In [27]:

```
#import Library matplotlib dan pandas
import matplotlib.pyplot as plt
import pandas as pd
```

In [20]:

```
#ambil Data CSV

data = pd.read_csv('D:\\Data_mobil.csv')
```

In [4]:

```
#Tampilkan jumlah baris dan kolom

data.shape
```

Out[4]:

```
(53, 8)
```

In [8]:

```
#Tampilkan 5 data terakhir
data.head()
```

Out[8]:

	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 [10]:

```
#Cari karakteristik data transmisi dan brand
data['Transmisi']
```

Out[10]:

```
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 [12]:

```
#Diubah transmisi 1 = Automatic, 0 diubah ke Manual
data.loc[(data['Transmisi']==1),'Transmisi'] = 'Automatic'
data.loc[(data['Transmisi']==0),'Transmisi'] = 'Manual'

data['Transmisi']
```

Out[12]:

```
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 [33]:

```
#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[33]:

	Merk	Brand	Transmisi	cc	km	tahun	harga	harga_juta	harga_1	harga_2
0	Toyota Kijang Innova	1	1	1998	71500	2018	265000000	265.0	259.700	254.50600
1	Toyota Sienta	1	1	1497	90000	2016	172000000	172.0	168.560	165.18880
2	Toyota Fortuner	1	1	2393	15000	2021	575000000	575.0	563.500	552.23000
3	Toyota Fortuner	1	1	2393	75000	2016	385000000	385.0	377.300	369.75400
4	Toyota Harrier	1	1	1986	65000	2015	569000000	569.0	557.620	546.46760
5	Toyota Camry Hybrid Sedan	1	1	2487	6000	2021	750000000	750.0	735.000	720.30000
6	Toyota Alphard	1	1	2494	25000	2020	1200000000	1200.0	1176.000	1152.48000
7	Toyota Avanza	1	1	1496	70000	2017	177000000	177.0	173.460	169.99080
8	Toyota Yaris	1	1	1496	25000	2018	261000000	261.0	255.780	250.66440
9	Toyota Camry	1	1	2494	25000	2019	551000000	551.0	539.980	529.18040
10	Toyota Avanza	1	1	1496	100000	2016	142000000	142.0	139.160	136.37680
11	Toyota Vios	1	1	1496	65000	2018	206000000	206.0	201.880	197.84240
12	Toyota Camry	1	1	2494	93000	2013	190000000	190.0	186.200	182.47600
13	Toyota Kijang Innova	1	1	1998	6900	2018	299800000	299.8	293.804	287.92792
14	Toyota Fortuner	1	1	2494	200000	2009	200000000	200.0	196.000	192.08000
15	Toyota Vios	1	1	1497	125000	2014	144000000	144.0	141.120	138.29760
16	Toyota Avanza	1	1	1496	40000	2019	199000000	199.0	195.020	191.11960
17	Toyota Avanza	1	1	1496	15000	2021	238000000	238.0	233.240	228.57520
18	Toyota Calya	1	1	1197	25000	2019	138000000	138.0	135.240	132.53520
19	Toyota Avanza	1	1	1496	20000	2021	230000000	230.0	225.400	220.89200
20	Toyota Avanza	1	1	1496	110000	2017	153000000	153.0	149.940	146.94120
21	Toyota Avanza	1	1	1496	110000	2014	115000000	115.0	112.700	110.44600
22	Toyota Kijang Innova	1	0	1998	155000	2011	180000000	180.0	176.400	172.87200
23	Toyota Kijang Innova	1	0	1998	155000	2008	125000000	125.0	122.500	120.05000
24	Toyota Kijang Innova	1	1	1998	40000	2015	285000000	285.0	279.300	273.71400
25	Toyota Kijang Innova	1	1	1998	20000	2019	330000000	330.0	323.400	316.93200
26	Toyota Avanza	1	1	1496	25000	2018	185000000	185.0	181.300	177.67400
27	Toyota Avanza	1	1	1496	63010	2019	190000000	190.0	186.200	182.47600
28	Toyota Avanza	1	0	1496	115000	2016	147500000	147.5	144.550	141.65900
29	Toyota Calya	1	1	1197	75000	2018	122000000	122.0	119.560	117.16880
30	Toyota Vios	1	1	1496	110000	2009	90000000	90.0	88.200	86.43600
31	Toyota Yaris	1	1	1496	46149	2018	231000000	231.0	226.380	221.85240
32	Toyota Avanza	1	1	1496	202147	2011	94000000	94.0	92.120	90.27760
33	Toyota Avanza	1	1	1496	15000	2021	290000000	290.0	284.200	278.51600
34	Toyota Rush	1	0	1496	45000	2015	168000000	168.0	164.640	161.34720
35	Toyota Avanza	1	1	1496	135000	2012	118000000	118.0	115.640	113.32720
36	Toyota Agya	1	1	1197	36959	2019	136000000	136.0	133.280	130.61440
37	Toyota Voxy	1	1	2494	45000	2017	381000000	381.0	373.380	365.91240
38	Toyota Rush	1	1	1496	55000	2019	225000000	225.0	220.500	216.09000
39	Toyota Yaris	1	1	1496	145000	2012	125000000	125.0	122.500	120.05000
40	Toyota Vios	1	1	1496	65000	2018	206000000	206.0	201.880	197.84240
41	Toyota Yaris	1	1	1496	35000	2018	227000000	227.0	222.460	218.01080
42	Toyota Avanza	1	1	1496	100000	2016	152000000	152.0	148.960	145.98080
43	Toyota Avanza	1	1	1496	10000	2018	199000000	199.0	195.020	191.11960
44	Toyota Agya	1	1	998	75000	2016	109000000	109.0	106.820	104.68360
45	Toyota Avanza	1	0	1296	200000	2013	50000000	50.0	49.000	48.02000
46	Toyota Corolla	1	0	1597	220000	1990	50000000	50.0	49.000	48.02000
47	Toyota Vios	1	1	1496	170000	2010	100000000	100.0	98.000	96.04000
48	Toyota Calya	1	1	1197	80000	2017	100000000	100.0	98.000	96.04000
49	Toyota Avanza	1	1	1497	70000	2015	150000000	150.0	147.000	144.06000
50	Toyota Rush	1	1	1497	55000	2018	200000000	200.0	196.000	192.08000
51	Toyota Corolla Sedan	1	1	1797	80000	2015	200000000	200.0	196.000	192.08000
52	Toyota Corolla Sedan	1	1	1797	60000	2018	250000000	250.0	245.000	240.10000

In [38]:

```
#Filtering
#1. Carilah mobil yang diatas tahun 2015
#2. Carilah mobil dengan harga 200jt-279jt


fl_1 = data[(data['tahun'] >= 2015) & (data['harga_juta'] <200)]
fl_1
```

Out[38]:

	Merk	Brand	Transmisi	cc	km	tahun	harga	harga_juta	harga_1	harga_2
1	Toyota Sienta	1	1	1497	90000	2016	172000000	172.0	168.56	165.1888
7	Toyota Avanza	1	1	1496	70000	2017	177000000	177.0	173.46	169.9908
10	Toyota Avanza	1	1	1496	100000	2016	142000000	142.0	139.16	136.3768
16	Toyota Avanza	1	1	1496	40000	2019	199000000	199.0	195.02	191.1196
18	Toyota Calya	1	1	1197	25000	2019	138000000	138.0	135.24	132.5352
20	Toyota Avanza	1	1	1496	110000	2017	153000000	153.0	149.94	146.9412
26	Toyota Avanza	1	1	1496	25000	2018	185000000	185.0	181.30	177.6740
27	Toyota Avanza	1	1	1496	63010	2019	190000000	190.0	186.20	182.4760
28	Toyota Avanza	1	0	1496	115000	2016	147500000	147.5	144.55	141.6590
29	Toyota Calya	1	1	1197	75000	2018	122000000	122.0	119.56	117.1688
34	Toyota Rush	1	0	1496	45000	2015	168000000	168.0	164.64	161.3472
36	Toyota Agya	1	1	1197	36959	2019	136000000	136.0	133.28	130.6144
42	Toyota Avanza	1	1	1496	100000	2016	152000000	152.0	148.96	145.9808
43	Toyota Avanza	1	1	1496	10000	2018	199000000	199.0	195.02	191.1196
44	Toyota Agya	1	1	998	75000	2016	109000000	109.0	106.82	104.6836
48	Toyota Calya	1	1	1197	80000	2017	100000000	100.0	98.00	96.0400
49	Toyota Avanza	1	1	1497	70000	2015	150000000	150.0	147.00	144.0600

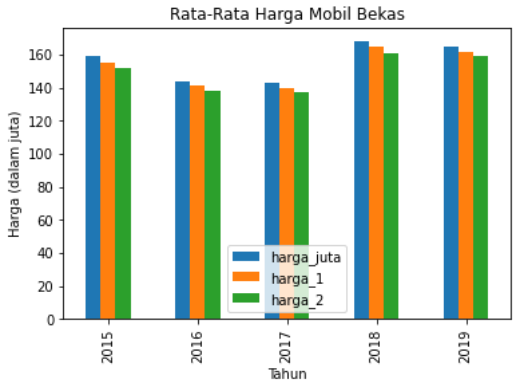
In [39]:

```
#Visualisasi, pada tahun ke X, rata" harga mobil bekas nya berapa, harga_1 berapa, harga_2 berapa

data_group = fl_1.groupby('tahun')[['harga_juta','harga_1','harga_2']].mean().astype(int)

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

plt.show()
```



In [ ]: