

Final Project - Monte Carlo integration

Rakshya

```
In [100]: %matplotlib inline
import matplotlib.pyplot as plt
import numpy as np
```

Set some parameters of the integration

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In [101]: n = 10000 #number of samples for the integration
```

Making some unifromly sampled variables [-1,1]

```
In [102]: x = np.random.uniform(-1,1,n)
y = np.random.uniform(-1,1,n)
```

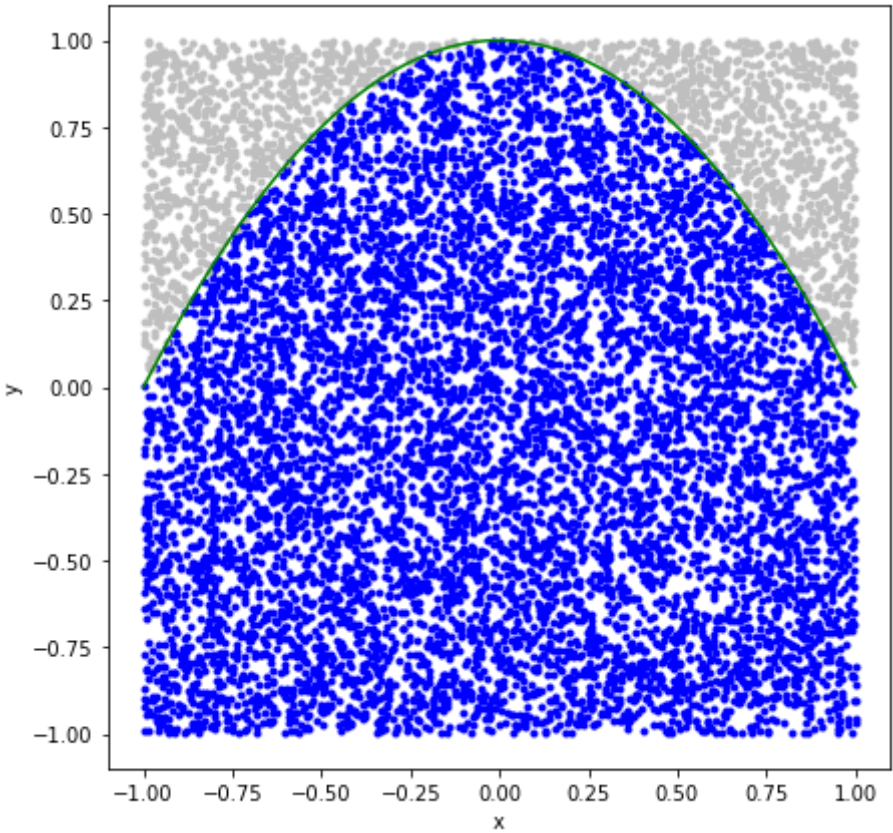
Finding the number of samples within the function

```
In [103]: ir = np.where((x**2 + y)<1.0)[0]
ur = np.where((x**2 + y)>=1.0)[0]
```

Plotting the samples and the function

```
In [104]: fig = plt.figure(figsize = (7,7))
plt.xlim([-1.1,1.1])
plt.ylim([-1.1,1.1])
plt.plot(x[ir],y[ir], '.', color = "blue")
plt.plot(x[ur],y[ur], '.', color = "0.75")
theta = np.linspace(0,np.pi,1000)
xc = np.cos(theta)
yc = np.sin(theta)**2
plt.plot(xc,yc,color="green")

plt.xlabel('x')
plt.ylabel('y')
plt.show()
```



```
In [ ]:
```