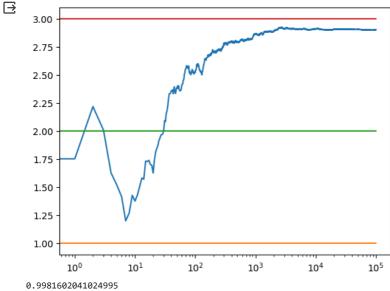
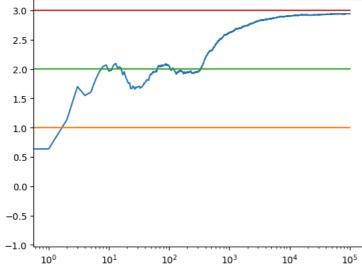
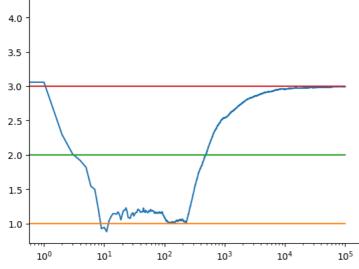
```
!pip install -U future
     Requirement already satisfied: future in /usr/local/lib/python3.10/dist-packages (0.18.3)
       Downloading future-1.0.0-py3-none-any.whl (491 kB)
                                                  - 491.3/491.3 kB 3.5 MB/s eta 0:00:00
     Installing collected packages: future
      Attempting uninstall: future
         Found existing installation: future 0.18.3
         Uninstalling future-0.18.3:
           Successfully uninstalled future-0.18.3
     Successfully installed future-1.0.0
from __future__ import print_function, division
from builtins import range
import numpy as np
import matplotlib.pyplot as plt
class Bandit:
 def __init__(self, m):
   self.m = m
   self.mean = 0
    self.N = 0
 def pull(self):
   return np.random.randn() + self.m
 def update(self, x):
   self.N+=1
    self.mean = (1 - 1.0/self.N)*self.mean + 1.0/self.N*x
def run_experiment (m1, m2, m3, eps, N):
 bandits = [Bandit(m1), Bandit(m2), Bandit (m3)]
 data = np.empty (N)
  for i in range(N):
   # epsilon greedy
    p = np.random.random()
   if p < eps:
     j = np.random.choice(3)
     j = np.argmax([b.mean for b in bandits])
    x = bandits[j].pull()
   bandits[j].update(x)
   # for the plot
   data[i] = x
  cumulative_average = np.cumsum(data)/ (np.arange(N) + 1)
  #plot moving average ctr
  plt.plot(cumulative_average)
 plt.plot(np.ones(N)*m1)
 plt.plot(np.ones(N)*m2)
 plt.plot(np.ones(N)*m3)
 plt.xscale('log')
 plt.show()
 for b in bandits:
   print(b.mean)
  return cumulative_average
if __name__ == '__main__':
 c_1 = run_experiment (1.0, 2.0, 3.0, 0.1, 100000)
  c_05 = run_experiment(1.0, 2.0, 3.0, 0.05, 100000)
  c_01 = run_experiment (1.0, 2.0, 3.0, 0.01, 100000)
 #log scale plot
  plt.plot(c_1, label='eps = 0')
  plt.plot(c_05, label='eps = 0.05')
 plt.plot(c_01, label='eps = 0.1')
 plt.plot(c_05, label='eps = 0.3')
 plt.plot(c_05, label='eps = 0.5')
 plt.legend()
 plt.xscale('log')
 plt.show()
 # linear plot
 plt.plot(c_1, label='eps = 0')
 plt.plot(c_05, label='eps = 0.05')
 plt.plot(c_01, label='eps = 0.1')
 plt.plot(c_05, label='eps = 0.3')
  plt.plot(c_05, label='eps = 0.5')
  plt.legend()
 plt.show()
```



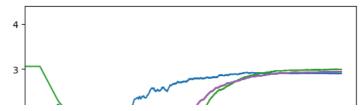
- 1.9805071958369131
- 3.0059925253885087



- 0.9762019180252399 1.9948122285125747
- 2.995546347921556



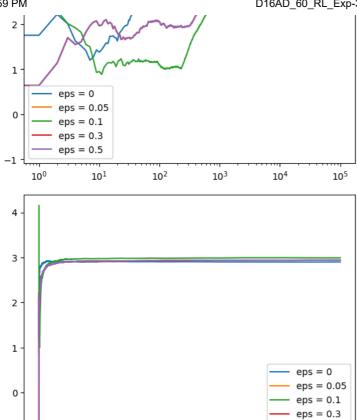
- 1.0087868761035805
- 2.071622153206988
- 3.0059726496172674



eps = 0.5

100000

80000



20000

40000

60000