

In [2]:

```
#201600282 염기산
```

In [3]:

#3.1

```
import matplotlib.pyplot as plt
%pylab inline

from collections import Counter

import matplotlib
#matplotlib.rc('font',family='NanumGothic')

def make_simple_line_chart():
    years = [1950,1960,1970,1980,1990,2000,2010]
    gdp = [300.2,543.3,1075.9,2862.5,5979.6,10289.7,14958.3]

    plt.plot(years,gdp,color='green',marker='v',linestyle='solid')
    plt.title("명목 GDP")
    plt.ylabel("Billions of$")
    plt.show()

def make_simple_bar_chart():
    movies = ["Annie Hall", "Ben-Hur", "Casablanca", "Gandhi", "West Side Story"]
    num_oscars = [5,11,3,8,10]

    xs = [i+0.1 for i, _ in enumerate(movies)]
    plt.bar(xs,num_oscars)
    plt.ylabel("#of Academy Awards")
    plt.title("My Favorite Movies")
    plt.xticks([i+0.5 for i, _ in enumerate(movies)], movies)

    plt.show()

def make_histogram():
    grades=[83,95,91,87,70,0,85,100,67,73,77,0]
    decile = lambda grade: grade // 10*10
    histogram = Counter(decile(grade) for grade in grades)

    plt.bar([x-4 for x in histogram.keys()], histogram.values(), 8)
    plt.axis([-5,105,0,5])
    plt.xticks([10*i for i in range(11)])
    plt.xlabel("Decile")
    plt.ylabel("# of Students")
    plt.title("Distribution of Exam 1 Grades")
    plt.show()

def make_several_line_charts():
    variance = [1,2,4,8,16,32,64,128,256]
    bias_squared=[256,128,64,32,16,8,4,2,1]
    total_error = [x+y for x,y in zip(variance, bias_squared)]

    xs = range(len(variance))

    plt.plot(xs,variance, 'g-', label='varinace')
    plt.plot(xs,bias_squared, 'r-.', label='bias^2')
    plt.plot(xs,total_error,'b:', label='total error')

    plt.legend(loc=9)
    plt.xlabel("model complexity")
    plt.title("The Bias-Variance Tradeoff")
    plt.show()
```

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def make_scatter_plot():
    friends=[70,65,72,63,71,64,60,64,67]
    minutes=[175,170,205,120,220,130,105,145,190]
    labels=['a','b','c','d','e','f','g','h','i']

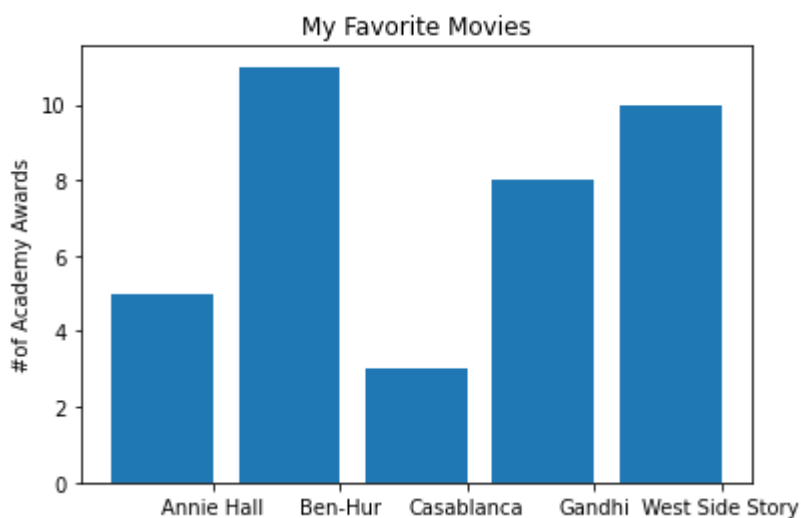
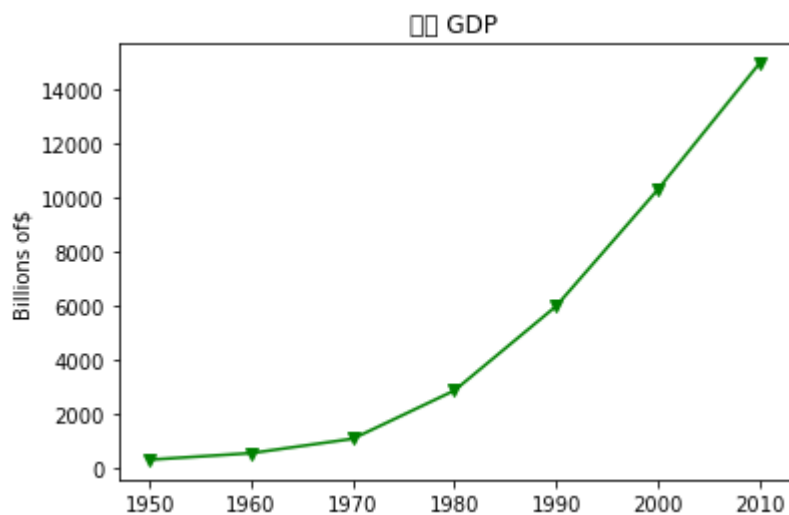
    plt.scatter(friends,minutes)

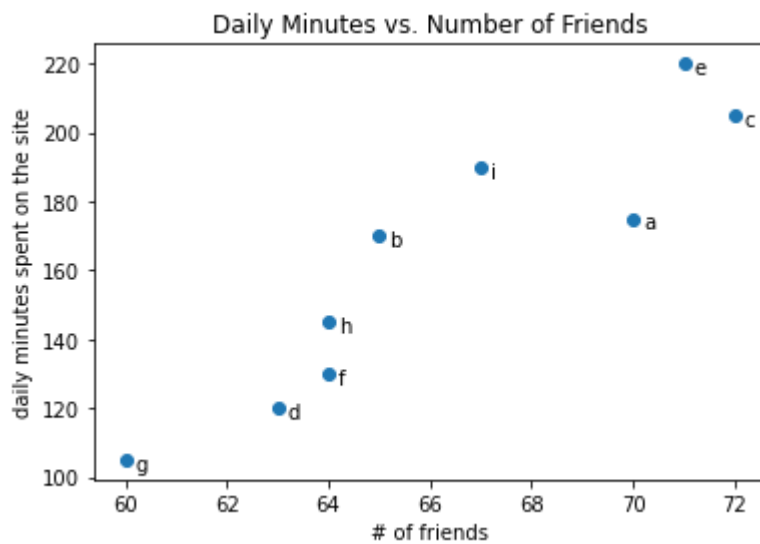
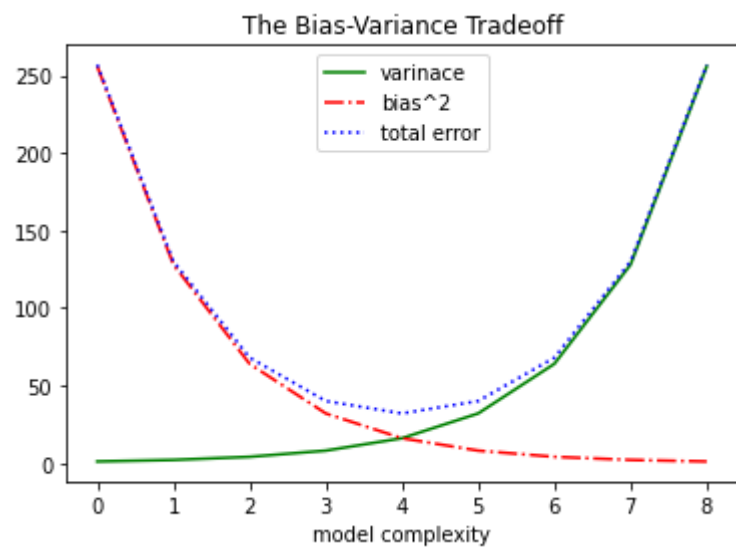
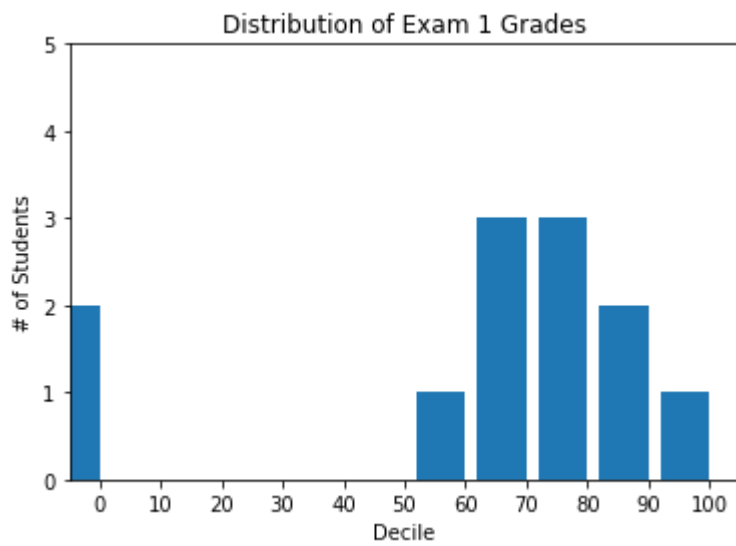
    for label, friend_count, minute_count in zip(labels,friends,minutes):
        plt.annotate(label, xy=(friend_count, minute_count), xytext=(5,-5),textcoords='offset points')

    plt.title("Daily Minutes vs. Number of Friends")
    plt.xlabel("# of friends")
    plt.ylabel("daily minutes spent on the site")
    plt.show()

make_simple_line_chart()
make_simple_bar_chart()
make_histogram()
make_several_line_charts()
make_scatter_plot()
```

Populating the interactive namespace from numpy and matplotlib





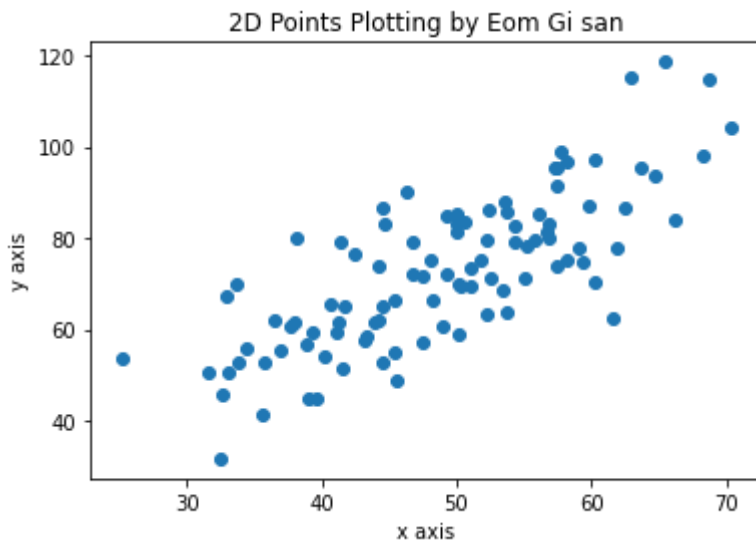
In [4]:

```
#3.2
data = np.loadtxt('./data.csv',delimiter=",",dtype=np.float32)
def make_s_plot2():
    x = data[:,0]
    y = data[:,1]

    plt.scatter(x,y)

    plt.title("2D Points Plotting by Eom Gi san")
    plt.xlabel("x axis")
    plt.ylabel("y axis")
    plt.show()

make_s_plot2()
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