Assignment1

January 22, 2018

```
In [2]: import matplotlib;
        import matplotlib.pyplot as plt
        import numpy as np
```

1. Create an array with 100 elements from 1 to 100 in order: Create a box plot to visualize your data.

```
In [160]: # fake up some data

          nums = np.arange(1,101)
          plt.boxplot(nums)

          plt.show()
```

```
[  1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18
  19  20  21  22  23  24  25  26  27  28  29  30  31  32  33  34  35  36
  37  38  39  40  41  42  43  44  45  46  47  48  49  50  51  52  53  54
  55  56  57  58  59  60  61  62  63  64  65  66  67  68  69  70  71  72
  73  74  75  76  77  78  79  80  81  82  83  84  85  86  87  88  89  90
  91  92  93  94  95  96  97  98  99 100]
```
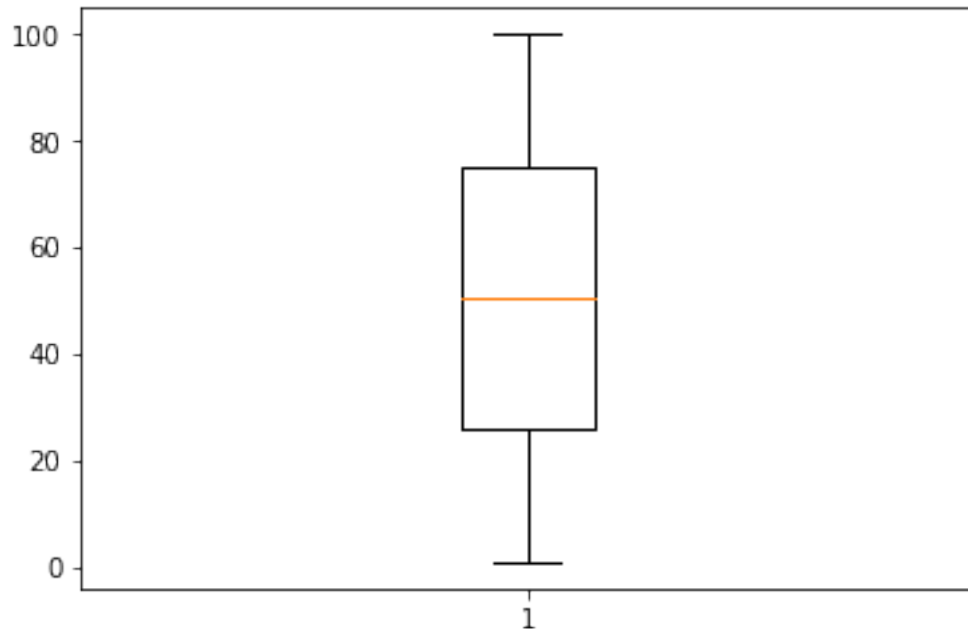
2. Create an array with 10,000 random numbers. Create a histogram of the data using 20 bins.

```
In [209]: x =  np.random.randn(10000)
          hist, bins = np.histogram(x, bins=20)
          width = 0.7 * (bins[1] - bins[0])
          print(bins)
          # center = (bins[:-1] + bins[1:]) / 2

          plt.bar(center, hist, width=width)
          # plt.bar([20], 2, hist)
          plt.show()

[-3.65412688 -3.25694771 -2.85976854 -2.46258937 -2.0654102  -1.66823103
 -1.27105186 -0.87387269 -0.47669352 -0.07951435  0.31766482  0.71484399
  1.11202316  1.50920233  1.9063815   2.30356068  2.70073985  3.09791902
  3.49509819  3.89227736  4.28945653]
```
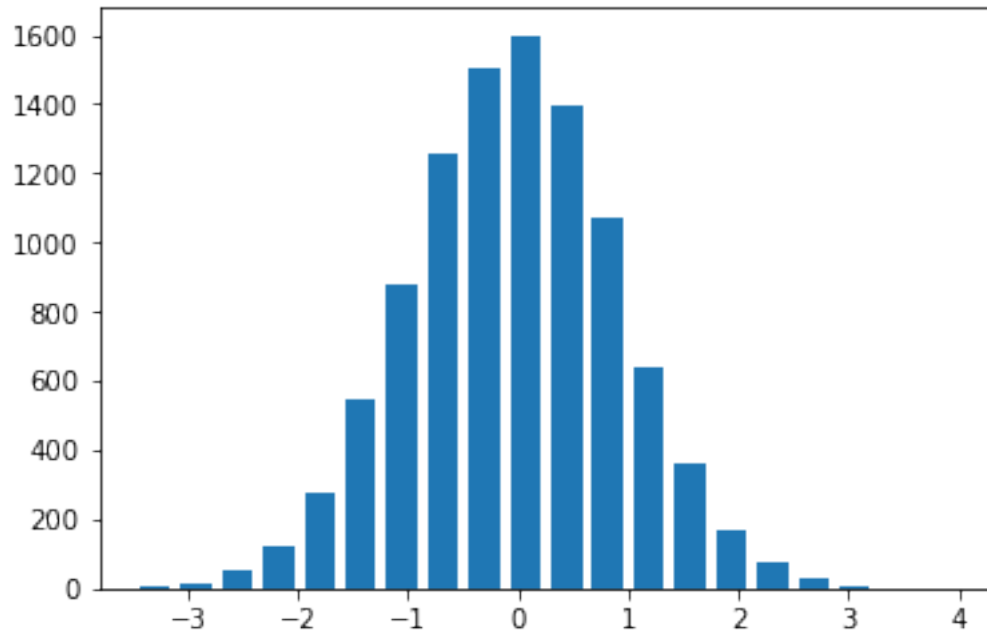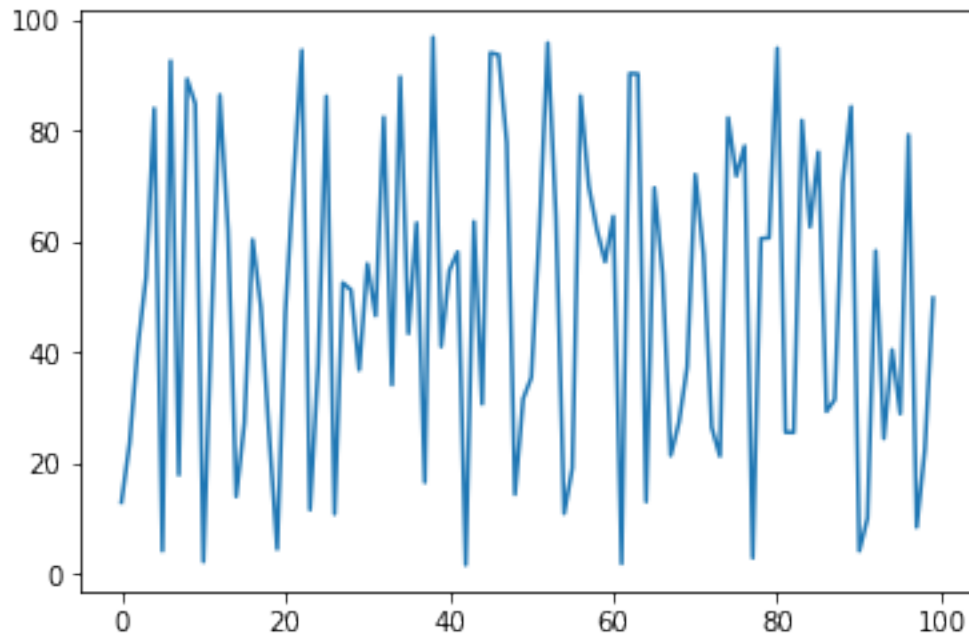
3. Write a program to generate 100 random number uniformly distributed between 1 and 100. Write the numbers out to a binary file and use a line graph to draw the 100 numbers.

```
In [226]: array = np.random.uniform(low=1,high=100,size=100)
          array.tofile('uniformDistNums.bin')

          plt.plot(array)
          plt.show()
```
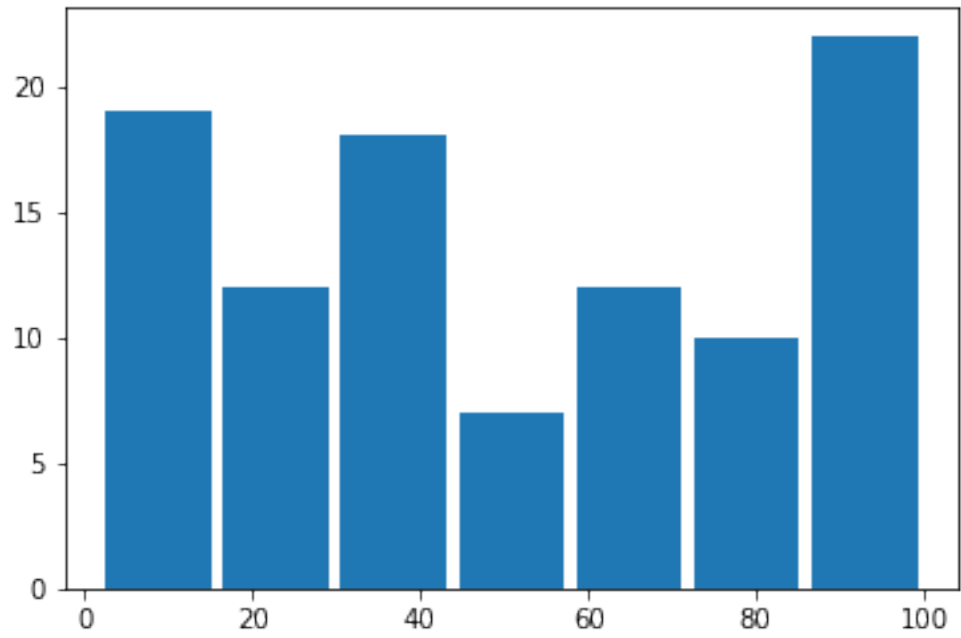
4 Write a program to read the binary file back, divide the range between 1 and 100 into 7 intervals, and calculate the frequency for each interval: display a histogram of your result.

```
In [225]: readarray = np.fromfile('uniformDistNums.bin')

          x = readarray
          hist, bins = np.histogram(x, bins=7)
          width = 0.9*(bins[1] - bins[0])
          print(bins)
          center = (bins[:-1] + bins[1:]) / 2

          plt.bar(center, hist, width=width)
          # plt.bar([20], 2, hist)
          plt.show()

[  1.79124817   15.80170325   29.81215833   43.82261341   57.83306849
   71.84352357   85.85397865   99.86443373]
```

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In [ ]:

In [ ]: