Assignment06

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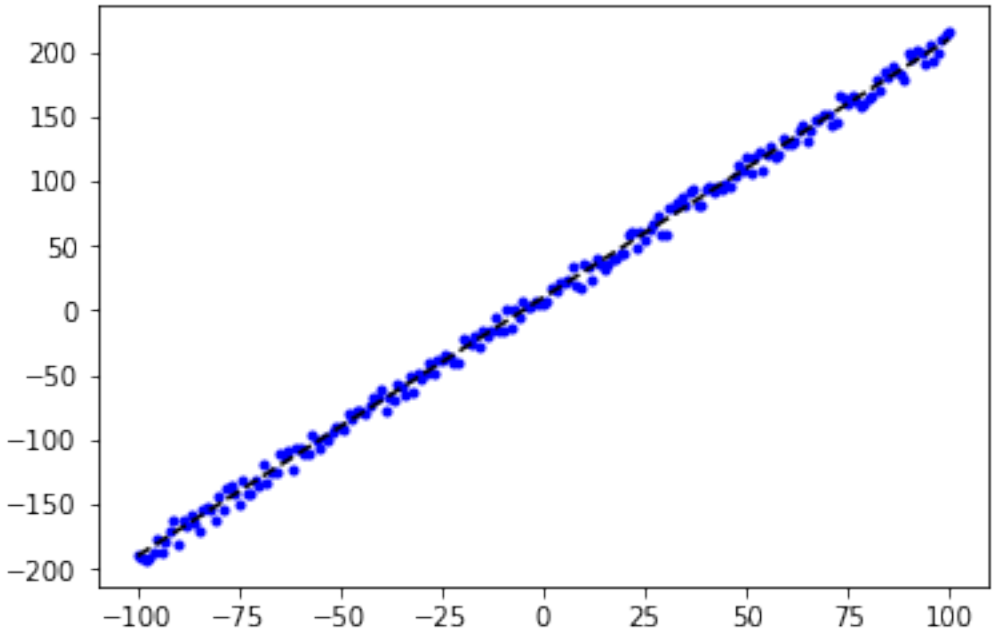
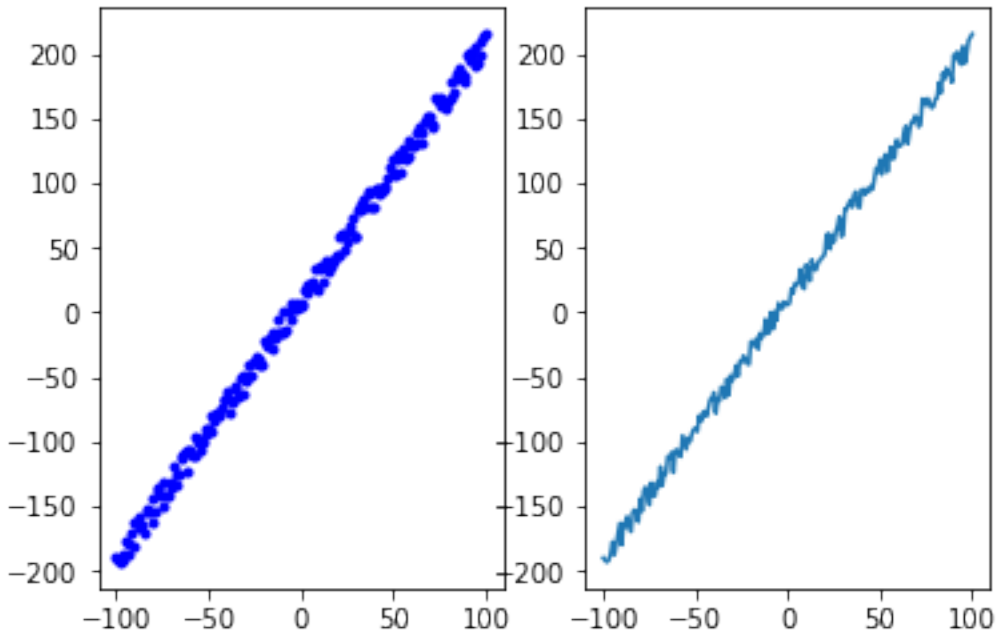
https://github.com/criticaster/assignment06

In [49]:
```
####### assignment06.py #######

import numpy as np
import matplotlib.pyplot as plt

num     = 201
std     = 20
a       = 2
b       = 10

n       = np.random.rand(num)
nn      = n - np.mean(n)
x       = np.linspace(-100,100,num)
y1      = a * x + nn * std + b
y2      = a * x + b

plt.plot(x, y1, 'b.', x, y2, 'k--')
plt.show()

# x  : x-coordinate data
# y1 : (noisy) y-coordinate data
# y2 : (clean) y-coordinate data
# y = f(x) = a * x + b
```



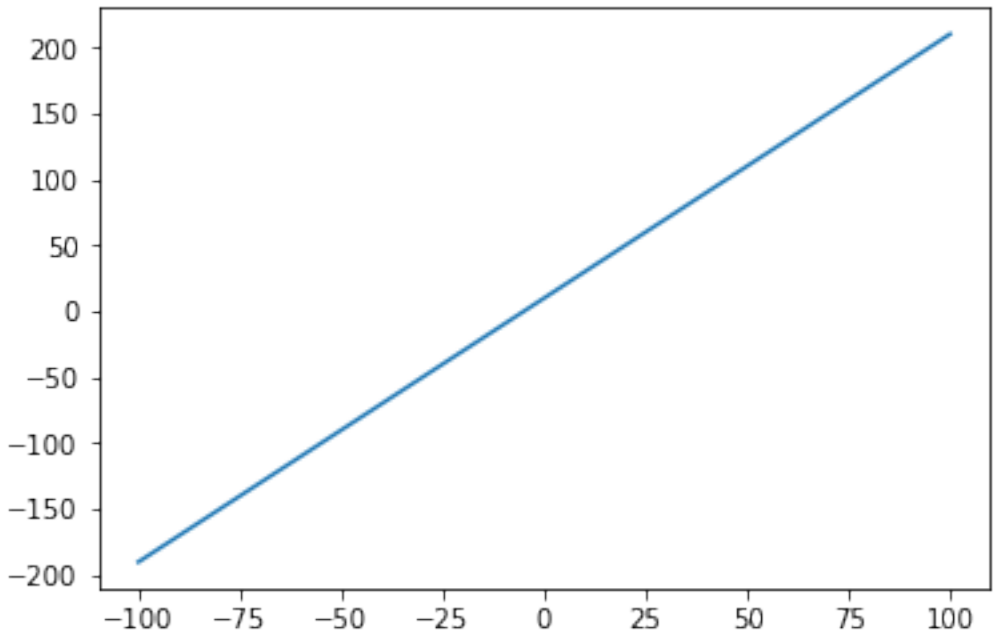
Plot the noise data

```
In [50]: ### noise data plots ###
         plt.subplot(1,2,1)
         plt.plot(x, y1, 'b.')

         plt.subplot(1,2,2)
         plt.plot(x, y1)

         plt.show()
```



Plot the clean data

```
In [51]: #### clean data plot #####
         plt.plot(x, y2)
         plt.show()
```



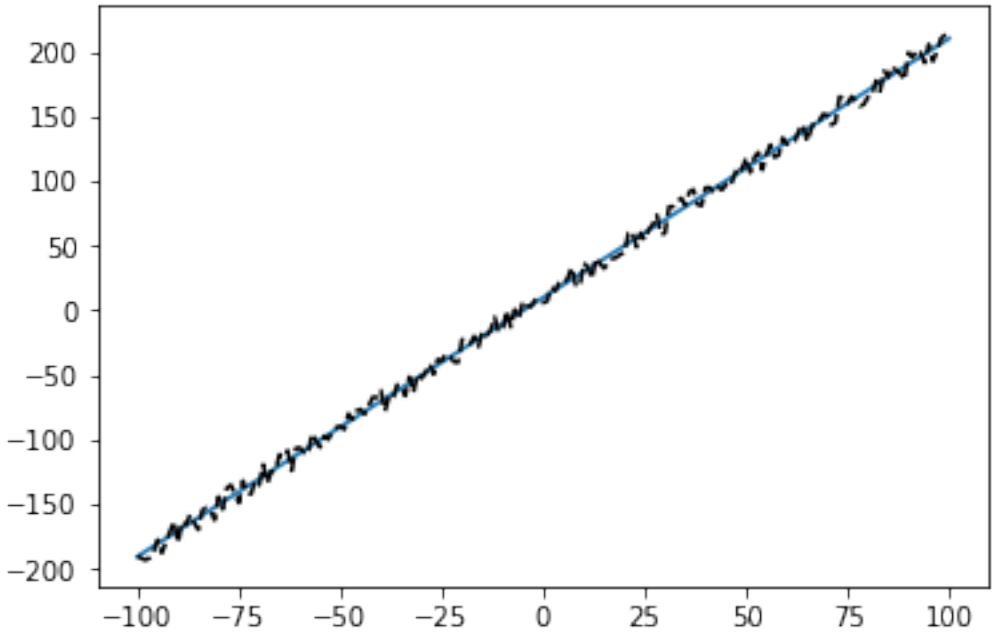
Calculate m, c in m*x + c with noise data set

In [58]:
```
### examing coeffient ###

        A = np.vstack([x, np.ones(len(x))]).T

        ###calculate m, c using np.linalg.lstsq

        m, c = np.linalg.lstsq(A, y1)[0]

        ### print (a,b), (m,c), error ###
        print(a, b)
        print(m, c)
        print("Error:", a - m, b - c)
```

```
2 10
2.0042355022479073 10.000000000000002
Error: -0.004235502247907252 -1.7763568394002505e-15


C:\ProgramData\Anaconda3\lib\site-packages\ipykernel_launcher.py:7: FutureWarning: `rcond` param
To use the future default and silence this warning we advise to pass `rcond=None`, to keep using
  import sys
```

Plot the line that fits the noisy data by the least square error

In [53]:
```
### make fit line with m, c ###

        yy = m*x + c
        plt.plot(x, yy, x, y1, 'k--')
        plt.show()
```


200
150
100
50
0
−50
−100
−150
−200
−100
−75
−50
−25
0
25
50
75
100