

1. Introduce yourself to your other group members.

a) Who/where is the group member who is physically furthest from Engineering Hall on UW’s campus?

Jedd's apartment is furthest

b) Who/where is the group member that is physically closest to Engineering Hall

Adhi's apartment is closest

2. Set up your numerical computing environment.

I'm using jupyter notebook on my local environment

3. Download and run the included notebook.

a) What digit is represented by the matrix in the first cell?

Seven (7)

b) Re-run the last cell a few times, and observe the resulting image. Does it represent a handwritten digit?

No, and it's really unlikely the generation to form an actual handwritten digit.

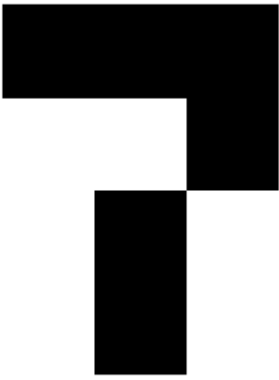
c) How would you write a program that generates images that do represent random hand- written digits? Note that there is not a single answer, and we will spend a lot of the course thinking about this question.

I'll probably use a simple GAN model (fully connected CNN with 8x8 output shape) trained on the MNIST dataset. I can add a condiitonal encoding to ensure I can specify what digit my network would generate.

```
In [1]: import numpy as np
import matplotlib.pyplot as plt

# create a matrix to represent a drawing of '7'
x = np.zeros((8,8))
x[2,3:6] = 1
x[3,5] = 1
x[4:6,4] = 1

# display image
plt.imshow(np.round(x,0), cmap='gray_r'), plt.axis('off')
plt.show()
```



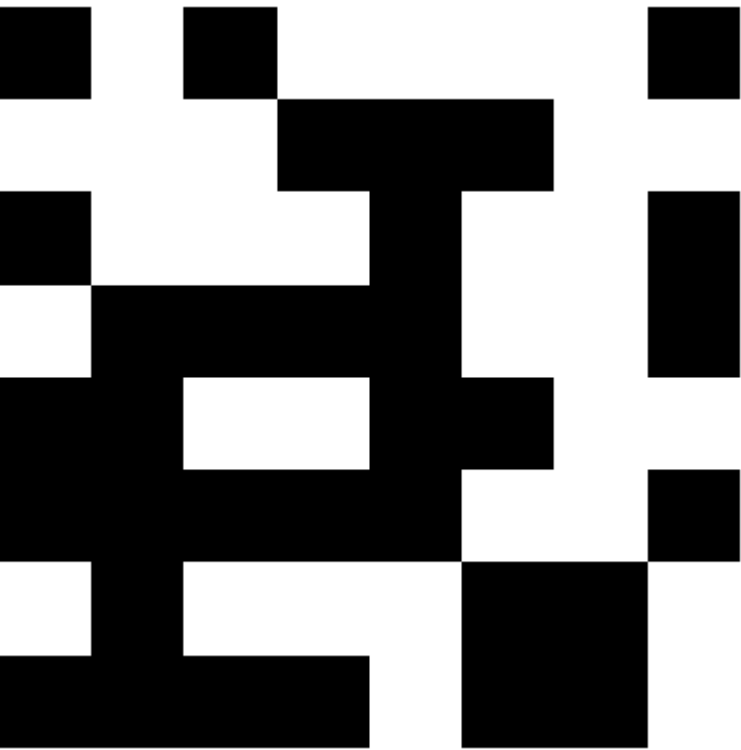
```
In [2]: # generate a random 0 or 1
x = np.round(np.random.rand(1))
print('my random number: \n', x)
```

my random number:
[0.]

```
In [3]: # generate a random 8x8 matrix
x = np.round(np.random.rand(8,8))
print('my random matrix: \n', x)

# display the matrix as an image
plt.imshow(x, cmap='gray_r'), plt.axis('off')
plt.show()
```

my random matrix:
[[1. 0. 1. 0. 0. 0. 0. 1.]
[0. 0. 0. 1. 1. 1. 0. 0.]
[1. 0. 0. 0. 1. 0. 0. 1.]
[0. 1. 1. 1. 1. 0. 0. 1.]
[1. 1. 0. 0. 1. 1. 0. 0.]
[1. 1. 1. 1. 1. 0. 0. 1.]
[0. 1. 0. 0. 0. 1. 1. 0.]
[1. 1. 1. 1. 0. 1. 1. 0.]]



```
In [5]: !jupyter nbconvert --to html activity01.ipynb
```

[NbConvertApp] Converting notebook activity01.ipynb to html
[NbConvertApp] Writing 626767 bytes to activity01.html

In []: