In [1]:
```
#import librarty matplotlib dan pandas
import matplotlib.pyplot as plt
```

In [2]:
```
#Ambil data CSV
```

In [3]:
```
#Tampilkan jumlah baris dan kolom
```

Out[3]: (53, 8)

In [4]:
```
#Tampilkan 5 data terakhir
```

Out[4]:

	Merk	Brand	Transmisi	cc	km	tahun	harga	harga_juta
0	Toyota Kijang Innova	1	1	1998	71500	2018	265000000	265.0
1	Toyota Sienta	1	1	1497	90000	2016	172000000	172.0
2	Toyota Fortuner	1	1	2393	15000	2021	575000000	575.0
3	Toyota Fortuner	1	1	2393	75000	2016	385000000	385.0
4	Toyota Harrier	1	1	1986	65000	2015	569000000	569.0

In [7]:
```
#cari karakteristik data transmisi dan brand
```

Out[7]:
```
0     1
1     1
2     1
3     1
4     1
5     1
6     1
7     1
8     1
9     1
10    1
11    1
12    1
13    1
14    1
15    1
16    1
17    1
18    1
19    1
20    1
21    1
22    0
23    0
24    1
25    1
26    1
27    1
28    0
29    1
30    1
31    1
32    1
33    1
34    0
35    1
36    1
37    1
38    1
39    1
40    1
41    1
42    1
43    1
44    1
45    0
46    0
47    1
48    1
49    1
50    1
51    1
52    1
Name: Transmisi, dtype: int64
```

In [10]:
```
#Diubah transmisi 1=Automatic, 0=Manual

data.loc[(data['Transmisi']==1), 'Transmisi'] = 'Automatic'
data.loc[(data['Transmisi']==0), 'Transmisi'] = 'Manual'
```

Out[10]:

0	Automatic
1	Automatic
2	Automatic
3	Automatic
4	Automatic
5	Automatic
6	Automatic
7	Automatic
8	Automatic
9	Automatic
10	Automatic
11	Automatic
12	Automatic
13	Automatic
14	Automatic
15	Automatic
16	Automatic
17	Automatic
18	Automatic
19	Automatic
20	Automatic
21	Automatic
22	Manual
23	Manual
24	Automatic
25	Automatic
26	Automatic
27	Automatic
28	Manual
29	Automatic
30	Automatic
31	Automatic
32	Automatic
33	Automatic
34	Manual
35	Automatic
36	Automatic
37	Automatic
38	Automatic
39	Automatic
40	Automatic
41	Automatic
42	Automatic
43	Automatic
44	Automatic
45	Manual
46	Manual
47	Automatic
48	Automatic
49	Automatic

```
50    Automatic
51    Automatic
52    Automatic
Name: Transmisi, dtype: object
```

In [12]:
```
#Buatlah perkiraan penyusutan harga mobil bekas 2 tahun berikutnya -> 2%

data = data.assign(harga_1 = data['harga_juta'] * 0.98)
data = data.assign(harga_2 = data['harga_1'] * 0.98)
data
```

Out[12]:

	Merk	Brand	Transmisi	cc	km	tahun	harga	harga_juta	harga_1	harga
0	Toyota Kijang Innova	1	Automatic	1998	71500	2018	265000000	265.0	259.700	254.506
1	Toyota Sienta	1	Automatic	1497	90000	2016	172000000	172.0	168.560	165.188
2	Toyota Fortuner	1	Automatic	2393	15000	2021	575000000	575.0	563.500	552.230
3	Toyota Fortuner	1	Automatic	2393	75000	2016	385000000	385.0	377.300	369.754
4	Toyota Harrier	1	Automatic	1986	65000	2015	569000000	569.0	557.620	546.467
5	Toyota Camry Hybrid Sedan	1	Automatic	2487	6000	2021	750000000	750.0	735.000	720.300

In [16]:
```
#filtering
#1. Carilah mobil diatas tahun 2015
#2. Carilah mobil dengan harga 200jt - 270jt

f1 = data[data['tahun']> 2015]
f2 = data[(data['harga_juta'] >= 200) & (data['harga_juta'] <= 270)]
```

Out[16]:

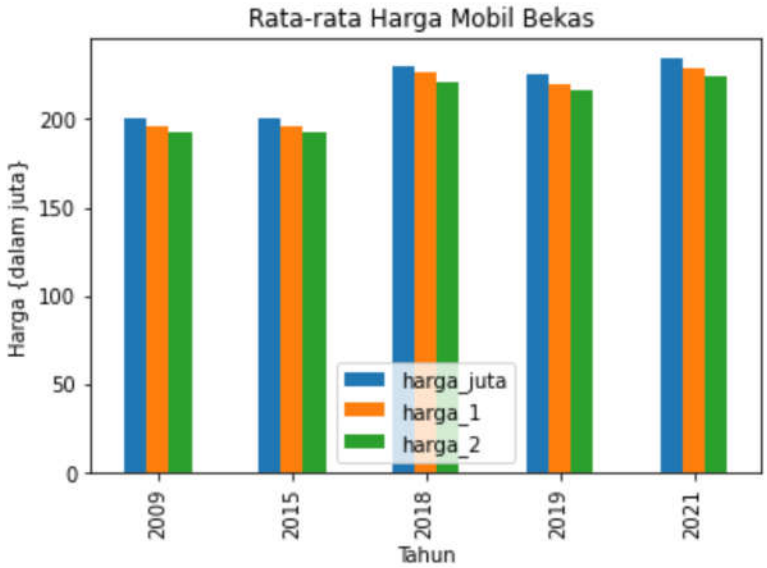
	Merk	Brand	Transmisi	cc	km	tahun	harga	harga_juta	harga_1	harga_2
0	Toyota Kijang Innova	1	Automatic	1998	71500	2018	265000000	265.0	259.70	254.5060
8	Toyota Yaris	1	Automatic	1496	25000	2018	261000000	261.0	255.78	250.6644
11	Toyota Vios	1	Automatic	1496	65000	2018	206000000	206.0	201.88	197.8424
14	Toyota Fortuner	1	Automatic	2494	200000	2009	200000000	200.0	196.00	192.0800
17	Toyota Avanza	1	Automatic	1496	15000	2021	238000000	238.0	233.24	228.5752
19	Toyota Avanza	1	Automatic	1496	20000	2021	230000000	230.0	225.40	220.8920
31	Toyota Yaris	1	Automatic	1496	46149	2018	231000000	231.0	226.38	221.8524
38	Toyota Rush	1	Automatic	1496	55000	2019	225000000	225.0	220.50	216.0900
40	Toyota Vios	1	Automatic	1496	65000	2018	206000000	206.0	201.88	197.8424
41	Toyota Yaris	1	Automatic	1496	35000	2018	227000000	227.0	222.46	218.0108
50	Toyota Rush	1	Automatic	1497	55000	2018	200000000	200.0	196.00	192.0800
51	Toyota Corolla Sedan	1	Automatic	1797	80000	2015	200000000	200.0	196.00	192.0800
52	Toyota Corolla Sedan	1	Automatic	1797	60000	2018	250000000	250.0	245.00	240.1000

In [19]:
```
#visualisasi, pada tahun ke X rata - rata harga mobil bekas nya berapa, harga_

data_group = f2.groupby('tahun')[['harga_juta','harga_1','harga_2']].mean().as
data_group

data_group.plot(kind='bar')
plt.xlabel('Tahun')
plt.ylabel('Harga {dalam juta}')
plt.title('Rata-rata Harga Mobil Bekas ')

plt.show()
```



In [ ]: