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1 CS 590D Mini Programming Assignment

```python
In [1]: import numpy as np
```

```python
In [2]: import collections
```

```python
In [3]: import matplotlib.pyplot as plt
```

```python
In [4]: def ressample(n):
            x=np.arange(1,101)# np array for 1-100 in order
            p=[]
            b=[]
            c=[]
            for i in x:
                p.append(1.0/i)# prob of each element getting picked with prob 1/i
            for i in range(0,n):
                y=np.random.choice(x, 1,p)# picking one item from x with prob p
                b.append(y)
            return(b)
```

```python
In [5]:  def plots(b):
            unique, counts = np.unique(b, return_counts=True)
            d=dict(zip(unique, counts))
            lists = sorted(d.items()) # sorted by key, return a list of tuples

            xx, yy = zip(*lists) # unpack a list of pairs into two tuples

            plt.plot(xx, yy)
            plt.xlabel("VALUE SAMPLED")
            plt.ylabel("COUNT")
            plt.show()
```
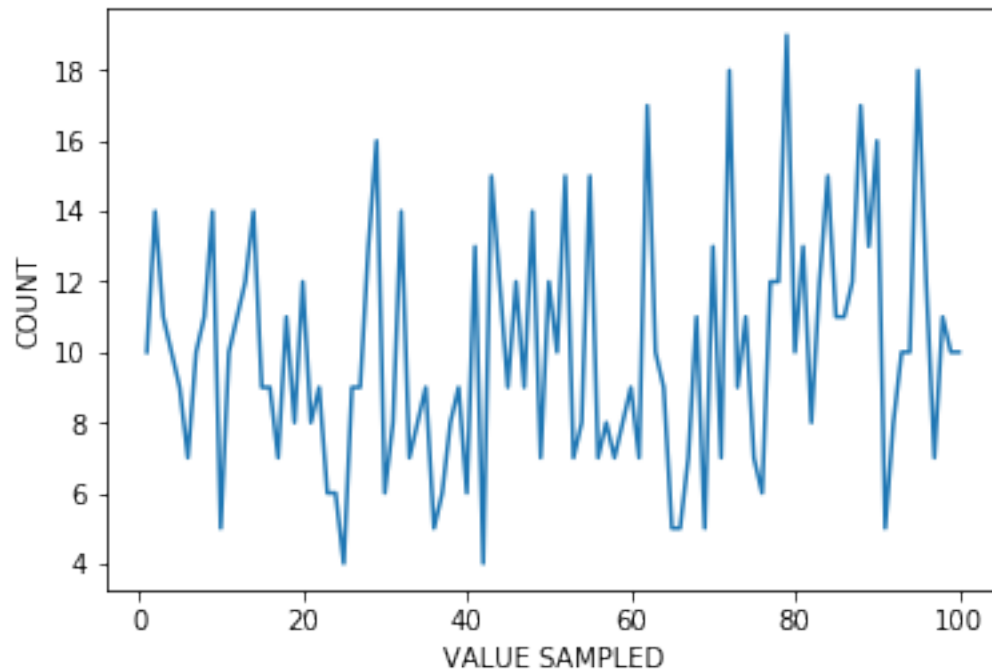
1.1 Single Run

```python
In [6]: ressample(1)
```

```python
Out[6]: [array([70])]
```

1

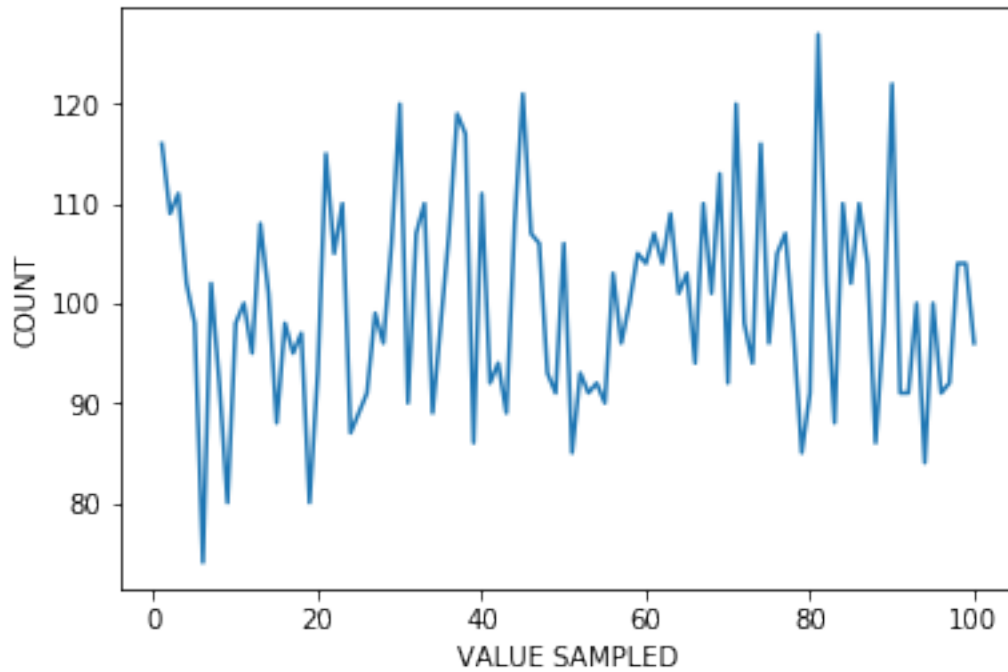## 1.2 Repeating the Algorithm 1000 times

```
In [7]: b=ressample(1000)

In [8]: plots(b)
```


1.3 Repeating it 10000 times

```
In [9]: b=ressample(10000)

In [10]: plots(b)
```

1.4 Repeating it 100000 times

```
In [11]: b=ressample(100000)
```

```
In [12]: plots(b)
```