Lecture: 4-1

- Prerequisites for this lecture are: 3-1 and 3-2.

John Romero Programming Proverbs

- 4. “Great tools help make great games. Spend as much time on tools as possible.”

- John Romero, “The Early Days of Id Software - John Romero @ WeAreDevelopers Conference 2017”

Python scopes

- a declaration occurs when an object is created
- by default usage is confined to the current scope

Python scopes

myfunc.py

```
#!/usr/bin/python3

s = "hello world"  #  s is declared as a string
i = 42             #  i is an int

def func (j):
   i = 1           #  another variable, i, local
   print(j * 2)     #  to func

func (2)
print(i)
```

- notice how the scope changes with indentation

```
$ python3 myfunc.py
4
42
```

Accessing global variables from a function

myfunc2.py

```
#!/usr/bin/python3

s = "hello world"  #  s is declared as a string
i = 42             #  i is an int

def func (j):
   global i        #  reference global scope i
   i = 1           #  assign to global variable
   print(j * 2)

func (2)
print(i)
```

- a common error is to forget the `global` keyword in a function

Python dictionaries

- recall from our first python lecture that python has a dictionary type

- ```
  #!/usr/bin/python3

  d = {"spam":2, "ham":1, "eggs":10}

  print(d["eggs"])
  ```

- ```
  $ python3 py13.py
  10
  ```

Python dictionaries

- dictionaries can be altered
  - by adding new entries
  - by changing values
  - by removing entries

- we can test for the presence of an entry within the dictionary

Python dictionaries

```
#!/usr/bin/python3

d = {"spam":2, "ham":1, "eggs":10}
print(d["eggs"])

d["eggs"]=12
d["bacon"]=1
print(d["bacon"])
print(d)
```

```
$ python3 py14.py
10
1
{"spam": 2, "ham": 1, "bacon": 1, "eggs": 12}
```

Dictionary initialisation

- we can create an empty dictionary by:
- ```
  d = {}
  ```
- we can add to a dictionary by:
- ```
  d["foobar"] = 4
  ```

Dictionary modification

- we can remove an entry via:

- ```
  del d["eggs"]
  ```
  ```

Dictionary modification

- we can test whether an item exists in the dictionary

```
#!/usr/bin/python3

d = {"spam":2, "ham":1, "eggs":10}

if "eggs" in d:
    print("we have some eggs")
else:
    print("we do not have any eggs")

if "flour" in d:
    print("we have some flour")
else:
    print("we do not have any flour")
```