import numpy as np  
import matplotlib.pyplot as plt  
  
def seqSim(biased, numFlips):  
 seq = []  
 pHeads = 0  
 if biased:  
 pHeads = 0.25  
 else:  
 pHeads = 0.75  
  
 pBiased = 0  
 flips = 0  
 biasProbs = []  
 while (numFlips > 0):  
 r = np.random.rand()  
 if r <= pHeads:  
 seq.append("H")  
 else:  
 seq.append("T")  
 flips += 1  
  
 numH = seq.count("H")  
 numT = seq.count("T")  
  
 pBiased = (np.power(0.75, numT) \* np.power(0.25, numH) \* 0.25)/((np.power(0.75, numT) \* np.power(0.25, numH) + np.power(0.5, flips))/2)  
 biasProbs.append(pBiased)  
 numFlips -= 1  
  
 return(biasProbs)  
  
  
fairSim1 = seqSim(False, 100)  
fairSim2 = seqSim(False, 100)  
fairSim3 = seqSim(False, 100)  
fairSim4 = seqSim(False, 100)  
fairSim5 = seqSim(False, 100)  
  
biasSim1 = seqSim(True, 100)  
biasSim2 = seqSim(True, 100)  
biasSim3 = seqSim(True, 100)  
biasSim4 = seqSim(True, 100)  
biasSim5 = seqSim(True, 100)  
  
x = range(100)  
plt.figure()  
plt.plot(x, fairSim1)  
plt.plot(x, fairSim2)  
plt.plot(x, fairSim3)  
plt.plot(x, fairSim4)  
plt.plot(x, fairSim5)  
plt.xlabel('Number of Flips')  
plt.ylabel('Probability of Biased Coin Picked')  
plt.title('Probability of Biased Coin Picked using a Fair Coin')  
plt.show()  
  
plt.figure()  
plt.plot(x, biasSim1)  
plt.plot(x, biasSim2)  
plt.plot(x, biasSim3)  
plt.plot(x, biasSim4)  
plt.plot(x, biasSim5)  
plt.xlabel('Number of Flips')  
plt.ylabel('Probability of Biased Coin Picked')  
plt.title('Probability of Biased Coin Picked using a Biased Coin')  
plt.show()

A picture containing chart

Description automatically generatedChart

Description automatically generated with medium confidence