201600779 김영민

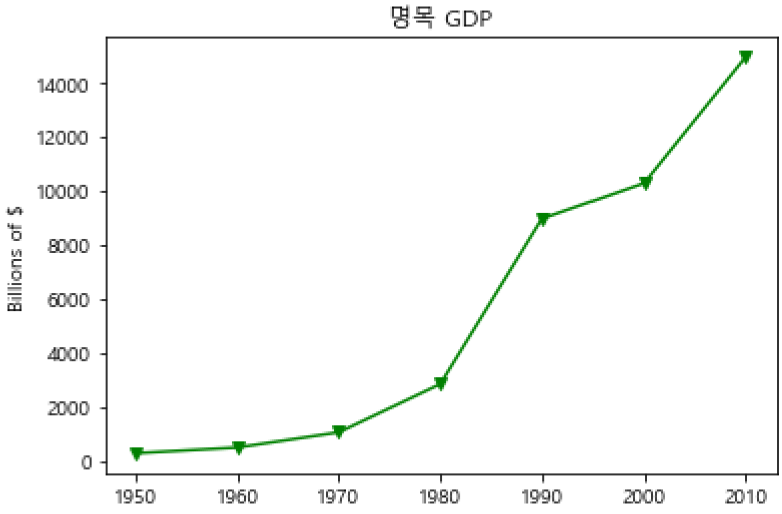
In [1]:

```
import matplotlib.pyplot as plt
import warnings
warnings.filterwarnings('ignore')
from collections import Counter
import numpy as np
import pandas as pd
```

1-1번

In [2]:

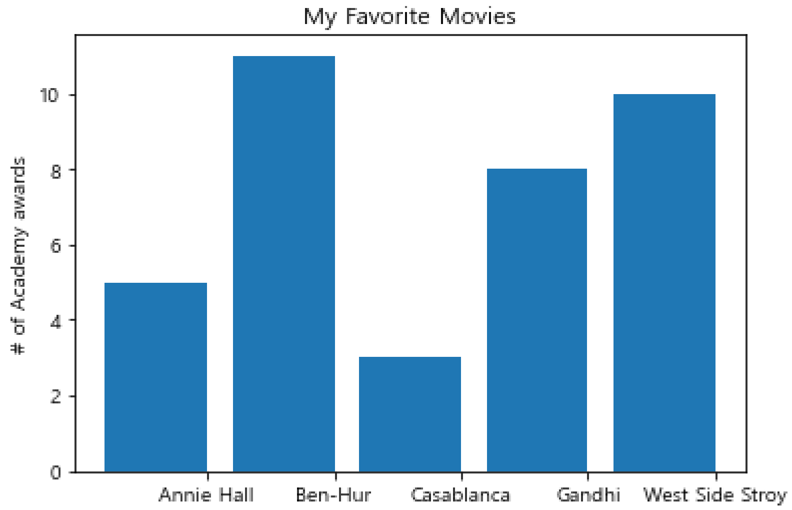
```
from matplotlib import font_manager, rc
font_name = font_manager.FontProperties(fname="c:/Windows/Fonts/malgun.ttf").get_name()
rc('font', family=font_name)

def make_simple_line_chart():
    years = [1950,1960,1970,1980,1990,2000,2010]
    gdp = [300.2,513.3,1075.9,2862.5,8979.6,10289.7,14958.3]

    plt.plot(years,gdp,color='green',marker='v',linestyle='solid')

    plt.title('명목 GDP')

    plt.ylabel('Billions of $')
    plt.show()
make_simple_line_chart()
```



1-2번

In [3]:

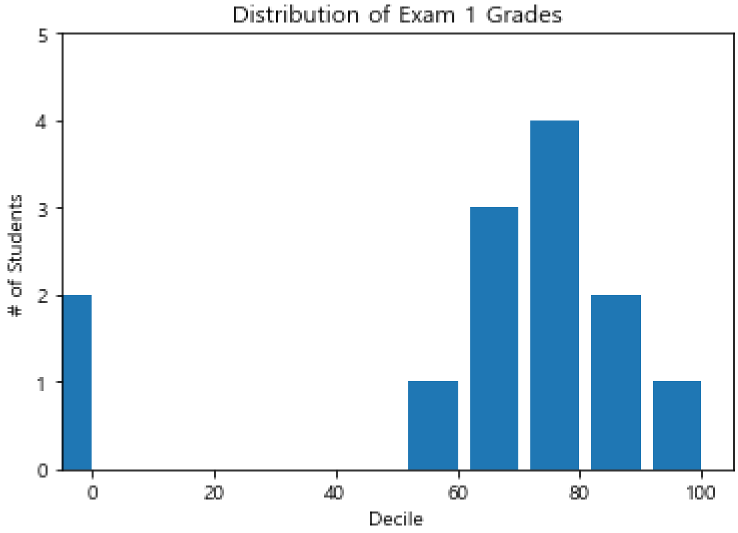
```
def make_simple_bar_chart():
    movies=['Annie Hall','Ben-Hur','Casablanca','Gandhi','West Side Stroy']
    num_oscars = [5,11,3,8,10]

    xs = [i+0.1 for i in range(len(movies))]
    plt.bar(xs,num_oscars)
    plt.ylabel("# of Academy awards")
    plt.title("My Favorite Movies")

    plt.xticks([i+0.5 for i in range(len(movies))],movies)
    plt.show()
make_simple_bar_chart()
```



1-3번

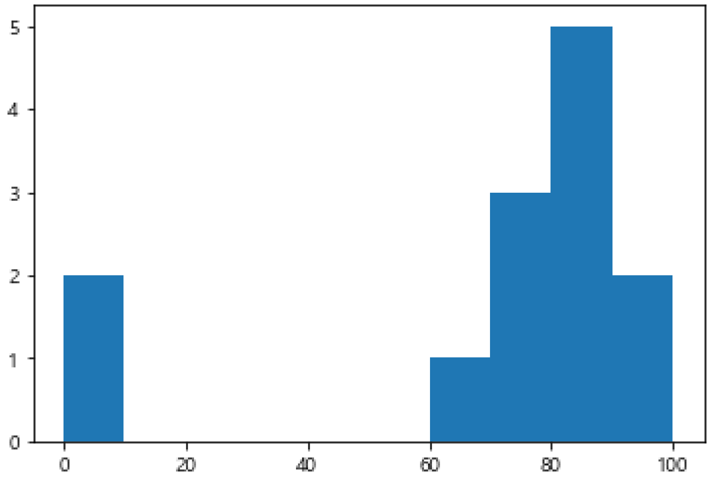
In [4]:

```
def make_simple_hist():
    grades = [83,95,91,87,70,0,85,82,100,67,73,77,0]
    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.xlabel("Decile")
    plt.ylabel("# of Students")
    plt.title("Distribution of Exam 1 Grades")
    plt.show()
make_simple_hist()
```



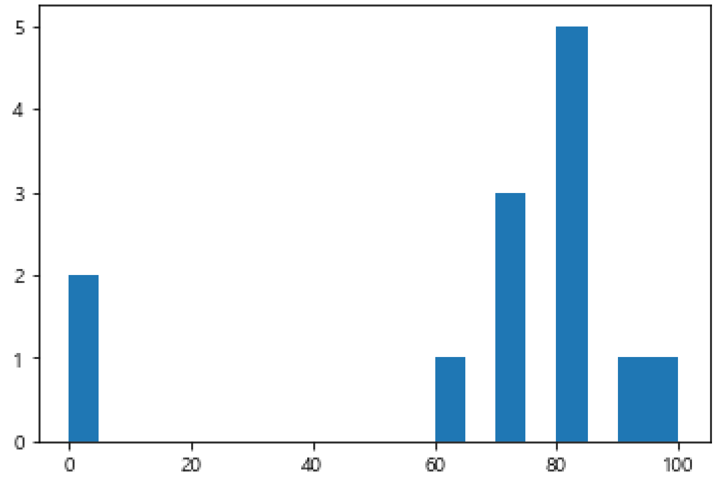
In [5]:

```
grades = np.array([83,85,91,87,70,0,85,82,100,67,73,77,0])
grade = grades//10*10
plt.hist(grade)
plt.show()
```



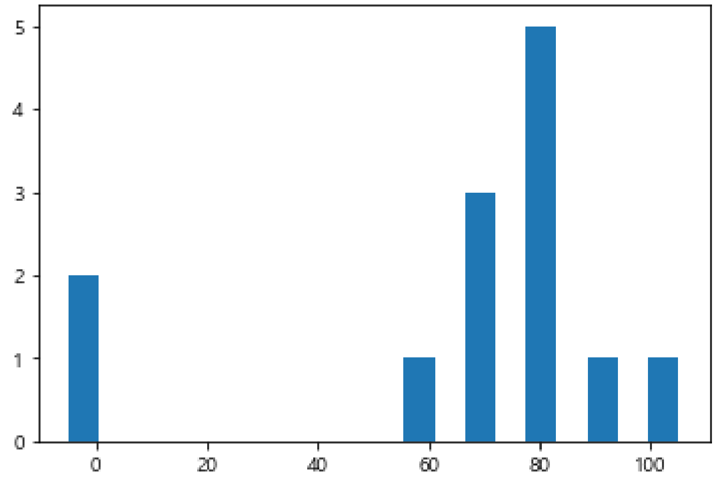
In [6]:

```
plt.hist(grade,bins = 20)
plt.show()
```



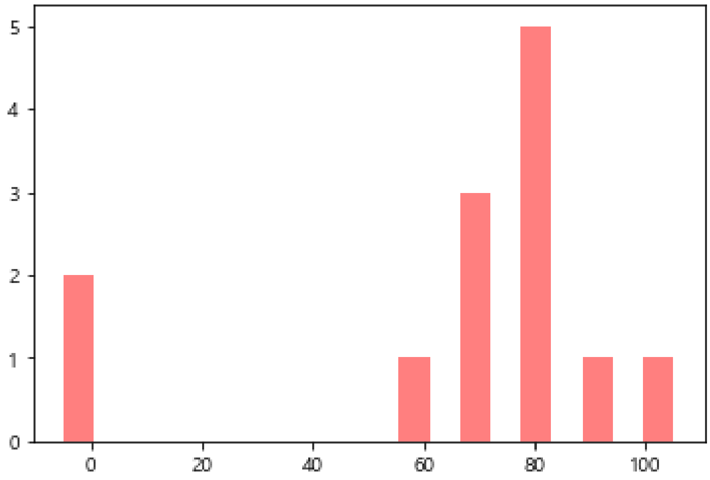
In [7]:

```
plt.hist(grade,bins=20 ,range = (grade.min()-5,grade.max()+5))
plt.show()
```



In [8]:

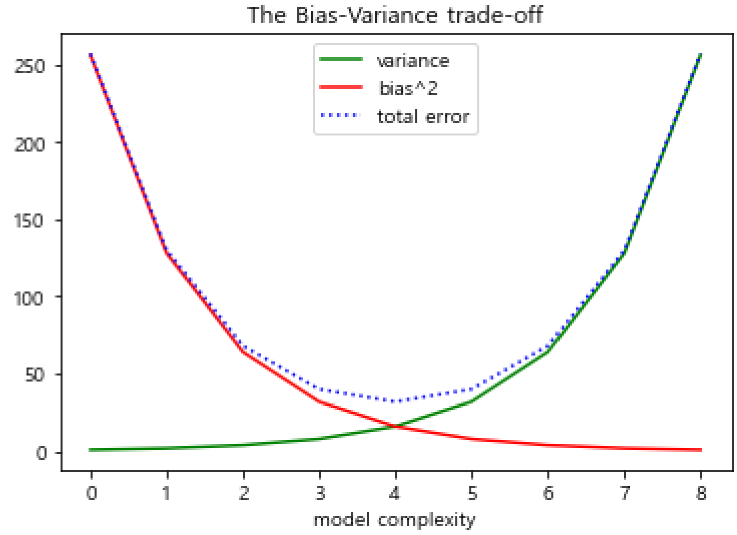
```
plt.hist(grade,bins=20 ,range = (grade.min()-5,grade.max()+5), alpha=.5,
        histtype = 'stepfilled',color = 'red',edgecolor = 'none')
plt.show()
```



1-4번

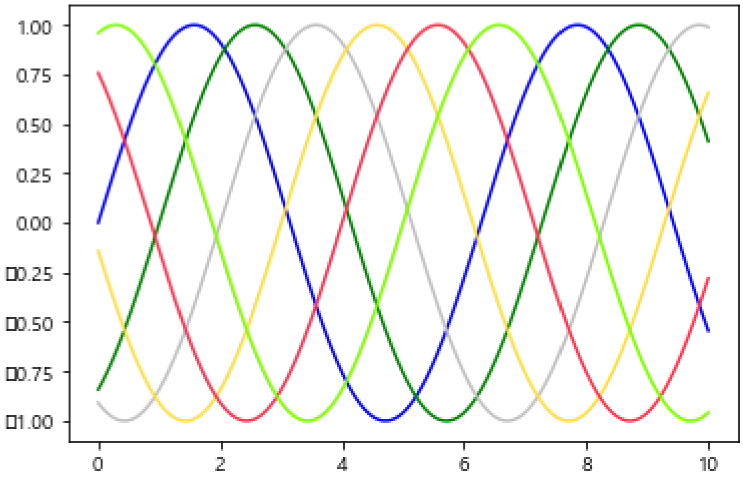
In [9]:

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

    plt.legend(loc='upper center')
    plt.xlabel("model complexity")
    plt.title('The Bias-Variance trade-off')
    plt.show()
make_several_line_charts()
```



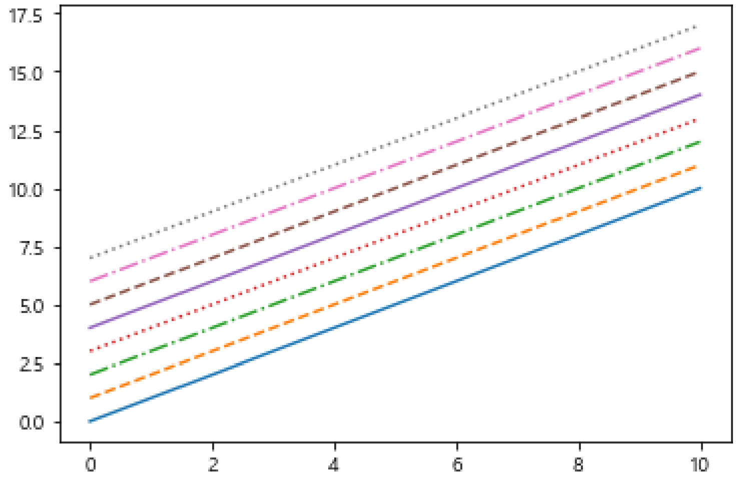
In [10]:

```
x = np.linspace(0, 10, 1000)

plt.plot(x, np.sin(x - 0), color='blue')        # specify color by name
plt.plot(x, np.sin(x - 1), color='g')           # short color code (rgbcmyk)
plt.plot(x, np.sin(x - 2), color='0.75')        # Grayscale between 0 and 1
plt.plot(x, np.sin(x - 3), color='#FFDD44')     # Hex code (RRGGBB from 00 to FF)
plt.plot(x, np.sin(x - 4), color=(1.0,0.2,0.3)) # RGB tuple, values 0 to 1
plt.plot(x, np.sin(x - 5), color='chartreuse'); # all HTML color names supported
```



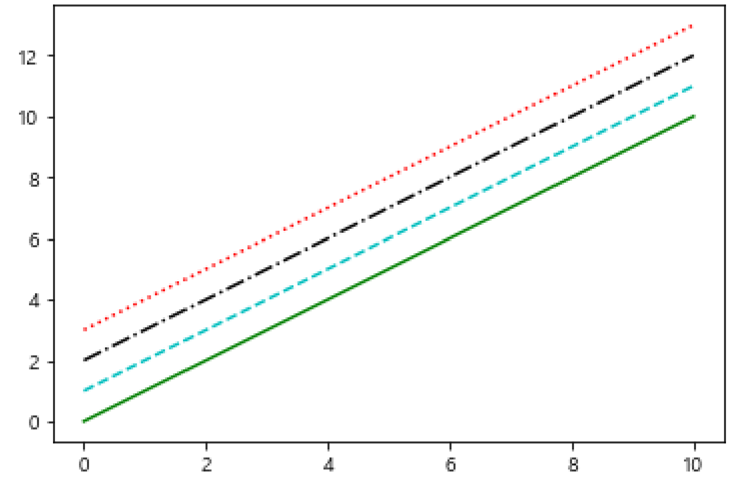
In [11]:

```
plt.plot(x, x + 0, linestyle='solid')
plt.plot(x, x + 1, linestyle='dashed')
plt.plot(x, x + 2, linestyle='dashdot')
plt.plot(x, x + 3, linestyle='dotted');

# For short, you can use the following codes:
plt.plot(x, x + 4, linestyle='-')  # solid
plt.plot(x, x + 5, linestyle='--') # dashed
plt.plot(x, x + 6, linestyle='-.') # dashdot
plt.plot(x, x + 7, linestyle=':');  # dotted
```



In [12]:

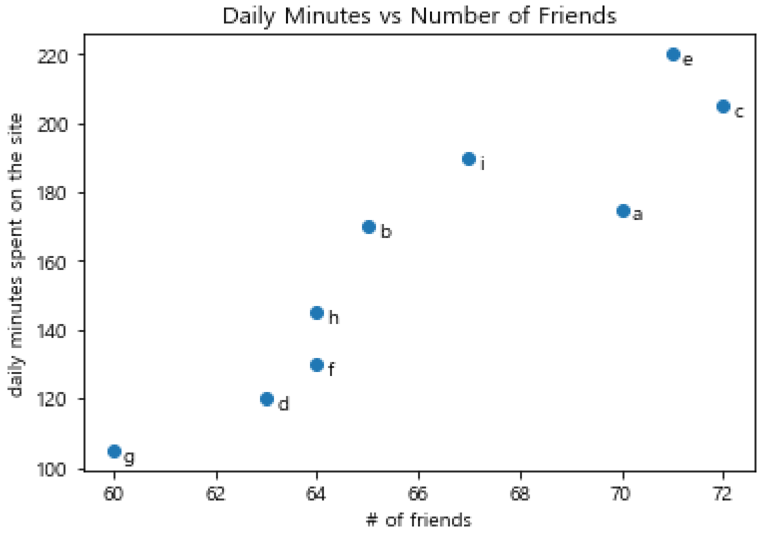
```
plt.plot(x, x + 0, '-g')  # solid green
plt.plot(x, x + 1, '--c') # dashed cyan
plt.plot(x, x + 2, '-.k') # dashdot black
plt.plot(x, x + 3, ':r');  # dotted red
```



1-5번

In [13]:

```
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_scatter_plot()
```



In [14]:

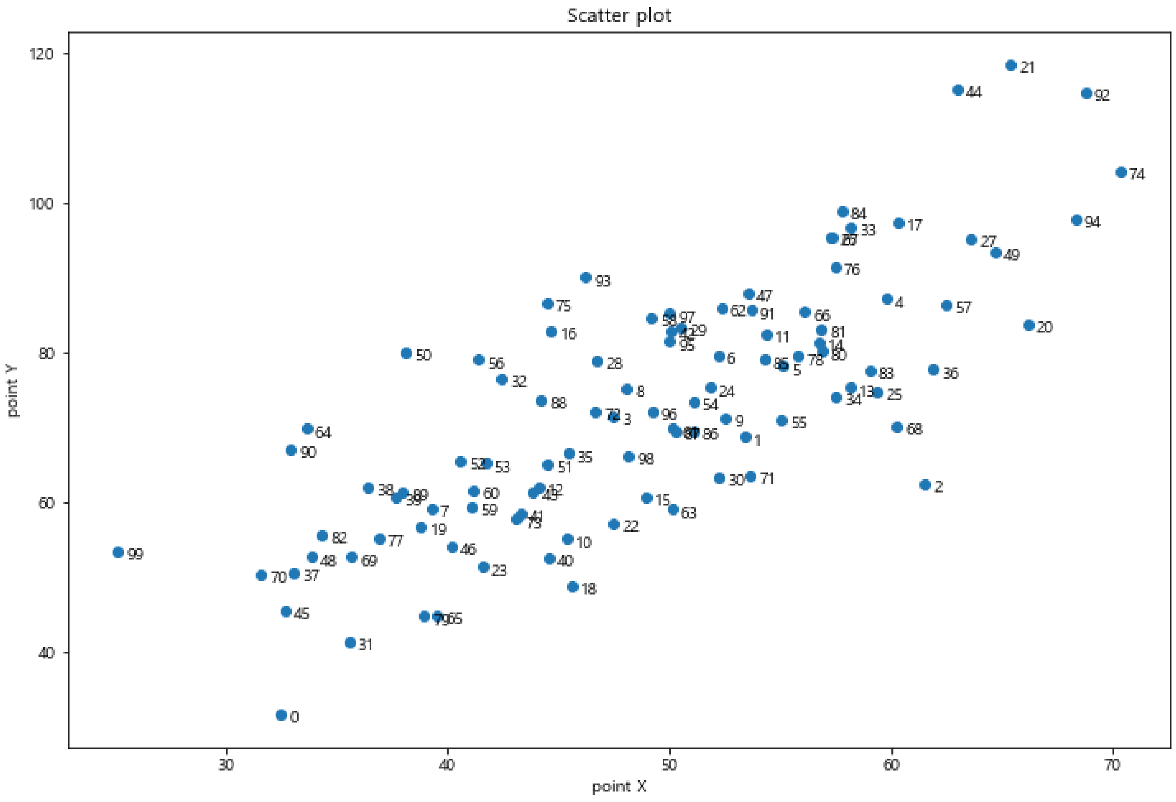
```
data = pd.read_csv('data.csv',header=None)
data.columns = ['x','y']
data.head()
```

Out[14]:

	x	y
0	32.502345	31.707006
1	53.426804	68.777596
2	61.530358	62.562382
3	47.475640	71.546632
4	59.813208	87.230925

In [15]:

```
plt.figure(figsize=(12,8))
plt.scatter(data['x'],data['y'])
plt.xlabel('point X')
plt.ylabel('point Y')
plt.title('Scatter plot')
for idx,i,j in zip(data.index,data['x'],data['y']):
        plt.annotate(idx,xy=(i,j),xytext=(5,-5),
                    textcoords = 'offset points')
```

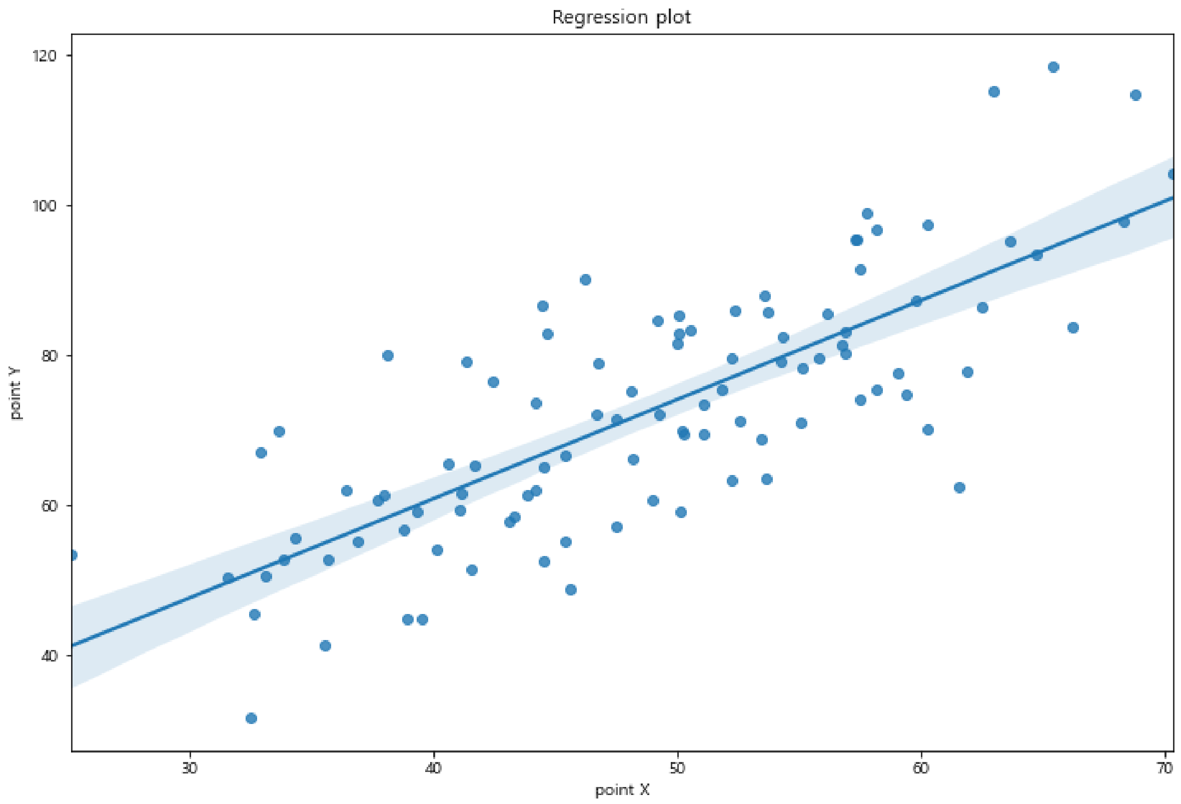


In [16]:

```
import seaborn as sns
plt.figure(figsize=(12,8))
sns.regplot(data=data,x='x',y='y')
plt.title('Regression plot')
plt.xlabel('point X')
plt.ylabel('point Y')
```

Out[16]:

```
Text(0, 0.5, 'point Y')
```



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