

## 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")
```

