

Megan Moore  
PHY 494  
Assignment 2  
Due: February 2, 2017

### Version control with Git

- A) A version control system manages files and track and records changes that are made to those files. Since it records all changes made to any files it stores a complete history of the files in which you can recover the file from any stage.
- B) “git init” turns a directory into a repository while “git clone” allows you to clone a repository from a remote source
- C) *“git add” adds files and directories to the repository that are being prepared to be committed while “git commit” commits the files to the repository.*
- D) “git push” sends your changes to the remote repository while “git commit” will only sends your changes to your local repository

### Your GitHub account

- A) Username: mrmoor11

### Simple coordinate manipulation in Python

- A) positions[1] = [1.34234, 1.34234, 0.0]
- B) positions[1][1] = 1.34234
- C) **In [15]: import math**

```
...:
...: class Vectors:
...:     "multiple vectors"
...:
...:     def __init__(self, pos1, pos2, pos3, pos4):
...:         self.pos1 = tuple(pos1)
...:         self.pos2 = tuple(pos2)
...:         self.pos3 = tuple(pos3)
...:         self.pos4 = tuple(pos4)
...:
...:
...:     def translate(self, t):
...:         self.pos1 = tuple(xi + ti for xi, ti in zip(self.pos1, t))
...:         self.pos2 = tuple(xi + ti for xi, ti in zip(self.pos2, t))
...:         self.pos3 = tuple(xi + ti for xi, ti in zip(self.pos3, t))
...:         self.pos4 = tuple(xi + ti for xi, ti in zip(self.pos4, t))
...:
```

```
In [16]: positions = Vectors((0.0, 0.0, 0.0), (1.34234, 1.34234, 0.0), (1.34234, 0.0, 1.34
...: 234), (0.0, 1.34234, 1.34234))
```

```
In [18]: positions.translate((1.34234, -1.34234, -1.34234))
```

```
In [19]: positions.pos1, positions.pos2, positions.pos3, positions.pos4
```

```
Out[19]:
```

```
((1.34234, -1.34234, -1.34234),  
(2.68468, 0.0, -1.34234),  
(2.68468, -1.34234, 0.0),  
(1.34234, 0.0, 0.0))
```

D) .

## NumPy arrays

A) NumPy uses commands written in string or text. For example, to execute a dot product of two vectors you would write “np.dot(vector1, vector2)”

B)

a) “j” was not added to the product

```
In [66]: sx * sy * sz
```

```
Out[66]:
```

```
array([[ 0.+0.j,  0.+0.j],  
       [ 0.+0.j, -0.+0.j]])
```

b) Each array contains two arrays, the dot product is not possible

```
In [68]: np.dot(np.array([[0, 1], [1, 0]]), np.array([[0, -1j], [1j, 0]]), np.array([[1, 0  
...: ], [0, -1]]))
```

-----  
ValueError

Traceback (most recent call last)

<ipython-input-68-f82efd954bcf> in <module>()

```
----> 1 np.dot(np.array([[0, 1], [1, 0]]), np.array([[0, -1j], [1j, 0]]), np.array([[1, 0, [0,  
-1]]))
```

ValueError: output array is not acceptable (must have the right type, nr dimensions, and be a C-Array)

c0

## Coordinate manipulation with NumPy

A) The positions array is a 4x3 matrix, or 4 vectors each with 3 dimensions.

B) The t array is a 1x3 matrix, or 1 vector with 3 dimensions.

C) In [4]: positions[1]

```
Out[4]: array([ 1.34234,  1.34234,  0.   ])
```

D) The output is a floating point number, one dimensional

```
In [5]: positions[1][1]
```

```
Out[5]: 1.3423400000000001
```

E) In [15]: import math

```
...:
...: class Vectors:
...:     "multiple vectors"
...:
...:     def __init__(self, pos1, pos2, pos3, pos4):
...:         self.pos1 = tuple(pos1)
...:         self.pos2 = tuple(pos2)
...:         self.pos3 = tuple(pos3)
...:         self.pos4 = tuple(pos4)
...:
...:
...:     def translate(self, t):
...:         self.pos1 = tuple(xi + ti for xi, ti in zip(self.pos1, t))
...:         self.pos2 = tuple(xi + ti for xi, ti in zip(self.pos2, t))
...:         self.pos3 = tuple(xi + ti for xi, ti in zip(self.pos3, t))
...:         self.pos4 = tuple(xi + ti for xi, ti in zip(self.pos4, t))
...:
```

In [16]: positions = Vectors((0.0, 0.0, 0.0), (1.34234, 1.34234, 0.0), (1.34234, 0.0, 1.34234), (0.0, 1.34234, 1.34234))

In [18]: positions.translate((1.34234, -1.34234, -1.34234))

In [19]: positions.pos1, positions.pos2, positions.pos3, positions.pos4

Out[19]:

```
((1.34234, -1.34234, -1.34234),
(2.68468, 0.0, -1.34234),
(2.68468, -1.34234, 0.0),
(1.34234, 0.0, 0.0))
```