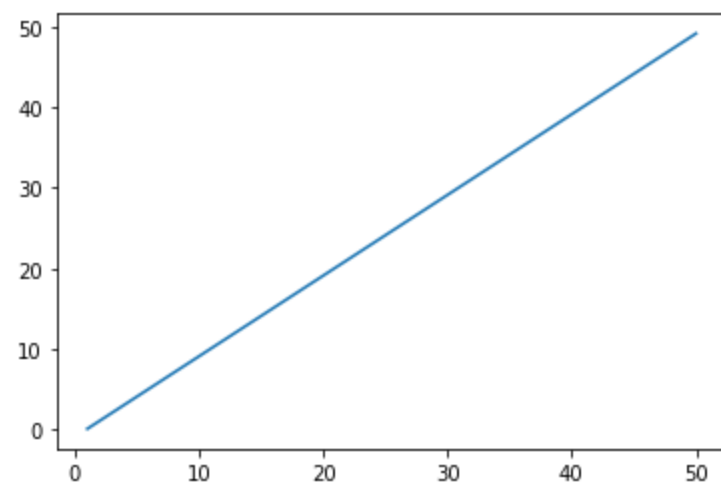


```
In [16]: # Import packages
import matplotlib.pyplot as plt
import numpy as np
from matplotlib.pyplot import figure
from mpl_toolkits.mplot3d import Axes3D
from pprint import pprint
```

```
In [17]: def FTL(T,V):
    zt = -0.5
    FTLloss = 0
    Regret = np.zeros(T)
    for i in range(1, T + 1):
        if (i == 2):
            xt = 1
        elif(i > 2):
            xt = -1*zt
        else:
            xt = np.random.uniform(V[0],V[1])
        if (i != 1 and i%2 == 0):
            zt = 1
        elif (i != 1 and i%2 == 1):
            zt = -1
        if (xt < V[0] or xt > V[1]):
            FTLloss += zt * xt + np.Inf
        else:
            FTLloss += zt * xt
        Regret[i-1] = FTLloss # u = 0, so l_t(u)=0
    return Regret
```

```
In [18]: V = np.array([-1,1])
T = 50
Regret = FTL(T,V)
print(Regret)
xaxis = np.arange(1,T+1)
plt.plot(xaxis,Regret)
plt.show()
```

```
[ 0.11954944  1.11954944  2.11954944  3.11954944  4.11954944  5.11954944
 6.11954944  7.11954944  8.11954944  9.11954944 10.11954944 11.11954944
12.11954944 13.11954944 14.11954944 15.11954944 16.11954944 17.11954944
18.11954944 19.11954944 20.11954944 21.11954944 22.11954944 23.11954944
24.11954944 25.11954944 26.11954944 27.11954944 28.11954944 29.11954944
30.11954944 31.11954944 32.11954944 33.11954944 34.11954944 35.11954944
36.11954944 37.11954944 38.11954944 39.11954944 40.11954944 41.11954944
42.11954944 43.11954944 44.11954944 45.11954944 46.11954944 47.11954944
48.11954944 49.11954944]
```



In this case, Regret is linear, so FTL fail to achieve sublinear Regret.

```
In [ ]:
```