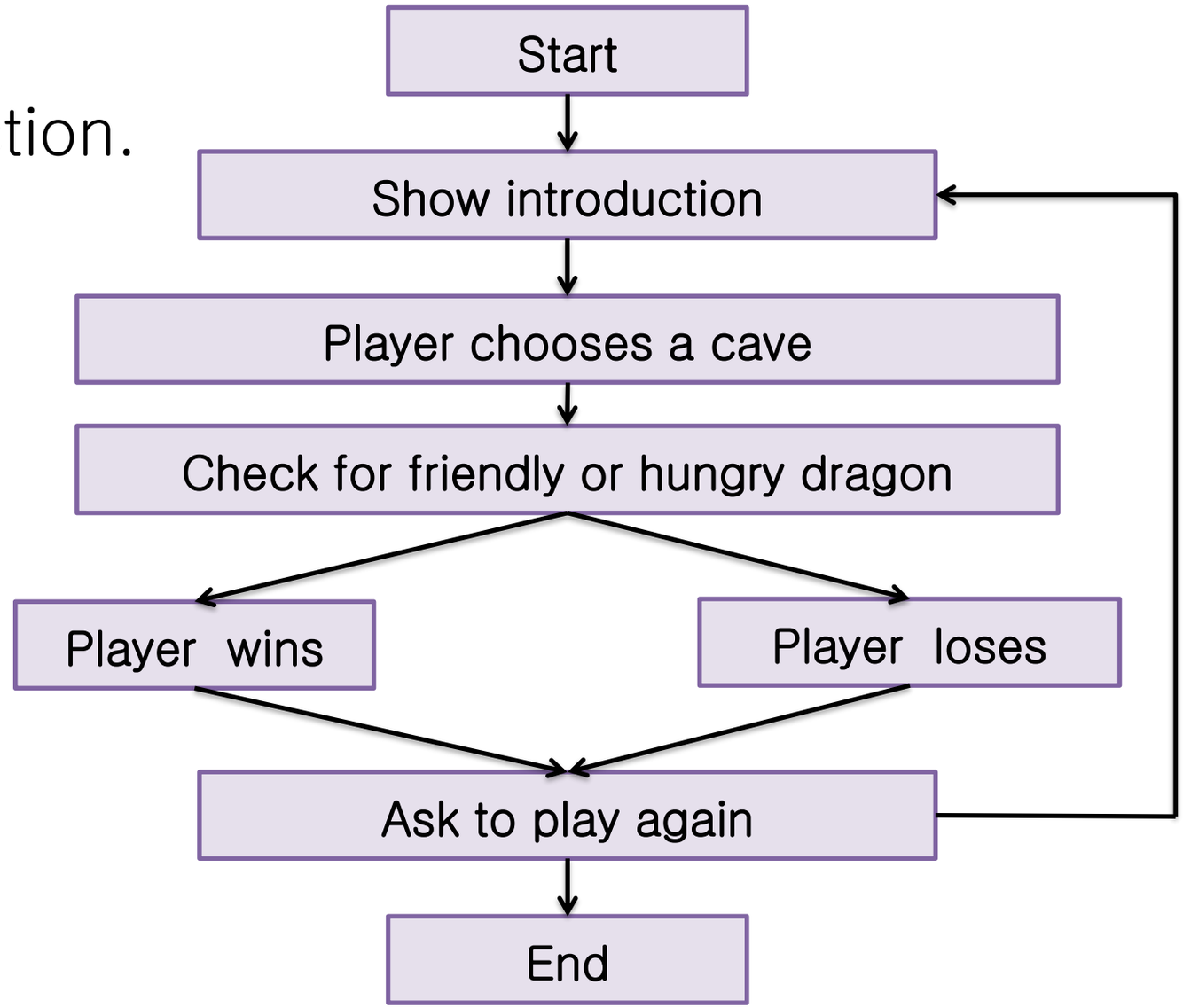
    checkCave(caveNumber)

    print('Do you want to play again? (yes or no)')
    playAgain = input()
```

Global Scope
playAgain == 'n'
caveNumber == '1'

Designing the Program

- Flow chart
  - shows every possible action.



USING THE DEBUGGER

Invent Your Own Computer Games with Python

Orientation

- IDLE's Debugger
- Stepping Into, Over, and Out
- Go and Quit
- Break Points

Using the Debugger

- infinite loop

```
>>> while True:
        print('Press Ctrl-C to stop this infinite loop!!!')
```

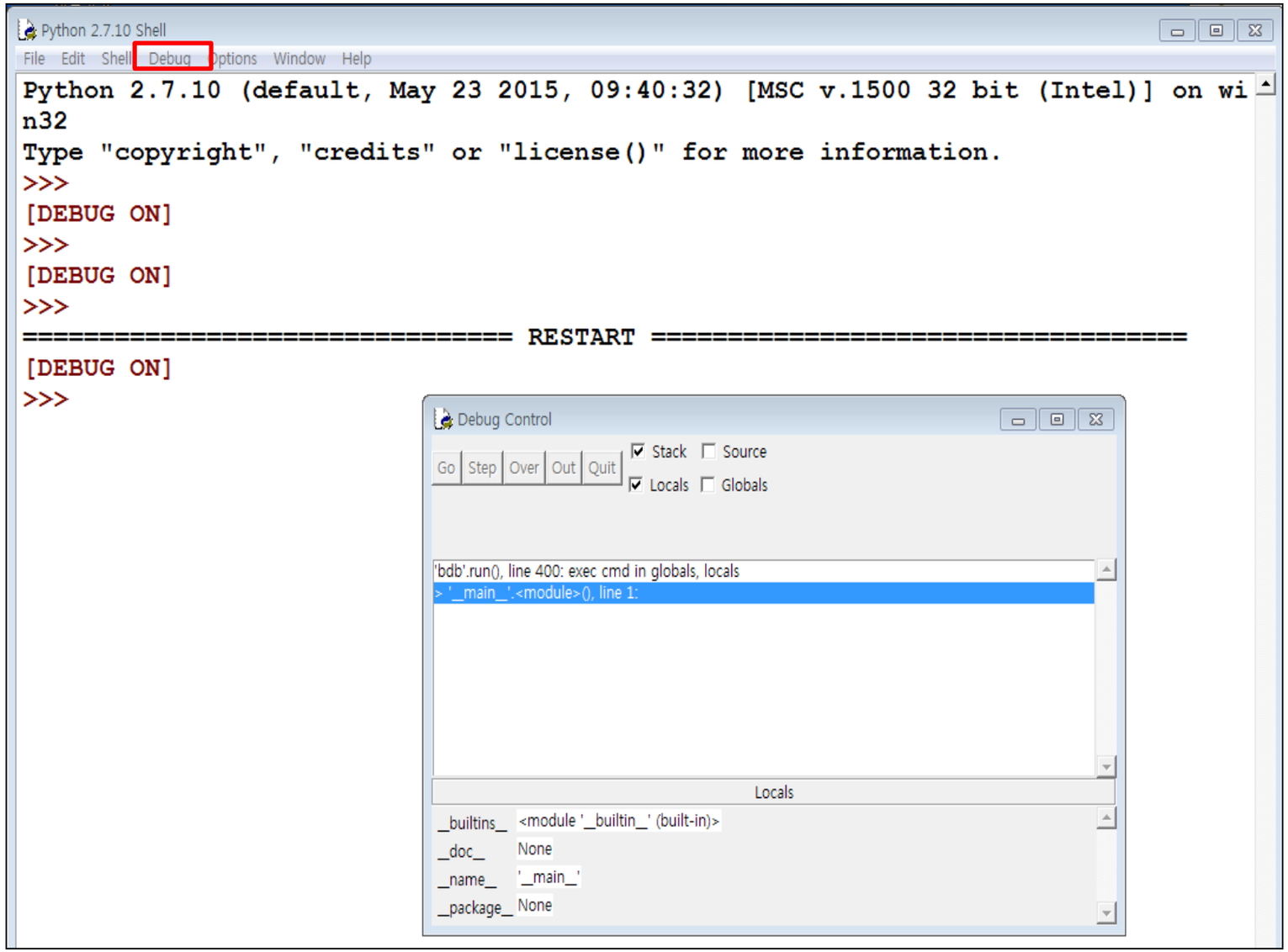
  - Now press *Ctrl*−*C* to stop the program

```
Press Ctrl-C to stop this infinite loop!!!
Press Ctrl-C to stop this infinite loop!!!
Press Ctrl-C to stop this infinite loop!!!
Press Ctrl-C to stop this infinite loop!!!


Traceback (most recent call last):
  File "<pyshell#2>", line 2, in <module>
    print('Press Ctrl-C to stop this infinite loop!!!')
  File "C:\Python27\lib\idlelib\PyShell.py", line 1356, in write
    return self.shell.write(s, self.tags)
KeyboardInterrupt
```

Using the Debugger

- The Debugger
  - Starting the Debugger
    - Debug > Debugger



Using the Debugger

- Stepping Into, Over, and Out

Go	▪ Executes the rest of the code as normal, or until it reaches a break point
Step	▪ Step one instruction. If the line is a function call, the debugger will step into the function.
Over	▪ Step one instruction. If the line is a function call, the debugger won't step into the function, but instead step over the call.
Out	▪ Keeps stepping over lines of code until the debugger leaves the function it was in when Out was clicked. This steps out the function.
Quit	▪ Immediately terminates the program.

Using the Debugger

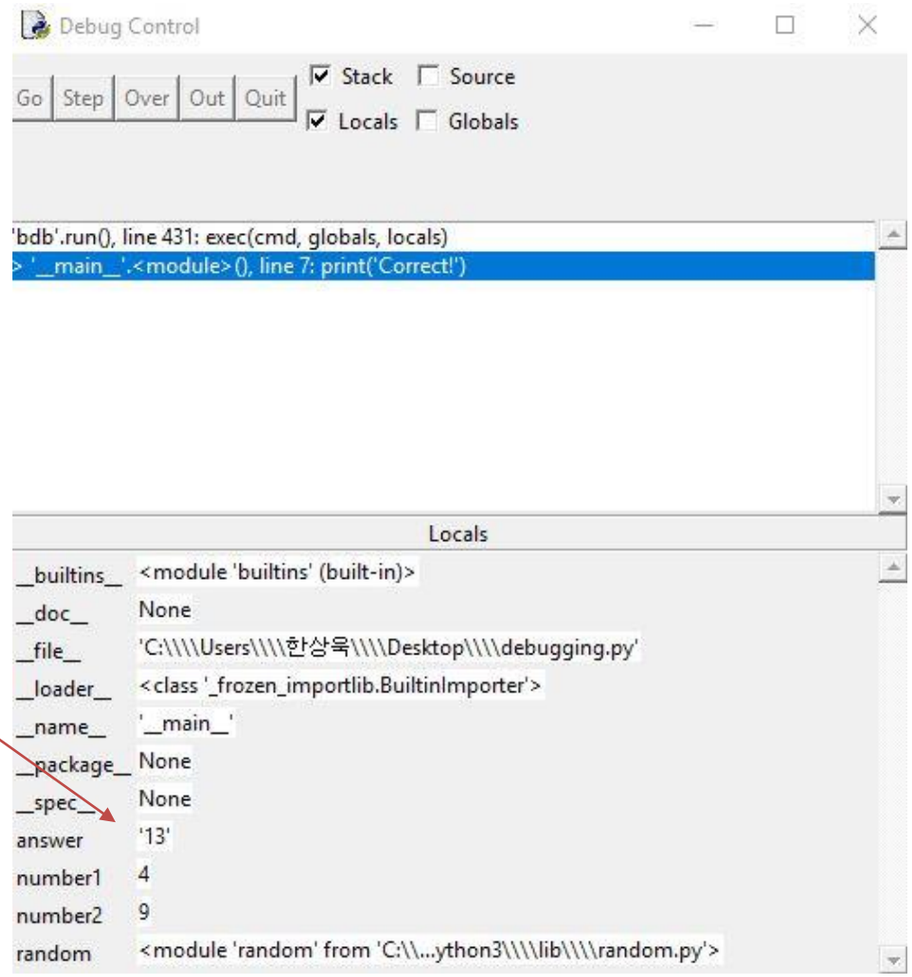
- Find the Bug
  - Small program with a bug.
    - The Program doesn't crash but it is not working correctly

```
import random
number1 = random.randint(1,10)
number2 = random.randint(1,10)
print('What is ' + str(number1) + ' + ' + str(number2) + '?')
answer = input()
if answer == number1 + number2:
    print('Correct!')
else:
    print('Nope! The answer is ' + str(number1 + number2))
```

```
What is 5 + 1?
6
Nope! The answer is 6
```

Using the Debugger

- Find the Bug
  - Debug Control



The values assigned to variables can be observed.

Using the Debugger

- Find the Bug
  - Change line 6 to int(answer), and run the program again.

```
import random
number1 = random.randint(1,10)
number2 = random.randint(1,10)
print 'What is ' + str(number1) + ' + ' + str(number2) + '?'
answer = input()
if int(answer) == number1 + number2:
    print 'Correct'
else:
    print 'Nope! The answer is ' + str(number1+number2)
```

```
What is 2 + 8?
10
Correct
```

Using the Debugger

- Break Points
  - Set on a line when you want the debugger to take control once execution reaches that line.
  - The file editor with two break points set.

```
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
```

Using the Debugger

- Example Using Break Points
  - Program that simulates coin flips

```
import random
print('I will flip a coin 1000 times. Guess how many times')
print('It will come up heads. (Please enter to begin)')
input()
flips = 0
heads = 0
while flips < 1000:
    if random.randint(0,1) == 1:
        heads = heads + 1
    flips = flips + 1

    if flips == 900:
        print('900 flips and there have been ' + str(heads) + ' head.')
    if flips == 100:
        print('At 100 tosses, heads has come up ' + str(heads) + ' times so far.')
    if flips == 500:
        print('Half way done, and heads have come up ' + str(heads) + ' times.')

print('')
print('Out of 1000 coin tosses, heads came up ' + str(heads) + ' times!')
print('Were you close?')
```

Using the Debugger

- Example Using Break Points
  - Three break points set.

```
import random
print('I will flip a coin 1000 times. Guess how many times')
print('It will come up heads. (Please enter to begin)')
input()
flips = 0
heads = 0
while flips < 1000:
    if random.randint(0,1) == 1:
        heads = heads + 1
    flips = flips + 1

    if flips == 900:
        print('900 flips and there have been ' + str(heads) + ' head.')
    if flips == 100:
        print('At 100 tosses, heads has come up ' + str(heads) + ' times so far.')
    if flips == 500:
        print('Half way done, and heads have come up ' + str(heads) + ' times.')

print('')
print('Out of 1000 coin tosses, heads came up ' + str(heads) + ' times!')
print('Were you close?')
```

Things Covered In This Chapter

- IDLE's Debugger
- Stepping Into, Over, and Out
- Go and Quit
- Break Points

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.