Lab 1 Shuhan Xu

1.3.1

Function 2 is correct.

1.3.2

Function 1 and 3 are wrong because the state with the lowest energy should have the highest probability.

Function 4 gives the same plot as function 2 but adding 10 to E is completely unnecessary.

Function 5 is similar to function 2 but subtracting 10 from temperature give slightly incorrect distribution.

1.3.2

The random sampler does not exactly agree at high temperature. At high temperature, the probabilities of the different states are very similar to one another. Hence, random sampling error is more pronounced.

1.4.1

State transition should not depend on whether the new is a prime number or not. It should depend on whether the new state has favourable energy compared to the old state.

1.4.2

def MyRule(current\_state, new\_state):

if energies[new\_state] - energies[current\_state] < 0:

return(True)

else:

chance = np.random.rand()

if(chance>(5.0/6.0)):

return(True)

else:

return(False)

1.4.3

def MyBetterRule(current\_state, new\_state):

if predictedDistribution[new\_state] / predictedDistribution[current\_state] > np.random.rand():

return(True)

else:

return(False)