

## Practicing Control Flow:

1. Create a new Kaggle notebook and import numpy. Define a new integer variable called `N_points` and set it equal to 1000. Define another integer variable called `counter` and set it equal to zero. Create two empty lists called `xList` and `yList`.
2. Write some code to generate a random number between -1 and 1 like so: `X = np.random.uniform(-1, 1)`. Do the same for a variable called `Y`.
3. Now, let's think about `X` and `Y` as coordinates on the coordinate plane,  $(X, Y)$ . For each of `N_points = 1000` iterations, generate a new `X` and `Y` coordinate. Append the `X` and `Y` values to their respective lists. Then, check if  $X^2 + Y^2 < 1$ . If it is, add one to the variable called `counter`.
4. After all `N_points = 1000` iterations, print out the value of the `counter` variable. How many points fell inside the circle?
5. Plot `xList` and `yList` along with the code at the bottom of this page to visualize the result.
6. What fraction of the points fall within the circle if `N_points` is changed to 10,000?

```
import numpy as np
import matplotlib.pyplot as plt #plotting
angles = np.linspace(0, 2*np.pi, 100)
Xcircle = np.cos(angles)
Ycircle = np.sin(angles)

plt.plot(Xcircle, Ycircle, '-')
plt.plot() #plot your points here
plt.xlabel("X")
plt.ylabel("Y")
plt.gca().set_aspect('equal')
plt.show()
```