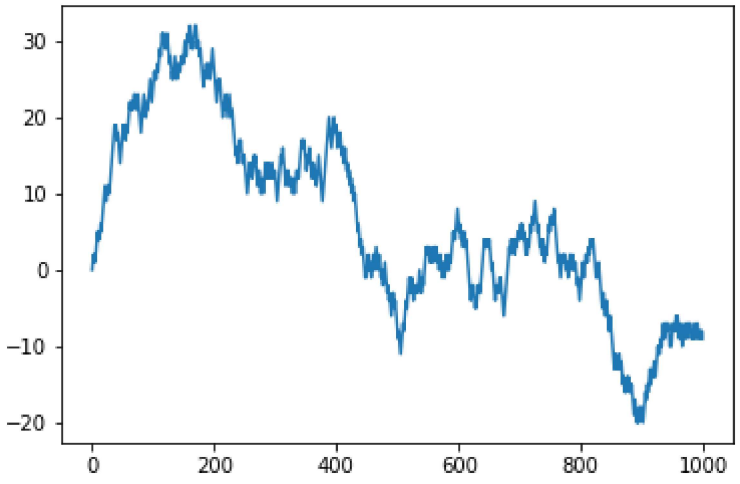
Random walk simulation

In [5]:
```
import matplotlib.pyplot as plt
import random
position = 0
walk = [position]
steps = 1000
for i in range(steps):
    step = 1 if random.randint(0,1) else -1
    position += step
    walk.append(position)
```

In [6]:
```
# current steps from original point
position
```

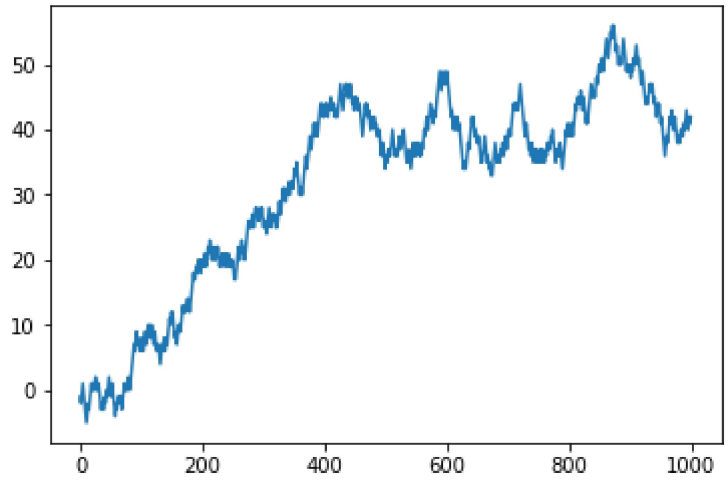
Out[6]: -10

In [8]:
```
# tracks historical positioning
plt.plot(walk[:1000])
plt.show()
```



In [9]:
```
# does the same as above but with the numpy library
import numpy as np
nsteps = 1000
draws = np.random.randint(0,2,size=nsteps)
steps = np.where(draws > 0,1,-1)
walk = steps.cumsum()
```

In [11]:
```
# plots first 100 positions out of 10000
plt.plot(walk[:1000])
plt.show()
```



In [12]:
```
# shows the index in which the walker reached 10 paces away from zero
(np.abs(walk) >= 10).argmax()
```

Out[12]: 111

In [13]:
```
# simulating 10000 walks of 100 steps.
position= 0
nsteps = 100
nwalks = 10000

draws = np.random.randint(0, 2, size=(nwalks,nsteps)) #array of 0 and 1
steps = np.where(draws > 0, 1, -1)
walks = steps.cumsum(1)
```

In [14]:
```
walks
```

Out[14]:
```
array([[  1,   2,   1, ..., -14, -15, -14],
       [  1,   0,   1, ...,  -2,  -1,  -2],
       [ -1,  -2,  -1, ...,  12,  11,  12],
       ...,
       [  1,   0,  -1, ...,  28,  29,  30],
       [  1,   0,   1, ...,   0,  -1,   0],
       [ -1,   0,  -1, ...,  -2,  -1,  -2]], dtype=int32)
```

In [20]:
```
print('Most steps taken backwards across 10,000 walks are ' + str(walks.min
()))
print('Most steps taken forward across 10,000 walks are ' + str(walks.max()))
```

```
Most steps taken backwards across 10,000 walks are -39
Most steps taken forward across 10,000 walks are 46
```