Probability Lab 6

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About

Various types of distributions

```
import numpy as np

SAMPLE_SIZE = 100000

# X ~ N(0,1)
mu, sigma = 0, 1
X = np.random.normal(mu, sigma, SAMPLE_SIZE)

a = 3
b = 5

# aX+b ~ N(b,a2)
newX  = [(a*num)+b for num in X]

print(f"Expected mu : {b}")
print(f"Calculated mu : {np.mean(newX)}")
print(f"Expected sigma : {a}")
print(f"Calulated sigma : {np.std(newX)}")
```

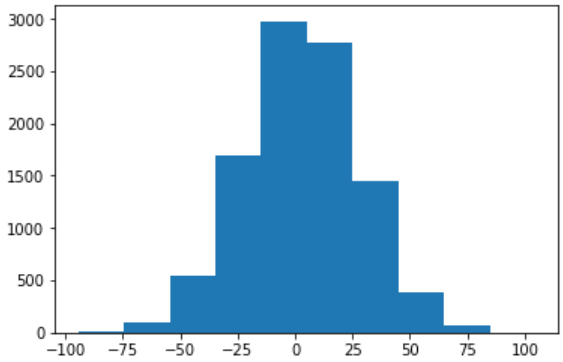
```
Expected mu : 5
Calculated mu : 4.9897698086973765
Expected sigma : 3
Calulated sigma : 2.9926712382993417
```

```
import numpy as np
import math

SAMPLE_SIZE = 100000
a = 3
b = 5

# X ~ N(a, b2)
mu, sigma = a, b**2
X = np.random.normal(mu, sigma, SAMPLE_SIZE)

## (X-a)/b ~N(0,1).
newX  = [((num - a)/b) for num in X]

print(f"Expected mu : {0}")
print(f"Calculated mu : {np.mean(newX)}")
print(f"Expected sigma : {math.floor(np.std(newX))}")
print(f"Calulated sigma : {np.std(newX)}")
```

```
Expected mu : 0
Calculated mu : 0.014274480614599275
Expected sigma : 4
Calulated sigma : 4.996474722957061
```

```
import matplotlib.pyplot as plt
import numpy as np

SAMPLE_SIZE = 10000

# normal dist
mu, sigma = 3, 5**2
norm = np.random.normal(mu, sigma, SAMPLE_SIZE)
plt.hist(norm)
plt.show()

# poisson dist
norm = np.random.poisson(5, SAMPLE_SIZE)
count, bins, ignored = plt.hist(norm, 15, normed=True)
plt.show()

# Exp dist
exp = np.random.exponential(100, SAMPLE_SIZE)
plt.hist(exp)
```

```
20 plt.show()
```




```
/usr/local/lib/python3.6/dist-packages/matplotlib/axes/_axes.py:6521: MatplotlibDeprecationWarning:
The 'normed' kwarg was deprecated in Matplotlib 2.1 and will be removed in 3.1. Use 'density' instead.
  alternative="'density'", removal="3.1")
```