Data Visualization with Matplotlib - Exercises

จงทำตามคำสั่งต่อไปนี้ด้วย data ที่กำหนดให้ต่อไปนี้

Data
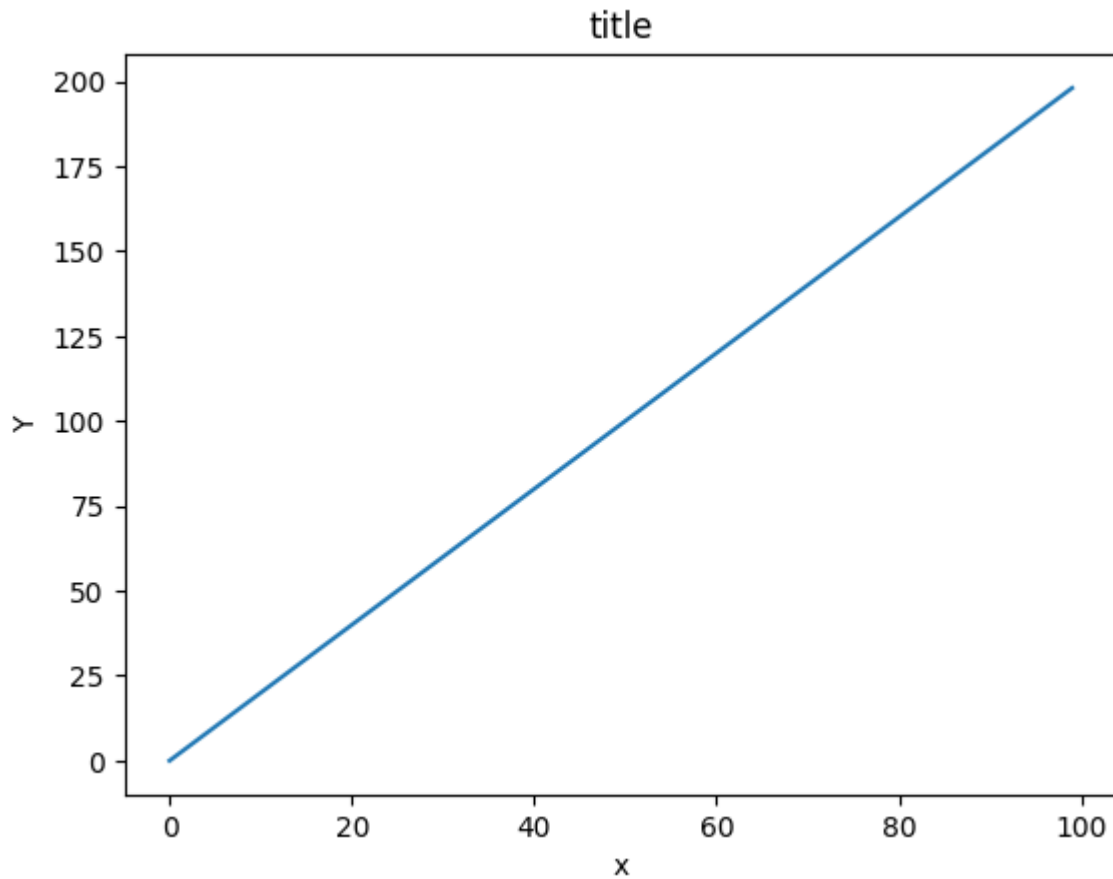
```
In [ ]:  import matplotlib.pyplot as plt
         import numpy as np
         import pandas as pd
         x = np.arange(0,100)
         y = x*2
         z = x**2
         df = pd.read_csv('Superstore.csv',encoding = 'iso-8859-1')
```

Exercise 1

```
In [ ]:  plt.plot(x, y)
         plt.title('title')
         plt.ylabel('Y')
         plt.xlabel('x')

         # plt.show()
```

```
Out[ ]:  Text(0.5, 0, 'x')
```
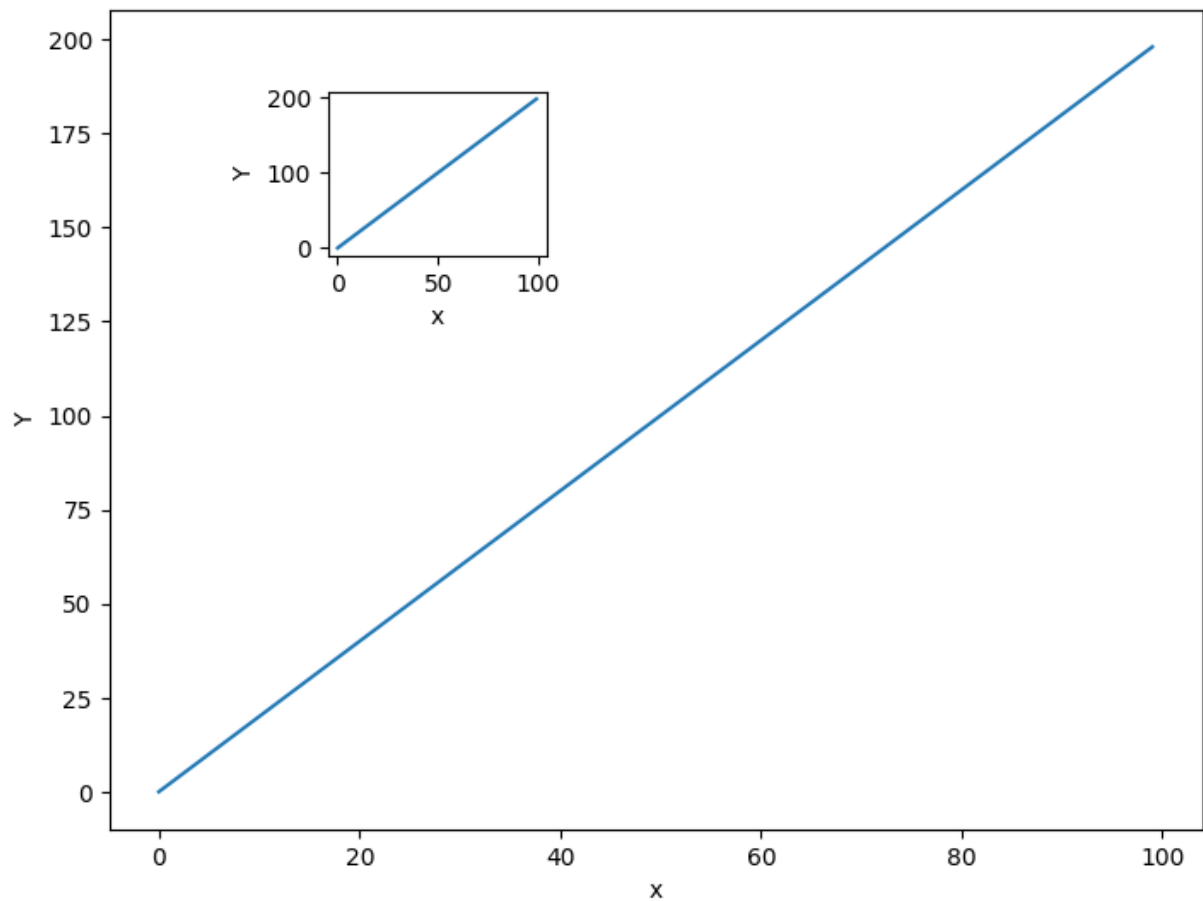
Exercise 2

```
In [ ]: fig= plt.figure()
        axes1 = fig.add_axes([0,0,1,1])
        axes1.plot(x, y,)
        plt.ylabel('Y')
        plt.xlabel('x')

        axes2 = fig.add_axes([0.2,0.7,0.2,0.2])
        axes2.plot(x, y,)
        plt.ylabel('Y')
        plt.xlabel('x')
```

Out[ ]: Text(0.5, 0, 'x')

Exercise 3

ใช้ arrays x, y และ z เพื่อทำการ plot บนแกนที่สร้างจากข้อที่แล้ว (Notice อย่าลืมกำหนด x - limits และ y - limits)
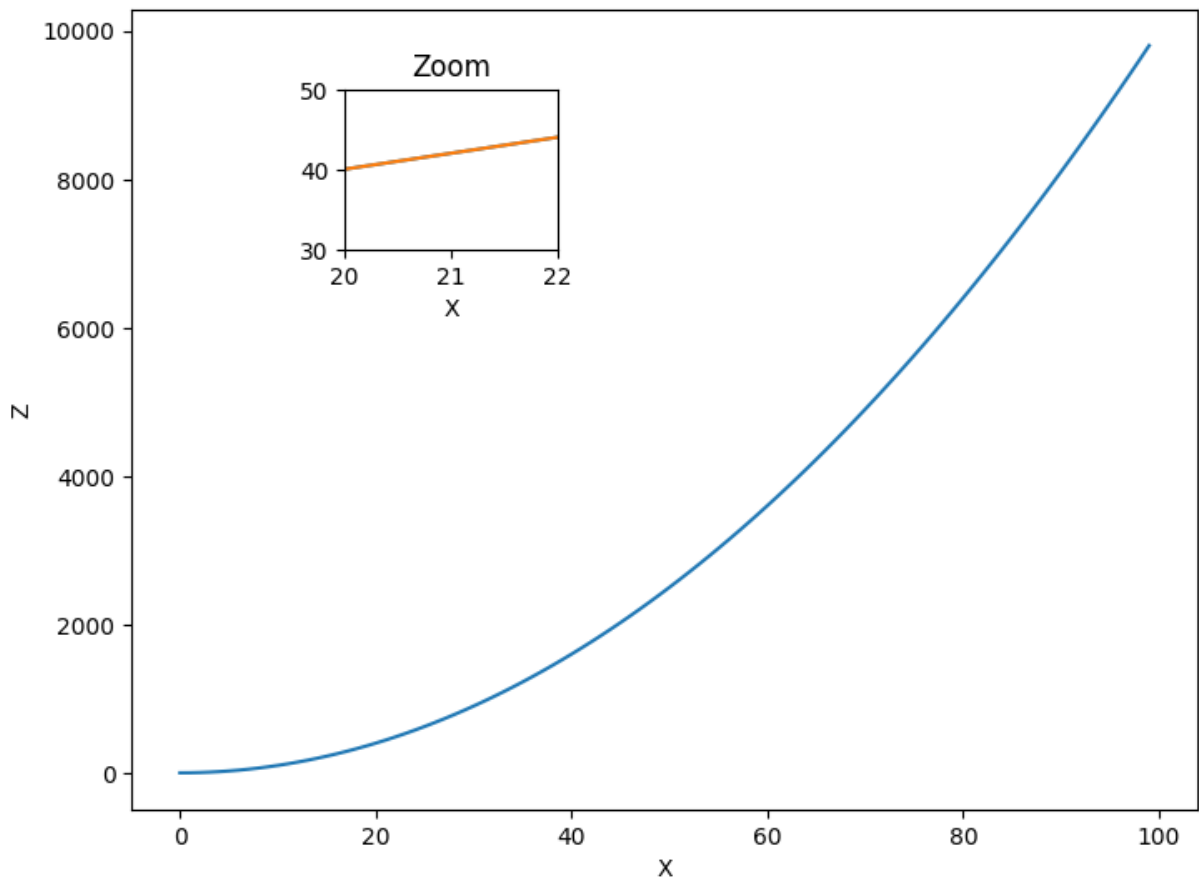
```
In [ ]:  fig= plt.figure()
         axes1 = fig.add_axes([0,0,1,1])
         axes1.plot(x, z,)

         plt.ylabel('Z')
         plt.xlabel('X')

         axes2 = fig.add_axes([0.2,0.7,0.2,0.2])
         axes2.plot(x, y,y)
         axes2.set_ylim(30,50)
         axes2.set_xlim(20,22)

         plt.title('Zoom')
         plt.xlabel('X')
```
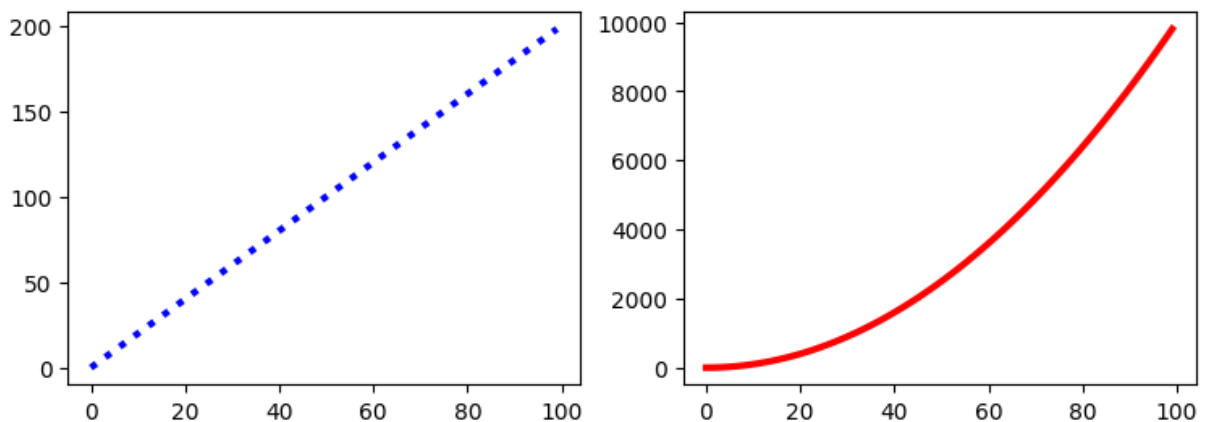
```
Out[ ]:  Text(0.5, 0, 'X')
```

Exercise 4

จงใช้คำสั่ง **plt.subplots(nrows=1, ncols=2)**

จากนั้นให้ทำการ **plot (x,y)** และ **plot (x,z)** บนแกน **axes** และให้ใช้งานคำสั่ง **linewidth and style** เพื่อตกแต่งเส้นของกราฟ

```
In [ ]:  fig, axes = plt.subplots( ncols = 2, nrows=1 ,figsize =(9,3))
         axes[0].plot(x, y, ':b',lw =3)
         axes[1].plot(x, z,'r', lw=3 )
```

Out[ ]: [<matplotlib.lines.Line2D at 0x1b6e0893050>]

Exercise 5

In [ ]: `df.head()`

Out[ ]:

	Order ID	Customer Name	Segment	Day	Month	Year	Ship Mode	City	State	Categ
0	CA-2016-152156	Claire Gute	Consumer	8	11	2016	Second Class	Henderson	Kentucky	Furni
1	CA-2016-152156	Claire Gute	Consumer	8	11	2016	Second Class	Henderson	Kentucky	Furni
2	CA-2016-138688	Darrin Van Huff	Corporate	12	6	2016	Second Class	Los Angeles	California	O Supp
3	US-2015-108966	Sean O'Donnell	Consumer	11	10	2015	Standard Class	Fort Lauderdale	Florida	Furni
4	US-2015-108966	Sean O'Donnell	Consumer	11	10	2015	Standard Class	Fort Lauderdale	Florida	O Supp

In [ ]: `df.info()`

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9994 entries, 0 to 9993
Data columns (total 16 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   Order ID       9994 non-null   object
 1   Customer Name  9994 non-null   object
 2   Segment        9994 non-null   object
 3   Day            9994 non-null   int64
 4   Month          9994 non-null   int64
 5   Year           9994 non-null   int64
 6   Ship Mode      9994 non-null   object
 7   City           9994 non-null   object
 8   State          9994 non-null   object
 9   Category       9994 non-null   object
 10  Sub-Category   9994 non-null   object
 11  Product Name   9994 non-null   object
 12  Sales          9994 non-null   float64
 13  Quantity       9994 non-null   int64
 14  Discount       9994 non-null   float64
 15  Profit         9994 non-null   float64
dtypes: float64(3), int64(4), object(9)
memory usage: 1.2+ MB
```

จงแสดงกราฟรายได้ของทุกปี

```python
df1 = df.groupby('Year')['Profit'].sum()
a = df1.index
b = df1
```

```python
plt.plot(a,b, '--k',marker = 'o',mec='k',mfc='red')
plt.xticks([2014,2015,2016,2017])
```
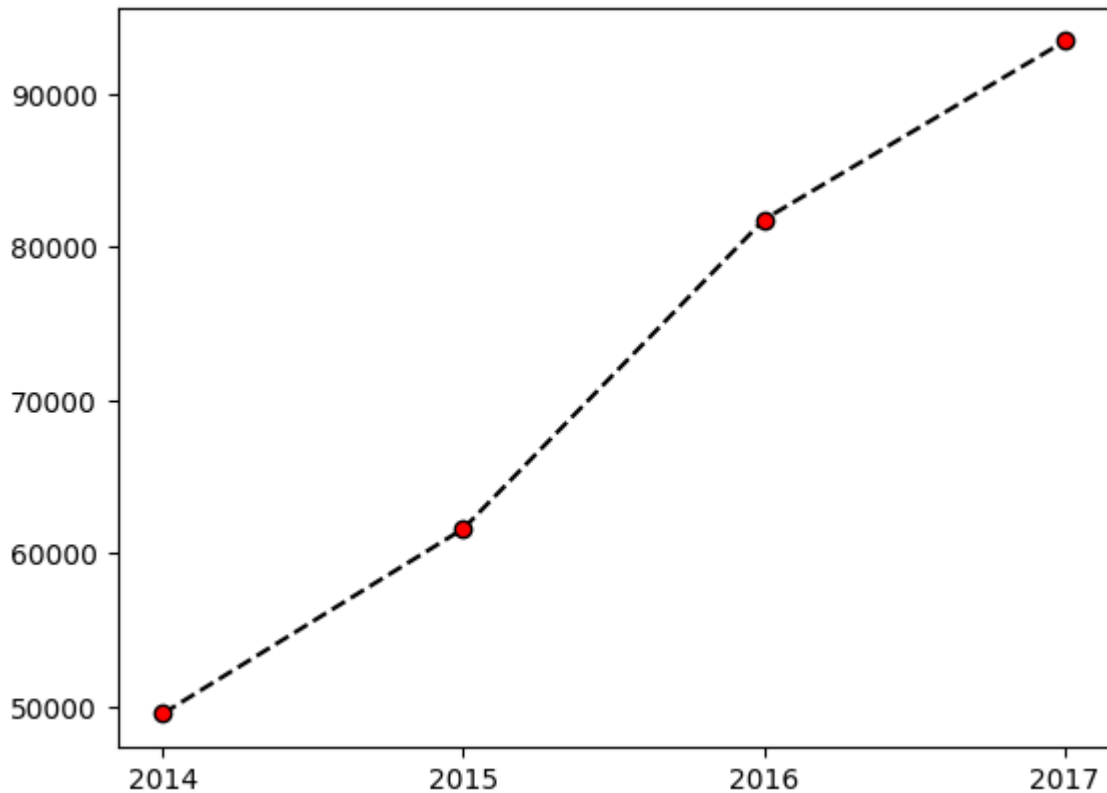
```
Out[ ]:  ([<matplotlib.axis.XTick at 0x1b6ebb4f6d0>,
            <matplotlib.axis.XTick at 0x1b6eb28b790>,
            <matplotlib.axis.XTick at 0x1b6eb1f2d10>,
            <matplotlib.axis.XTick at 0x1b6eb2b9810>],
          [Text(2014, 0, '2014'),
           Text(2015, 0, '2015'),
           Text(2016, 0, '2016'),
           Text(2017, 0, '2017')])
```

โค้ดต่อไปนี้ใช้ในสองข้อสุดท้าย

```
In [ ]:  df['Category'].unique()
```

```
Out[ ]:  array(['Furniture', 'Office Supplies', 'Technology'], dtype=object)
```

```
In [ ]:  df[ df['Category'] == 'Furniture' ].groupby('Year').sum()['Profit']
```

```
Out[ ]:  Year
         2014    5457.7255
         2015    3015.2029
         2016    6959.9531
         2017    3018.3913
         Name: Profit, dtype: float64
```

Dictionary of Category

```
In [ ]:  arr_df = {}
         for i in range(0,df['Category'].nunique()) :
             arr_df[df['Category'].unique()[i]] = df[ df['Category'] == df['Category'].uniqu
```

```
In [ ]:  x = arr_df['Furniture'].index
         y = arr_df['Furniture']
         z = arr_df['Technology']
         c = arr_df['Office Supplies']
```

จงแสดงกราฟรายได้ของแต่ละ Category ในแต่ละปีใน กราฟเดียว

```
In [ ]:  plt.plot(x,y,'^-', label= 'Furniture')
         plt.plot(x,c,'o-', label= 'Office Supplies ')
         plt.plot(x,z,'s-', label= 'Technology')
         plt.legend(loc = 'best')
         plt.xticks([2014,2015,2016,2017])
```

```
Out[ ]:  ([<matplotlib.axis.XTick at 0x1b6ec981110>,
           <matplotlib.axis.XTick at 0x1b6ec97b550>,
           <matplotlib.axis.XTick at 0x1b6ec979d50>,
           <matplotlib.axis.XTick at 0x1b6ec9b8510>],
          [Text(2014, 0, '2014'),
           Text(2015, 0, '2015'),
           Text(2016, 0, '2016'),
           Text(2017, 0, '2017')])
```
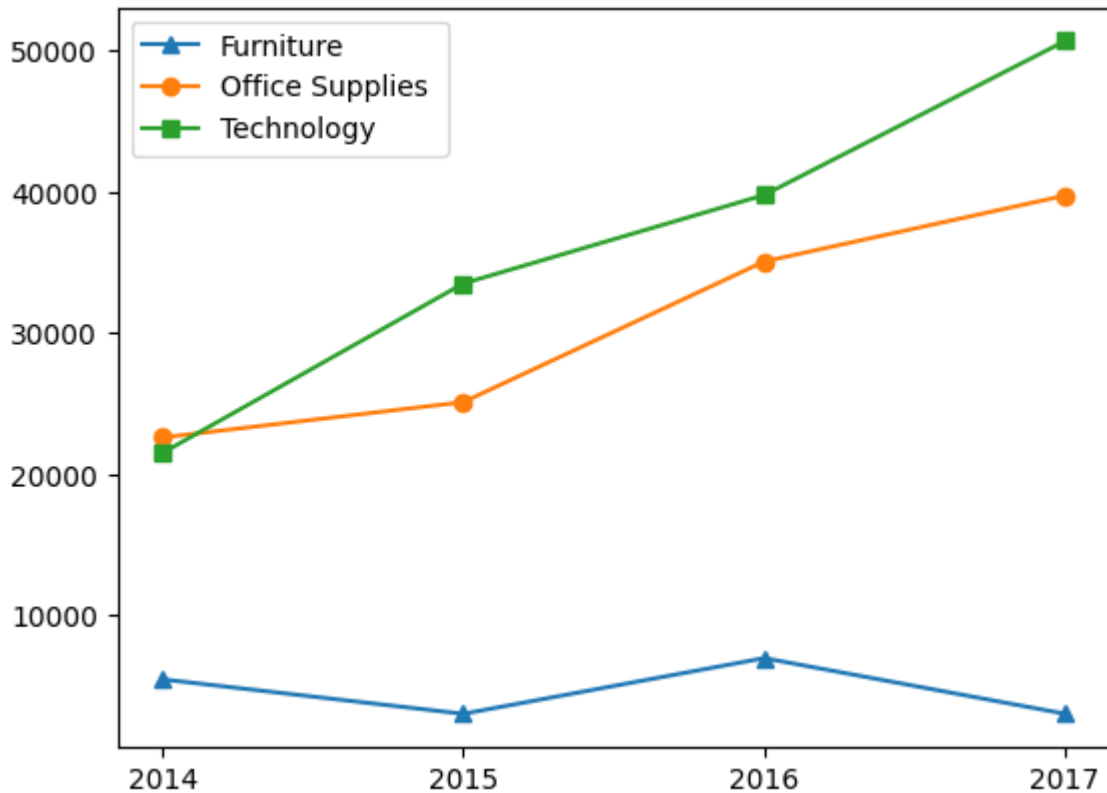

จงแสดงกราฟรายได้ของแต่ละ Category ในแต่ละปี แบบแยกกราฟ

```
In [ ]:  fig= plt.figure()
         axes1 = fig.add_axes([0.5,1.2,1,1])
         axes1.plot(x,z,'o:g')
         axes1.set_title('Technology')

         axes2 = fig.add_axes([0,0,1,1])
         axes2.plot(x,y, 'o--b')
         axes2.set_title('Furniture')

         axes3 = fig.add_axes([1.2,0,1,1])
```
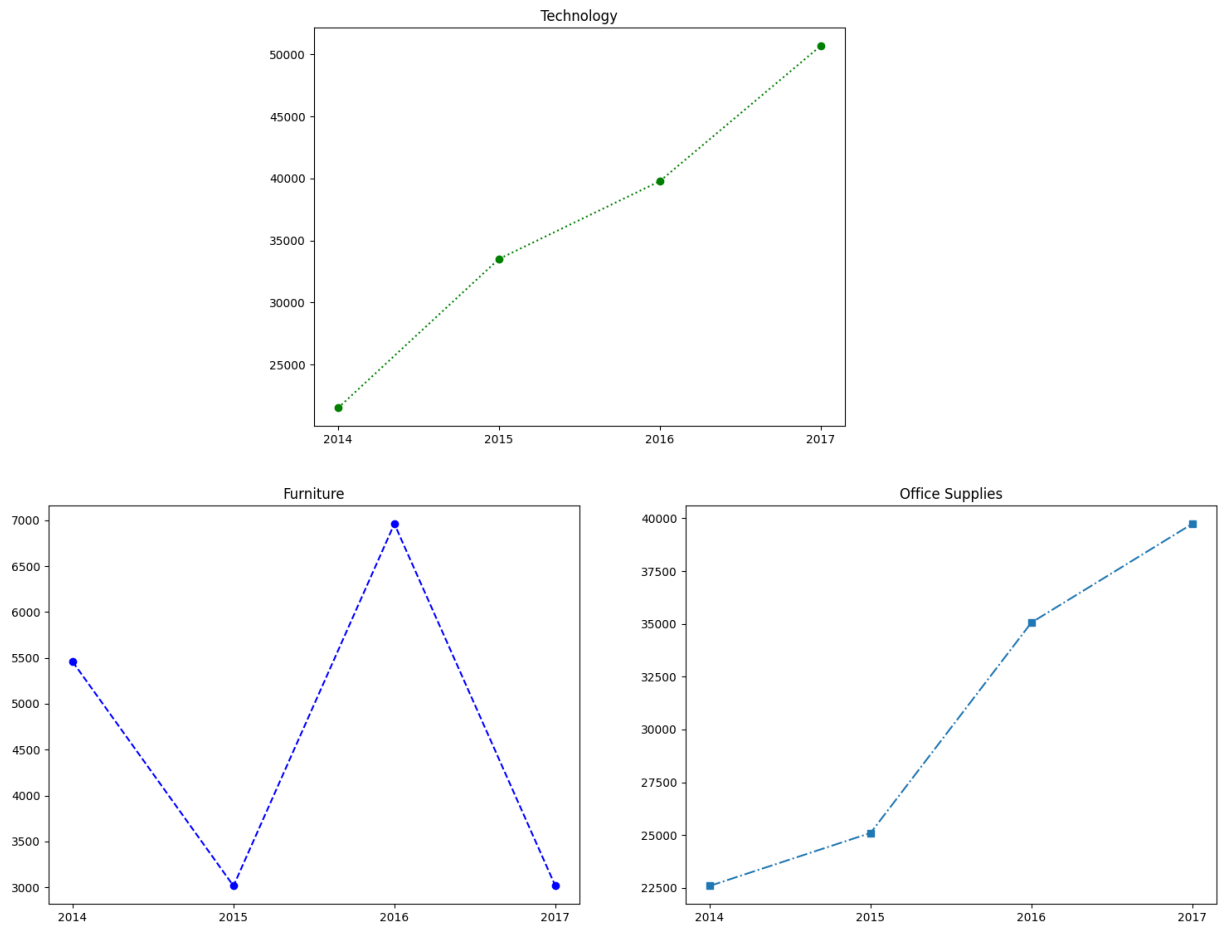
```
axes3.plot(x,c, 's-.')
axes3.set_title('Office Supplies')

axes1.set_xticks([2014,2015,2016,2017])
axes2.set_xticks([2014,2015,2016,2017])
axes3.set_xticks([2014,2015,2016,2017])
```

Out[ ]: [<matplotlib.axis.XTick at 0x1b6eb1df5d0>,
 <matplotlib.axis.XTick at 0x1b6eb1dd210>,
 <matplotlib.axis.XTick at 0x1b6ebb1ba90>,
 <matplotlib.axis.XTick at 0x1b6eb214a90>]

In [ ]: