In [36]:
```
!pip install folium
```

```
Collecting folium
  Using cached folium-0.12.1-py2.py3-none-any.whl (94 kB)
Requirement already satisfied: numpy in c:\users\shubham kumar\anaconda3\lib
\site-packages (from folium) (1.18.5)
Requirement already satisfied: jinja2>=2.9 in c:\users\shubham kumar\anaconda
3\lib\site-packages (from folium) (2.11.2)
Collecting branca>=0.3.0
  Using cached branca-0.4.2-py3-none-any.whl (24 kB)
Requirement already satisfied: requests in c:\users\shubham kumar\anaconda3\l
ib\site-packages (from folium) (2.24.0)
Requirement already satisfied: MarkupSafe>=0.23 in c:\users\shubham kumar\ana
conda3\lib\site-packages (from jinja2>=2.9->folium) (1.1.1)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\shubham kumar\a
naconda3\lib\site-packages (from requests->folium) (2020.6.20)
Requirement already satisfied: urllib3!=1.25.0,!=1.25.1,<1.26,>=1.21.1 in
c:\users\shubham kumar\anaconda3\lib\site-packages (from requests->folium)
(1.25.9)
Requirement already satisfied: chardet<4,>=3.0.2 in c:\users\shubham kumar\an
aconda3\lib\site-packages (from requests->folium) (3.0.4)
Requirement already satisfied: idna<3,>=2.5 in c:\users\shubham kumar\anacond
a3\lib\site-packages (from requests->folium) (2.10)
Installing collected packages: branca, folium
Successfully installed branca-0.4.2 folium-0.12.1
```

In [2]:
```
from IPython.display import Image
Image(filename="imagelogo.png", width="700", height="400")
```

Out[2]:

Module 5

Project On Hungary ChickenPox Case

Team:- Shubham Kumar, Sunik Nayak, Prahlad Kumar & Sagarika Khatua

```
In [3]:  import pandas as pd
         import numpy as np
         import matplotlib.pyplot as plt
         import seaborn as sns
         sns.set(color_codes=True)
         import folium
```

Hungary Satellite view

```
In [4]:  hungary_map = folium.Map(location=[47.27360234267104, 19.151112815963515], zoom_start=8)
         hungary_map
```

Out[4]:   Make this Notebook Trusted to load map: File -> Trust Notebook

Importing Excel file

```
In [5]: df = pd.read_excel("hungary_chickenpox.xlsx")
        df
```

Out[5]:

	Date	BUDAPEST	BARANYA	BACS	BEKES	BORSOD	CSONGRAD	FEJER	GYOR	HAJ
0	2005-01-03	168	79	30	173	169	42	136	120	
1	2005-01-10	157	60	30	92	200	53	51	70	
2	2005-01-17	96	44	31	86	93	30	93	84	
3	2005-01-24	163	49	43	126	46	39	52	114	
4	2005-01-31	122	78	53	87	103	34	95	131	
...	...	...	...	...	...	...	...	...	...	
517	2014-12-01	95	12	41	6	39	0	16	15	
518	2014-12-08	43	39	31	10	34	3	2	30	
519	2014-12-15	35	7	15	0	0	0	7	7	
520	2014-12-22	30	23	8	0	11	4	1	9	
521	2014-12-29	259	42	49	32	38	15	11	98	

522 rows × 21 columns

Slicing 1 year data all 20 cities...

In [10]:
```python
df1 = df[0:52]
df1
```

Out[10]:

	Date	BUDAPEST	BARANYA	BACS	BEKES	BORSOD	CSONGRAD	FEJER	GYOR	HAJD
0	2005-01-03	168	79	30	173	169	42	136	120	1(
1	2005-01-10	157	60	30	92	200	53	51	70	(
2	2005-01-17	96	44	31	86	93	30	93	84	1(
3	2005-01-24	163	49	43	126	46	39	52	114	1(
4	2005-01-31	122	78	53	87	103	34	95	131	1;
5	2005-02-07	174	76	77	152	189	26	74	181	1!
6	2005-02-14	153	103	54	192	148	65	100	118	1;
7	2005-02-21	115	74	64	174	140	56	111	175	1;
8	2005-02-28	119	86	57	171	90	65	118	105	1!
9	2005-03-07	114	81	129	217	167	64	93	154	1
10	2005-03-14	127	59	81	243	99	81	72	107	1
11	2005-03-21	135	74	51	271	215	48	115	148	1;
12	2005-03-28	116	63	98	119	51	48	51	92	;
13	2005-04-04	132	83	59	130	152	54	78	128	2(
14	2005-04-11	129	53	84	111	103	41	58	91	1;
15	2005-04-18	113	74	62	101	84	66	83	111	1;
16	2005-04-25	114	50	120	126	111	48	77	119	1!
17	2005-05-02	98	66	81	86	48	40	59	131	1
18	2005-05-09	140	81	103	116	129	51	89	146	(
19	2005-05-16	120	46	86	94	135	25	93	123	(
20	2005-05-23	173	99	125	139	84	37	84	122	2!
21	2005-05-30	135	62	145	85	93	27	75	123	1;
22	2005-06-06	143	98	129	100	104	48	73	128	(

	Date	BUDAPEST	BARANYA	BACS	BEKES	BORSOD	CSONGRAD	FEJER	GYOR	HAJD
23	2005-06-13	139	30	94	54	61	30	56	79	16
24	2005-06-20	155	56	94	56	147	24	77	93	15
25	2005-06-27	98	40	153	32	85	13	31	62	4
26	2005-07-04	87	18	38	26	69	32	33	66	10
27	2005-07-11	110	15	67	13	36	20	24	41	4
28	2005-07-18	70	12	11	12	29	8	13	35	2
29	2005-07-25	43	12	7	10	17	6	13	16	1
30	2005-08-01	37	4	21	1	6	6	9	9	1
31	2005-08-08	30	4	6	8	1	6	1	1	
32	2005-08-15	21	1	1	1	4	3	2	12	
33	2005-08-22	22	0	0	6	5	0	4	8	
34	2005-08-29	15	1	2	1	2	3	1	7	
35	2005-09-05	11	3	9	2	19	3	1	6	
36	2005-09-12	7	1	1	0	1	1	2	2	
37	2005-09-19	12	3	6	5	19	3	0	1	
38	2005-09-26	5	2	3	1	28	1	4	2	
39	2005-10-03	17	4	6	10	34	1	10	1	2
40	2005-10-10	11	3	5	7	60	0	16	5	
41	2005-10-17	27	8	15	7	46	8	25	6	3
42	2005-10-24	23	9	26	19	60	18	25	8	3
43	2005-10-31	30	15	33	4	12	12	30	18	2
44	2005-11-07	48	12	35	11	100	19	13	20	2
45	2005-11-14	37	21	58	5	51	9	18	19	1

	Date	BUDAPEST	BARANYA	BACS	BEKES	BORSOD	CSONGRAD	FEJER	GYOR	HAJD
46	2005-11-21	32	9	36	14	45	24	15	27	
47	2005-11-28	49	13	65	13	81	16	28	27	
48	2005-12-05	67	28	40	4	40	28	22	34	
49	2005-12-12	106	32	77	6	91	37	30	38	
50	2005-12-19	83	24	44	17	75	9	17	25	
51	2005-12-26	114	33	21	8	50	3	18	35	

52 rows × 21 columns

Create Head and Tail(First and last 5 rows)

In [11]:
```
df.head()
```

Out[11]:

	Date	BUDAPEST	BARANYA	BACS	BEKES	BORSOD	CSONGRAD	FEJER	GYOR	HAJDU
0	2005-01-03	168	79	30	173	169	42	136	120	162
1	2005-01-10	157	60	30	92	200	53	51	70	84
2	2005-01-17	96	44	31	86	93	30	93	84	191
3	2005-01-24	163	49	43	126	46	39	52	114	107
4	2005-01-31	122	78	53	87	103	34	95	131	172

5 rows × 21 columns

Last 5 values.

In [12]: `df.tail()`

Out[12]:

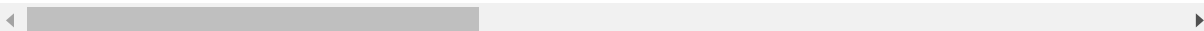|	Date	BUDAPEST	BARANYA	BACS	BEKES	BORSOD	CSONGRAD	FEJER	GYOR	HAJ
517	2014-12-01	95	12	41	6	39	0	16	15	
518	2014-12-08	43	39	31	10	34	3	2	30	
519	2014-12-15	35	7	15	0	0	0	7	7	
520	2014-12-22	30	23	8	0	11	4	1	9	
521	2014-12-29	259	42	49	32	38	15	11	98	

5 rows × 21 columns

Displaying Statistical Information

In [13]:
```
des = df1.describe()
des
```

Out[13]:

	BUDAPEST	BARANYA	BACS	BEKES	BORSOD	CSONGRAD	FEJER	
count	52.000000	52.000000	52.000000	52.000000	52.000000	52.000000	52.000000	5
mean	87.730769	39.442308	53.192308	68.153846	77.442308	27.519231	47.461538	6
std	53.436829	32.327620	41.629570	73.062258	55.631284	21.743144	38.144442	5
min	5.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	
25%	31.500000	9.000000	19.500000	7.000000	35.500000	7.500000	14.500000	1
50%	102.000000	32.500000	47.500000	29.000000	72.000000	25.500000	32.000000	6
75%	129.750000	68.000000	81.000000	116.750000	103.250000	43.500000	77.250000	11
max	174.000000	103.000000	153.000000	271.000000	215.000000	81.000000	136.000000	18

In [14]:
```
col = df.columns
col
```

Out[14]:
```
Index(['Date', 'BUDAPEST', 'BARANYA', 'BACS', 'BEKES', 'BORSOD', 'CSONGRAD',
       'FEJER', 'GYOR', 'HAJDU', 'HEVES', 'JASZ', 'KOMAROM', 'NOGRAD', 'PES
T',
       'SOMOGY', 'SZABOLCS', 'TOLNA', 'VAS', 'VESZPREM', 'ZALA'],
      dtype='object')
```

```
In [15]: col_data = df1[['BUDAPEST', 'BARANYA', 'BACS', 'BEKES', 'BORSOD', 'CSONGRAD',
                'FEJER', 'GYOR', 'HAJDU', 'HEVES', 'JASZ', 'KOMAROM', 'NOGRAD', 'PEST',
                'SOMOGY', 'SZABOLCS', 'TOLNA', 'VAS', 'VESZPREM', 'ZALA']]
         col_data
```

Out[15]:

	BUDAPEST	BARANYA	BACS	BEKES	BORSOD	CSONGRAD	FEJER	GYOR	HAJDU	HE
0	168	79	30	173	169	42	136	120	162	
1	157	60	30	92	200	53	51	70	84	
2	96	44	31	86	93	30	93	84	191	
3	163	49	43	126	46	39	52	114	107	
4	122	78	53	87	103	34	95	131	172	
5	174	76	77	152	189	26	74	181	157	
6	153	103	54	192	148	65	100	118	129	
7	115	74	64	174	140	56	111	175	138	
8	119	86	57	171	90	65	118	105	194	
9	114	81	129	217	167	64	93	154	119	
10	127	59	81	243	99	81	72	107	117	
11	135	74	51	271	215	48	115	148	171	
12	116	63	98	119	51	48	51	92	76	
13	132	83	59	130	152	54	78	128	207	
14	129	53	84	111	103	41	58	91	123	
15	113	74	62	101	84	66	83	111	134	
16	114	50	120	126	111	48	77	119	157	
17	98	66	81	86	48	40	59	131	111	
18	140	81	103	116	129	51	89	146	65	
19	120	46	86	94	135	25	93	123	99	
20	173	99	125	139	84	37	84	122	252	
21	135	62	145	85	93	27	75	123	135	
22	143	98	129	100	104	48	73	128	95	
23	139	30	94	54	61	30	56	79	161	
24	155	56	94	56	147	24	77	93	150	
25	98	40	153	32	85	13	31	62	40	
26	87	18	38	26	69	32	33	66	106	
27	110	15	67	13	36	20	24	41	49	
28	70	12	11	12	29	8	13	35	28	
29	43	12	7	10	17	6	13	16	18	
30	37	4	21	1	6	6	9	9	18	
31	30	4	6	8	1	6	1	1	5	
32	21	1	1	1	4	3	2	12	8	
33	22	0	0	6	5	0	4	8	3	
34	15	1	2	1	2	3	1	7	6	

	BUDAPEST	BARANYA	BACS	BEKES	BORSOD	CSONGRAD	FEJER	GYOR	HAJDU	HEV
35	11	3	9	2	19	3	1	6	1	
36	7	1	1	0	1	1	2	2	5	
37	12	3	6	5	19	3	0	1	5	
38	5	2	3	1	28	1	4	2	3	
39	17	4	6	10	34	1	10	1	21	
40	11	3	5	7	60	0	16	5	5	
41	27	8	15	7	46	8	25	6	32	
42	23	9	26	19	60	18	25	8	36	
43	30	15	33	4	12	12	30	18	20	
44	48	12	35	11	100	19	13	20	25	
45	37	21	58	5	51	9	18	19	14	
46	32	9	36	14	45	24	15	27	12	
47	49	13	65	13	81	16	28	27	27	
48	67	28	40	4	40	28	22	34	27	
49	106	32	77	6	91	37	30	38	11	
50	83	24	44	17	75	9	17	25	36	
51	114	33	21	8	50	3	18	35	55	

In [16]:
```python
proj = col_data
proj
```

Out[16]:

	BUDAPEST	BARANYA	BACS	BEKES	BORSOD	CSONGRAD	FEJER	GYOR	HAJDU	HEV
0	168	79	30	173	169	42	136	120	162	
1	157	60	30	92	200	53	51	70	84	
2	96	44	31	86	93	30	93	84	191	
3	163	49	43	126	46	39	52	114	107	
4	122	78	53	87	103	34	95	131	172	
5	174	76	77	152	189	26	74	181	157	
6	153	103	54	192	148	65	100	118	129	
7	115	74	64	174	140	56	111	175	138	
8	119	86	57	171	90	65	118	105	194	
9	114	81	129	217	167	64	93	154	119	
10	127	59	81	243	99	81	72	107	117	
11	135	74	51	271	215	48	115	148	171	
12	116	63	98	119	51	48	51	92	76	
13	132	83	59	130	152	54	78	128	207	
14	129	53	84	111	103	41	58	91	123	
15	113	74	62	101	84	66	83	111	134	
16	114	50	120	126	111	48	77	119	157	
17	98	66	81	86	48	40	59	131	111	
18	140	81	103	116	129	51	89	146	65	
19	120	46	86	94	135	25	93	123	99	
20	173	99	125	139	84	37	84	122	252	
21	135	62	145	85	93	27	75	123	135	
22	143	98	129	100	104	48	73	128	95	
23	139	30	94	54	61	30	56	79	161	
24	155	56	94	56	147	24	77	93	150	
25	98	40	153	32	85	13	31	62	40	
26	87	18	38	26	69	32	33	66	106	
27	110	15	67	13	36	20	24	41	49	
28	70	12	11	12	29	8	13	35	28	
29	43	12	7	10	17	6	13	16	18	
30	37	4	21	1	6	6	9	9	18	
31	30	4	6	8	1	6	1	1	5	
32	21	1	1	1	4	3	2	12	8	
33	22	0	0	6	5	0	4	8	3	
34	15	1	2	1	2	3	1	7	6	

	BUDAPEST	BARANYA	BACS	BEKES	BORSOD	CSONGRAD	FEJER	GYOR	HAJDU	HE
35	11	3	9	2	19	3	1	6	1	
36	7	1	1	0	1	1	2	2	5	
37	12	3	6	5	19	3	0	1	5	
38	5	2	3	1	28	1	4	2	3	
39	17	4	6	10	34	1	10	1	21	
40	11	3	5	7	60	0	16	5	5	
41	27	8	15	7	46	8	25	6	32	
42	23	9	26	19	60	18	25	8	36	
43	30	15	33	4	12	12	30	18	20	
44	48	12	35	11	100	19	13	20	25	
45	37	21	58	5	51	9	18	19	14	
46	32	9	36	14	45	24	15	27	12	
47	49	13	65	13	81	16	28	27	27	
48	67	28	40	4	40	28	22	34	27	
49	106	32	77	6	91	37	30	38	11	
50	83	24	44	17	75	9	17	25	36	
51	114	33	21	8	50	3	18	35	55	

Maximum Patient in all 20 Cities.

```
In [17]: max_value = proj.max()
         max_value
```

```
Out[17]: BUDAPEST     174
         BARANYA      103
         BACS         153
         BEKES        271
         BORSOD       215
         CSONGRAD      81
         FEJER        136
         GYOR         181
         HAJDU        252
         HEVES        104
         JASZ         224
         KOMAROM      146
         NOGRAD        55
         PEST         178
         SOMOGY       116
         SZABOLCS     203
         TOLNA         77
         VAS          111
         VESZPREM     153
         ZALA          70
         dtype: int64
```

```
In [18]: column = df1[['Date','BUDAPEST', 'BARANYA', 'BACS', 'BEKES', 'BORSOD', 'CSONGR
         AD',
                 'FEJER', 'GYOR', 'HAJDU', 'HEVES', 'JASZ', 'KOMAROM', 'NOGRAD', 'PEST',
                 'SOMOGY', 'SZABOLCS', 'TOLNA', 'VAS', 'VESZPREM', 'ZALA']]
         column
```

Out[18]:

	Date	BUDAPEST	BARANYA	BACS	BEKES	BORSOD	CSONGRAD	FEJER	GYOR	HAJD
0	2005-01-03	168	79	30	173	169	42	136	120	16
1	2005-01-10	157	60	30	92	200	53	51	70	8
2	2005-01-17	96	44	31	86	93	30	93	84	19
3	2005-01-24	163	49	43	126	46	39	52	114	10
4	2005-01-31	122	78	53	87	103	34	95	131	17
5	2005-02-07	174	76	77	152	189	26	74	181	15
6	2005-02-14	153	103	54	192	148	65	100	118	12
7	2005-02-21	115	74	64	174	140	56	111	175	13
8	2005-02-28	119	86	57	171	90	65	118	105	19
9	2005-03-07	114	81	129	217	167	64	93	154	11
10	2005-03-14	127	59	81	243	99	81	72	107	11
11	2005-03-21	135	74	51	271	215	48	115	148	17
12	2005-03-28	116	63	98	119	51	48	51	92	7
13	2005-04-04	132	83	59	130	152	54	78	128	20
14	2005-04-11	129	53	84	111	103	41	58	91	12
15	2005-04-18	113	74	62	101	84	66	83	111	13
16	2005-04-25	114	50	120	126	111	48	77	119	15
17	2005-05-02	98	66	81	86	48	40	59	131	1
18	2005-05-09	140	81	103	116	129	51	89	146	6
19	2005-05-16	120	46	86	94	135	25	93	123	9
20	2005-05-23	173	99	125	139	84	37	84	122	25
21	2005-05-30	135	62	145	85	93	27	75	123	13
22	2005-06-06	143	98	129	100	104	48	73	128	9

	Date	BUDAPEST	BARANYA	BACS	BEKES	BORSOD	CSONGRAD	FEJER	GYOR	HAJD
23	2005-06-13	139	30	94	54	61	30	56	79	16
24	2005-06-20	155	56	94	56	147	24	77	93	1!
25	2005-06-27	98	40	153	32	85	13	31	62	∠
26	2005-07-04	87	18	38	26	69	32	33	66	10
27	2005-07-11	110	15	67	13	36	20	24	41	∠
28	2005-07-18	70	12	11	12	29	8	13	35	2
29	2005-07-25	43	12	7	10	17	6	13	16	′
30	2005-08-01	37	4	21	1	6	6	9	9	′
31	2005-08-08	30	4	6	8	1	6	1	1	
32	2005-08-15	21	1	1	1	4	3	2	12	
33	2005-08-22	22	0	0	6	5	0	4	8	
34	2005-08-29	15	1	2	1	2	3	1	7	
35	2005-09-05	11	3	9	2	19	3	1	6	
36	2005-09-12	7	1	1	0	1	1	2	2	
37	2005-09-19	12	3	6	5	19	3	0	1	
38	2005-09-26	5	2	3	1	28	1	4	2	
39	2005-10-03	17	4	6	10	34	1	10	1	2
40	2005-10-10	11	3	5	7	60	0	16	5	
41	2005-10-17	27	8	15	7	46	8	25	6	3
42	2005-10-24	23	9	26	19	60	18	25	8	3
43	2005-10-31	30	15	33	4	12	12	30	18	2
44	2005-11-07	48	12	35	11	100	19	13	20	2
45	2005-11-14	37	21	58	5	51	9	18	19	′

	Date	BUDAPEST	BARANYA	BACS	BEKES	BORSOD	CSONGRAD	FEJER	GYOR	HAJD
46	2005-11-21	32	9	36	14	45	24	15	27	
47	2005-11-28	49	13	65	13	81	16	28	27	
48	2005-12-05	67	28	40	4	40	28	22	34	
49	2005-12-12	106	32	77	6	91	37	30	38	
50	2005-12-19	83	24	44	17	75	9	17	25	
51	2005-12-26	114	33	21	8	50	3	18	35	

52 rows × 21 columns

In [ ]:

In [19]:
```python
max_value.plot(kind='bar',color='red', figsize=(15,10))
plt.title("Maximum Patient(in one day)", fontsize=16)
plt.xlabel("Cities", fontsize=16)
plt.ylabel("Max Values", fontsize=16)
plt.show()
```
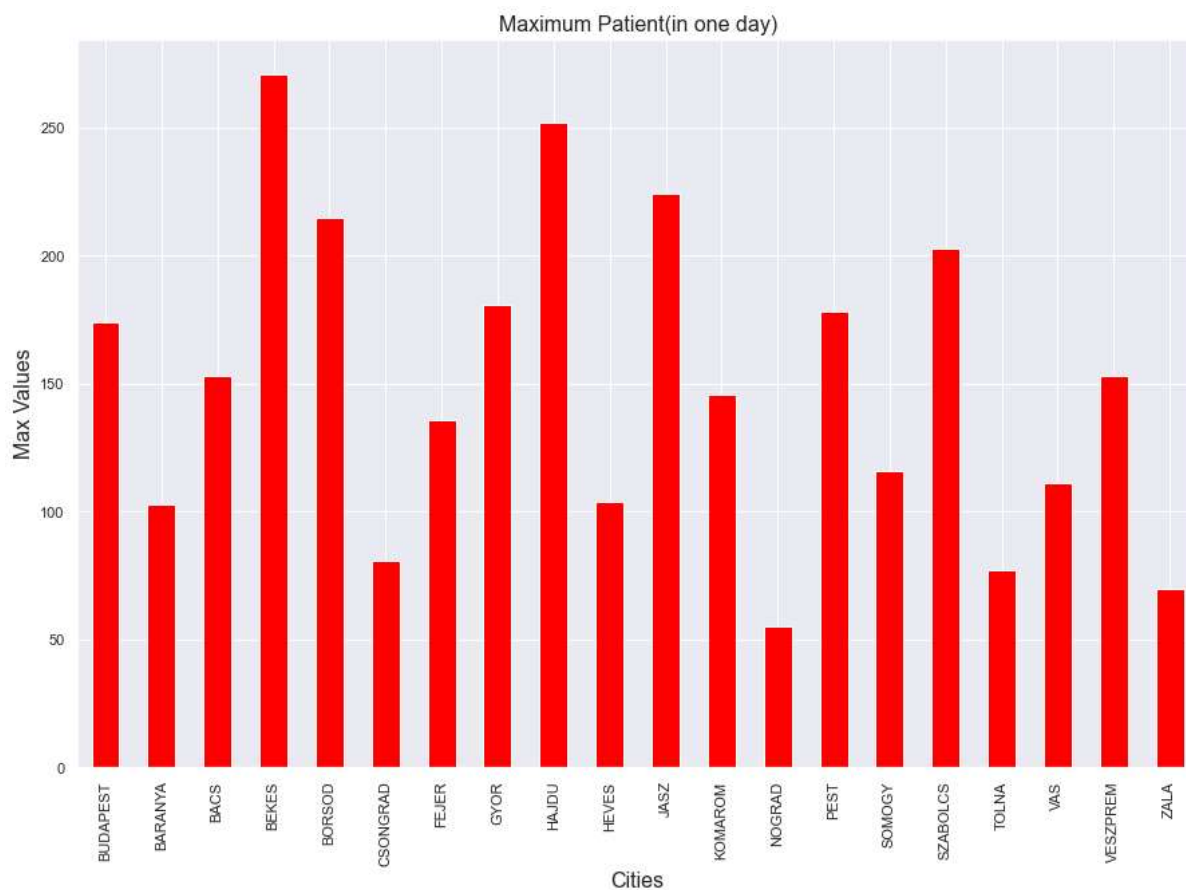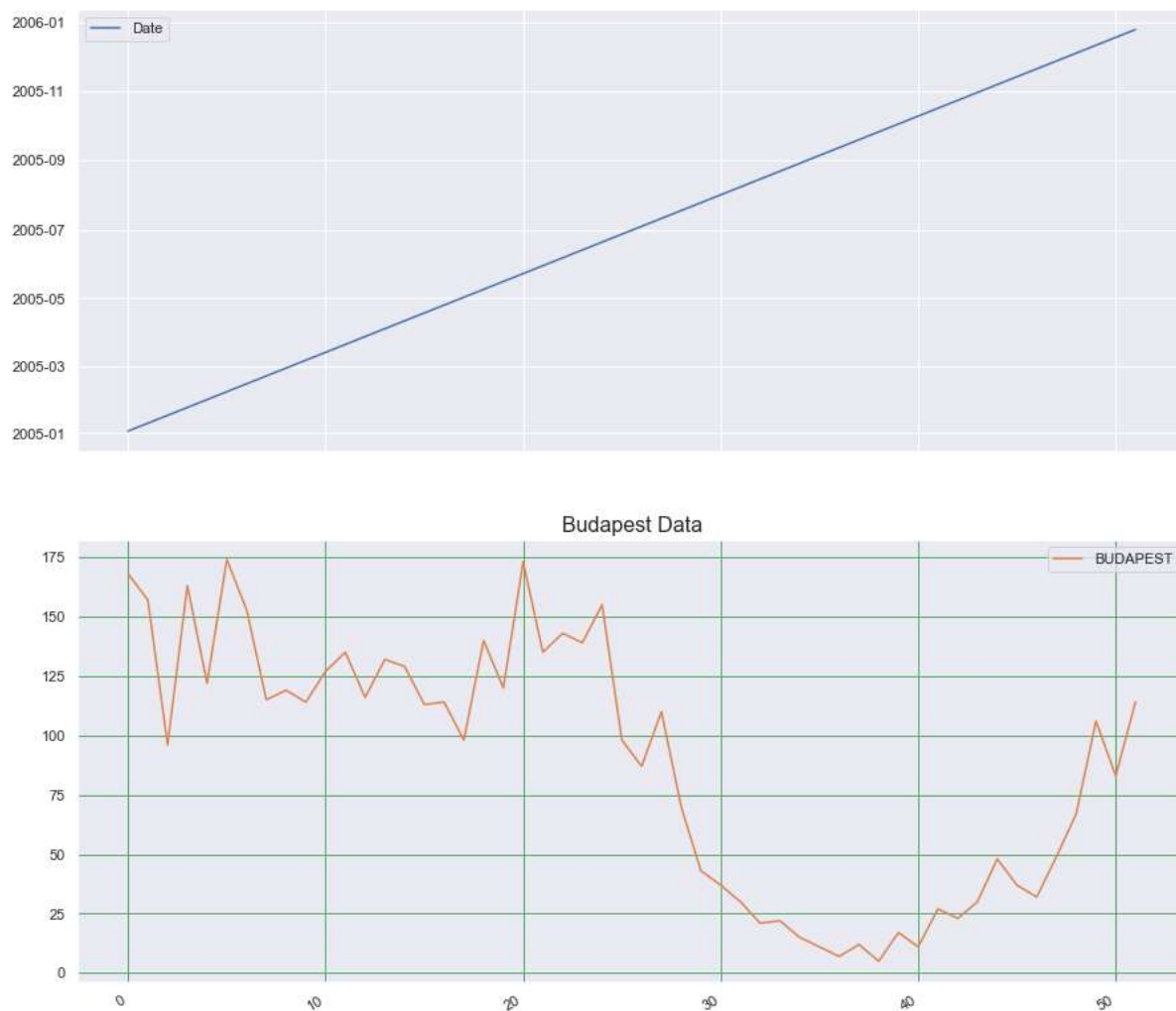
Budapest Data For 1 Year(Line Graph)

In [20]:
```python
bud_data = df1[['Date','BUDAPEST']]
bud_data
```

Out[20]:

	Date	BUDAPEST
0	2005-01-03	168
1	2005-01-10	157
2	2005-01-17	96
3	2005-01-24	163
4	2005-01-31	122
5	2005-02-07	174
6	2005-02-14	153
7	2005-02-21	115
8	2005-02-28	119
9	2005-03-07	114
10	2005-03-14	127
11	2005-03-21	135
12	2005-03-28	116
13	2005-04-04	132
14	2005-04-11	129
15	2005-04-18	113
16	2005-04-25	114
17	2005-05-02	98
18	2005-05-09	140
19	2005-05-16	120
20	2005-05-23	173
21	2005-05-30	135
22	2005-06-06	143
23	2005-06-13	139
24	2005-06-20	155
25	2005-06-27	98
26	2005-07-04	87
27	2005-07-11	110
28	2005-07-18	70
29	2005-07-25	43
30	2005-08-01	37
31	2005-08-08	30
32	2005-08-15	21
33	2005-08-22	22
34	2005-08-29	15

	Date	BUDAPEST
35	2005-09-05	11
36	2005-09-12	7
37	2005-09-19	12
38	2005-09-26	5
39	2005-10-03	17
40	2005-10-10	11
41	2005-10-17	27
42	2005-10-24	23
43	2005-10-31	30
44	2005-11-07	48
45	2005-11-14	37
46	2005-11-21	32
47	2005-11-28	49
48	2005-12-05	67
49	2005-12-12	106
50	2005-12-19	83
51	2005-12-26	114

```
In [21]: bud_data.plot(kind='line', subplots=True, figsize=(15,15))
         plt.title('Budapest Data', fontsize=16)
         plt.grid(True, color='g')
         plt.show()
```

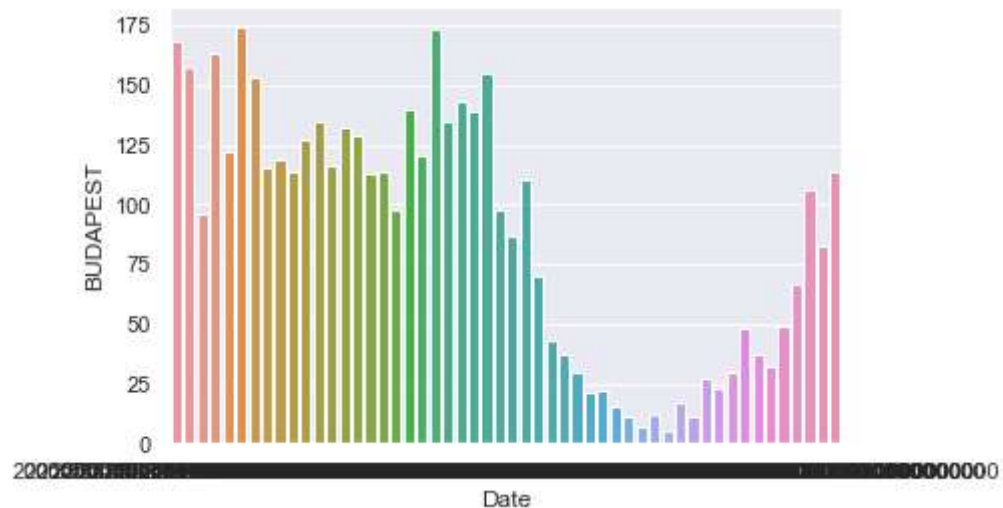

Budapest Data For 1 Year(Seaborn)

```
In [24]: sns.barplot(column['Date'], column['BUDAPEST'])
         sns['figure.figsize'] = 15.15, 18.27
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
<ipython-input-24-e4b754a9cdbc> in <module>
      1 sns.barplot(column['Date'], column['BUDAPEST'])
----> 2 sns['figure.figsize'] = 15.15, 18.27

TypeError: 'module' object does not support item assignment
```


Total No. Of Patient In One Year
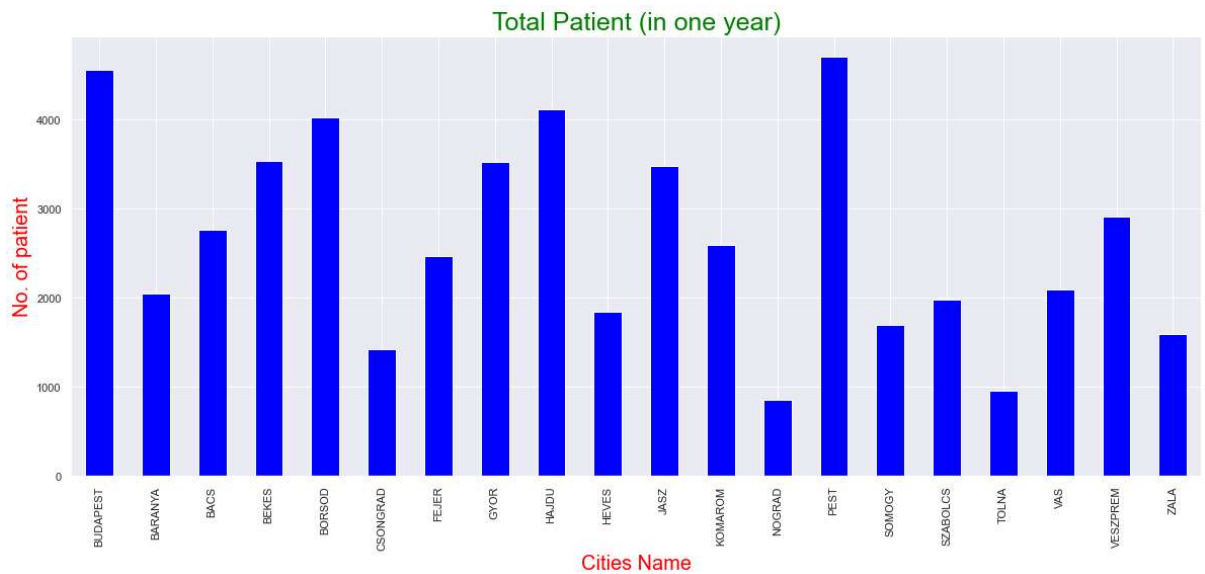
```
In [25]: total = proj.sum()
         total
```

```
Out[25]: BUDAPEST     4562
         BARANYA      2051
         BACS         2766
         BEKES        3544
         BORSOD       4027
         CSONGRAD     1431
         FEJER        2468
         GYOR         3524
         HAJDU        4122
         HEVES        1841
         JASZ         3486
         KOMAROM      2591
         NOGRAD        852
         PEST         4707
         SOMOGY       1694
         SZABOLCS     1986
         TOLNA         955
         VAS          2099
         VESZPREM     2916
         ZALA         1591
         dtype: int64
```

In [26]:
```python
total.plot(kind='bar', subplots=True, figsize=(20,8), color='blue')
plt.title('Total Patient (in one year)', fontsize=25, color='green')
plt.xlabel('Cities Name', fontsize = 20, color='red')
plt.ylabel('No. of patient', fontsize = 20, color='red')
plt.show()
```


Thank You...