

Project1

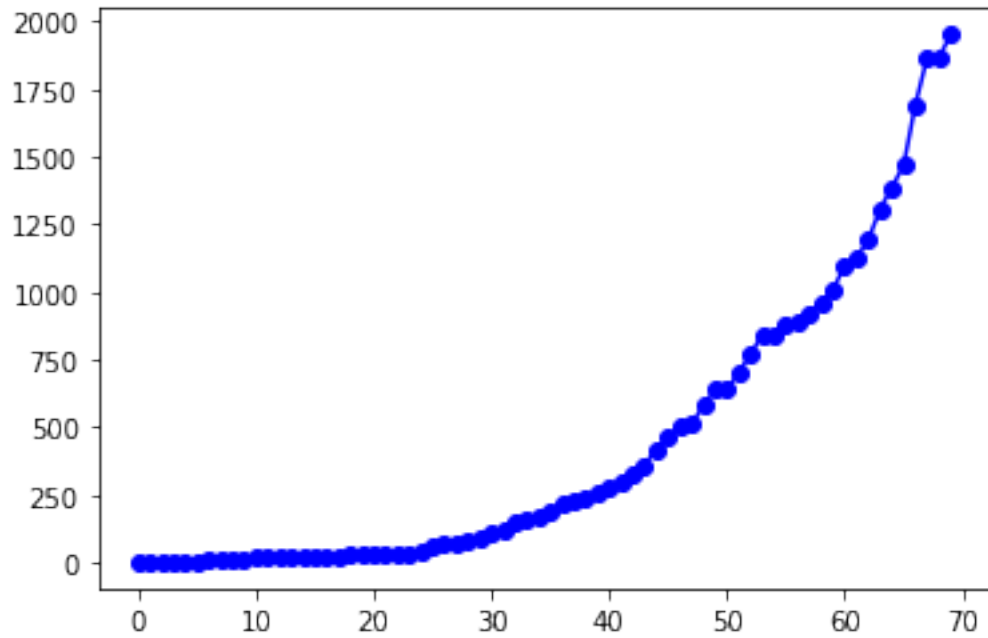
April 2, 2020

```
[6]: import numpy as np
x = np.array([2,2,2,2,4,4,7,7,11,15,20,20,20,22,22,22,25,25,
              26,26,26,28,28,29,43,59,66,74,84,94,105,122,
              147,159,170,189,214,228,241,256,274,293,331,
              360,420,461,502,511,581,639,639,701,773,839,
              839,878,889,924,963,1007,1101,1128,1193,1307,
              1387,1468,1693,1866,1866,1953])
d = x[1:] - x[:-1]
```

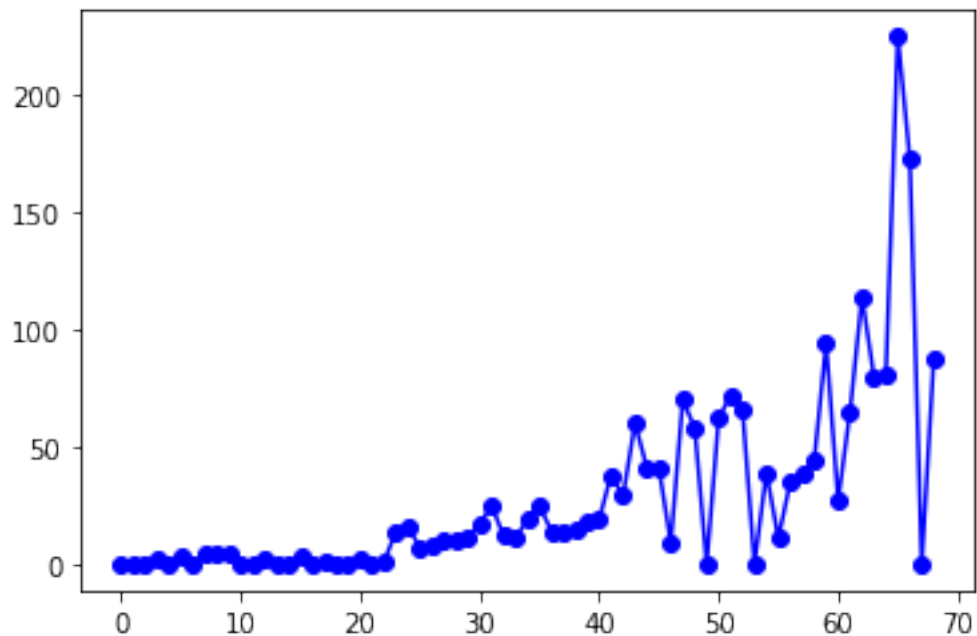
```
[7]: print(x)
      print(d)
```

```
[  2   2   2   2   4   4   7   7  11  15  20  20  20  22
  22  22  25  25  26  26  26  28  28  29  43  59  66  74
  84  94 105 122 147 159 170 189 214 228 241 256 274 293
 331 360 420 461 502 511 581 639 639 701 773 839 839 878
 889 924 963 1007 1101 1128 1193 1307 1387 1468 1693 1866 1866 1953]
[  0  0  0  2  0  3  0  4  4  5  0  0  2  0  0  3  0  1
  0  0  2  0  1 14 16  7  8 10 10 11 17 25 12 11 19 25
 14 13 15 18 19 38 29 60 41 41  9 70 58  0 62 72 66  0
 39 11 35 39 44 94 27 65 114 80 81 225 173  0 87]
```

```
[10]: /*Plot x as a time series*/
import matplotlib.pyplot as plt
plt.ion()
x1 = np.ndarray.tolist(x);
plt.plot(x1, '-bo')
plt.savefig('x.pdf', format = 'pdf')
plt.show()
```



```
[11]: /*Plot d as a time series*/
import matplotlib.pyplot as plt
plt.ion()
d1 = np.ndarray.tolist(d);
plt.plot(d1, '-bo')
plt.savefig('d.pdf', format = 'pdf')
plt.show()
```



[]: d represents the growth rate of new coronavirus cases in Japan. Although the line is volatile, the general trendline shows an increase in new coronavirus cases daily.