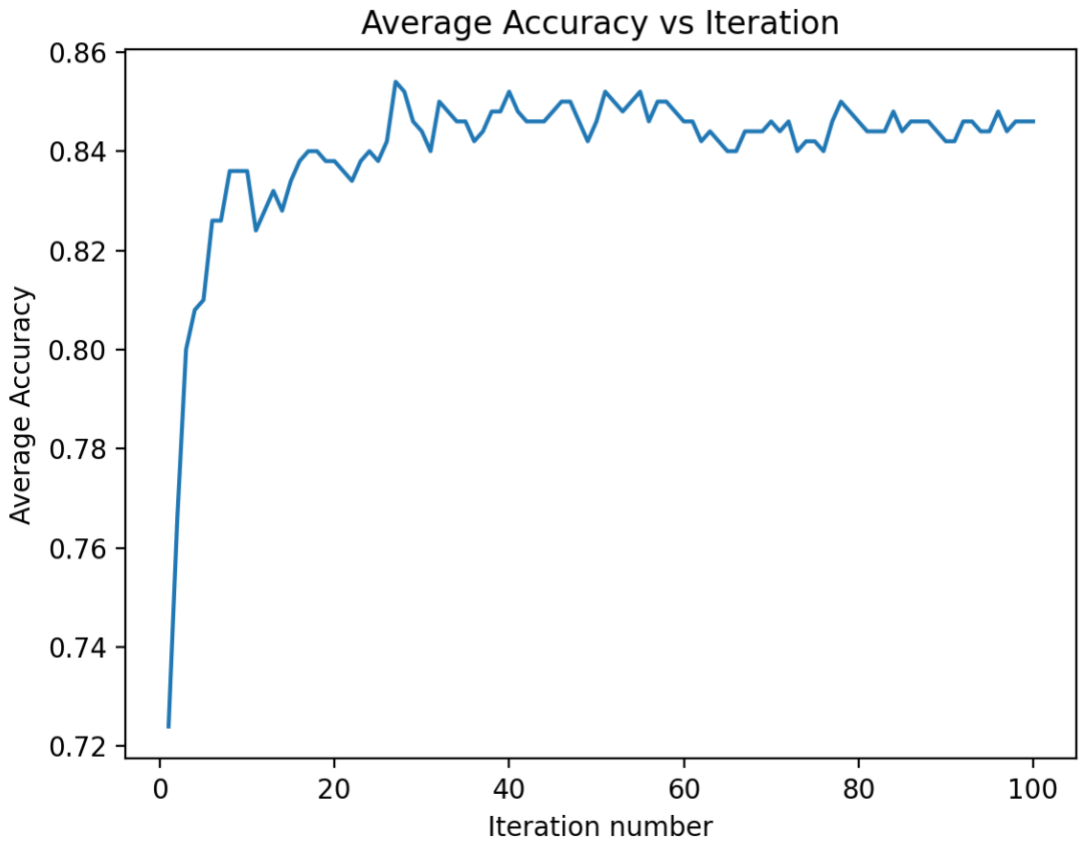
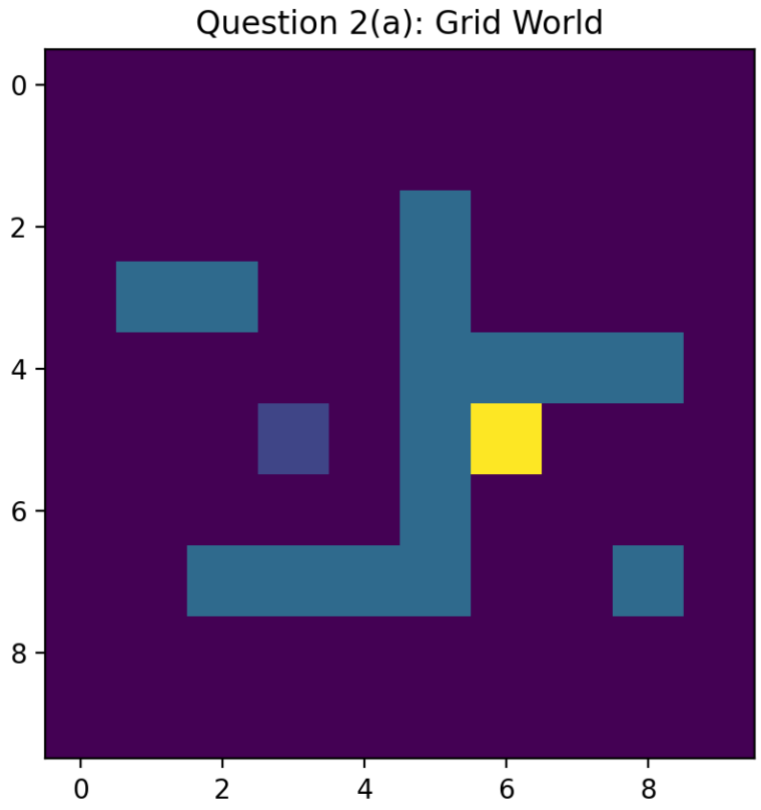
Question 1:

Part (g):

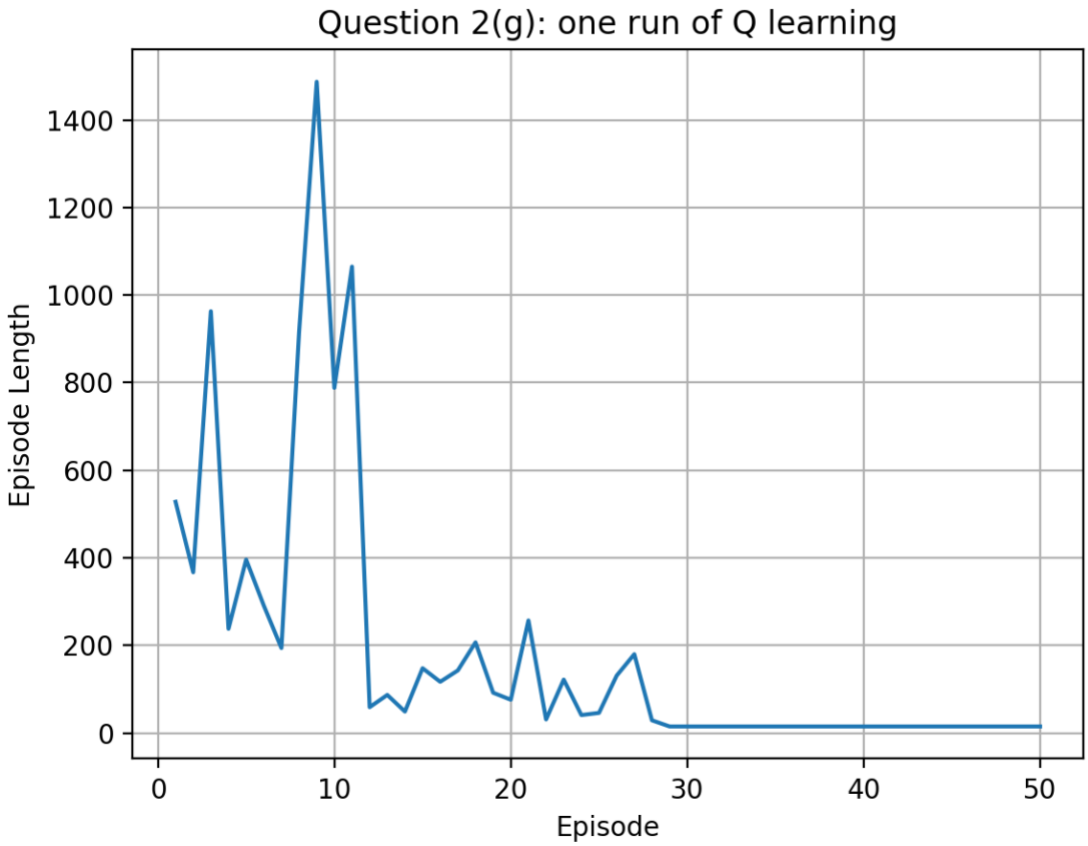


Question 2:

Part (a):



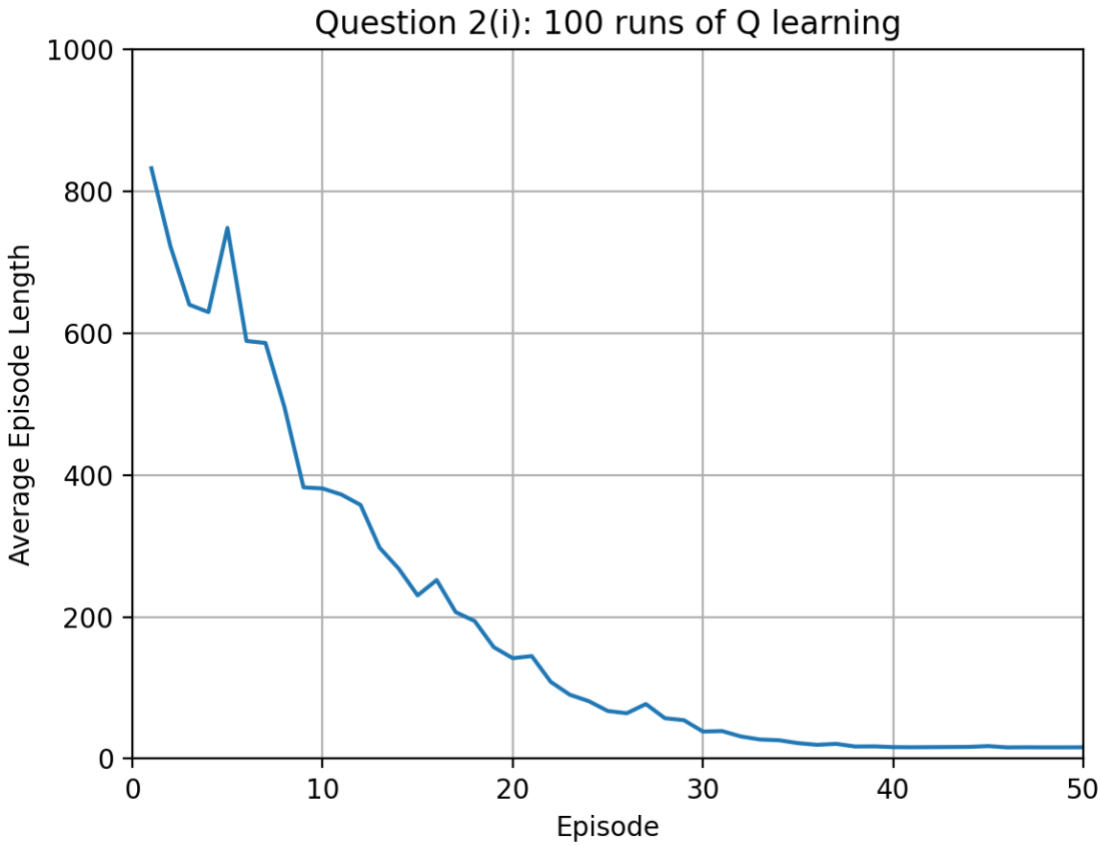
Part (g):


Question 2(g): one run of Q learning
Episode Length
Episode
0
200
400
600
800
1000
1200
1400
0
10
20
30
40
50

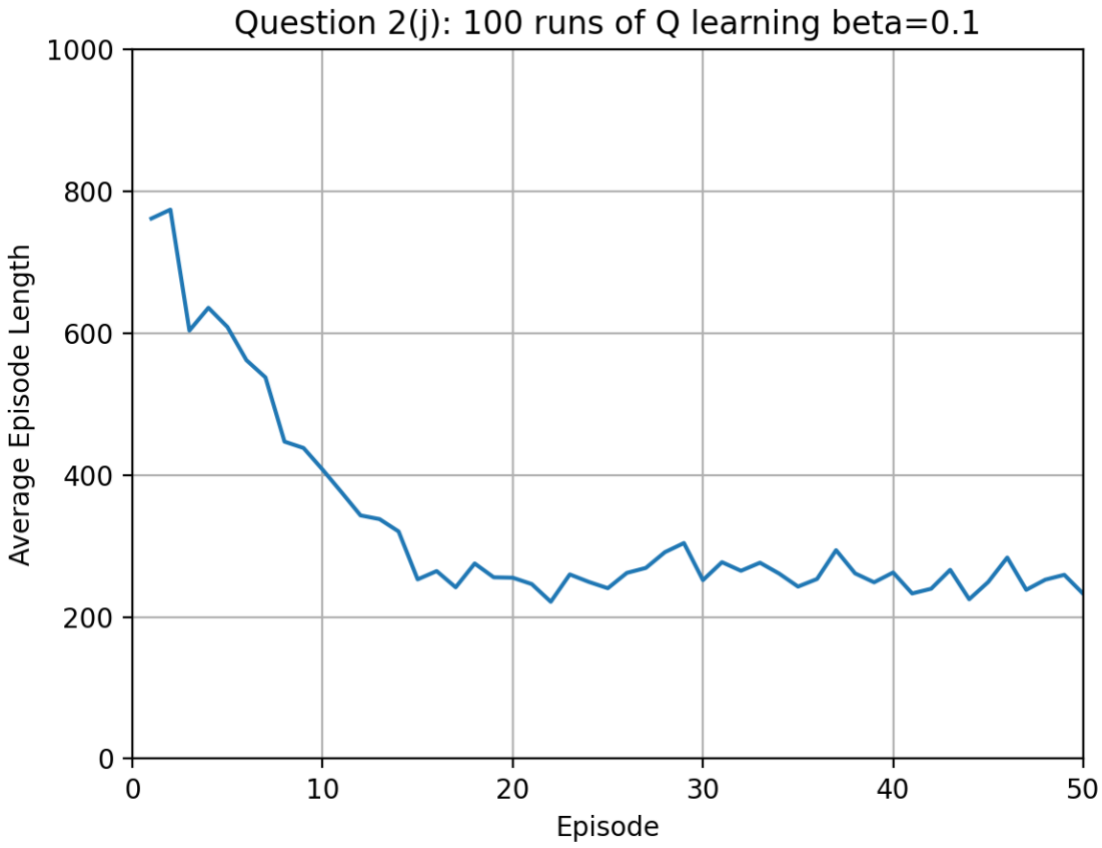
Part (h):

Question 2(h): one run of Q learning with beta=0
Episode Length
Episode
0
500
1000
1500
2000
2500
3000
3500
0
10
20
30
40
50

Part (i):


Question 2(i): 100 runs of Q learning
Average Episode Length
Episode
0
200
400
600
800
1000
0
10
20
30
40
50

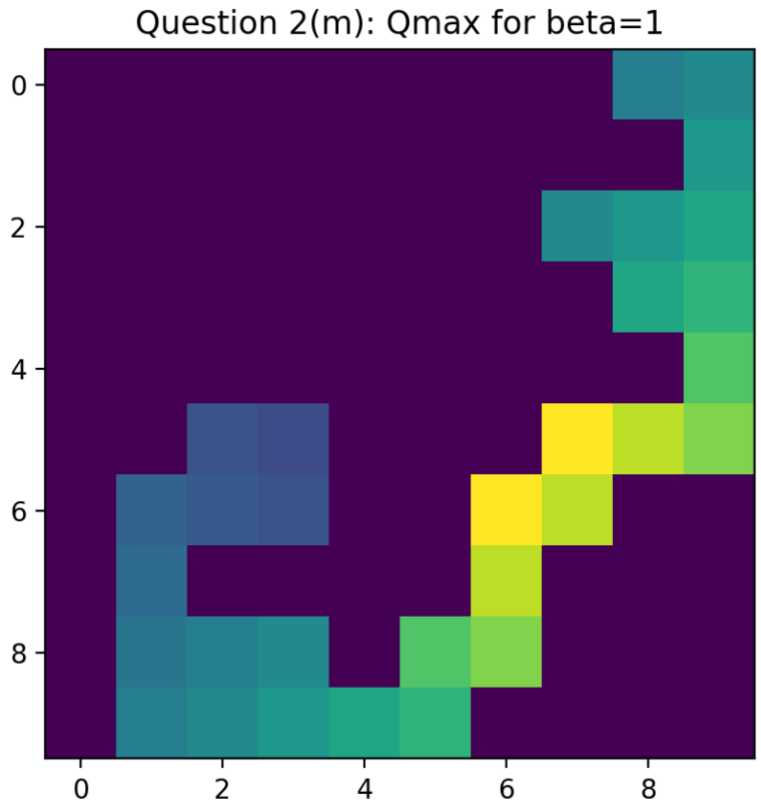
Part (j):


Question 2(j): 100 runs of Q learning beta=0.1
Average Episode Length
Episode
0
200
400
600
800
1000
0
10
20
30
40
50

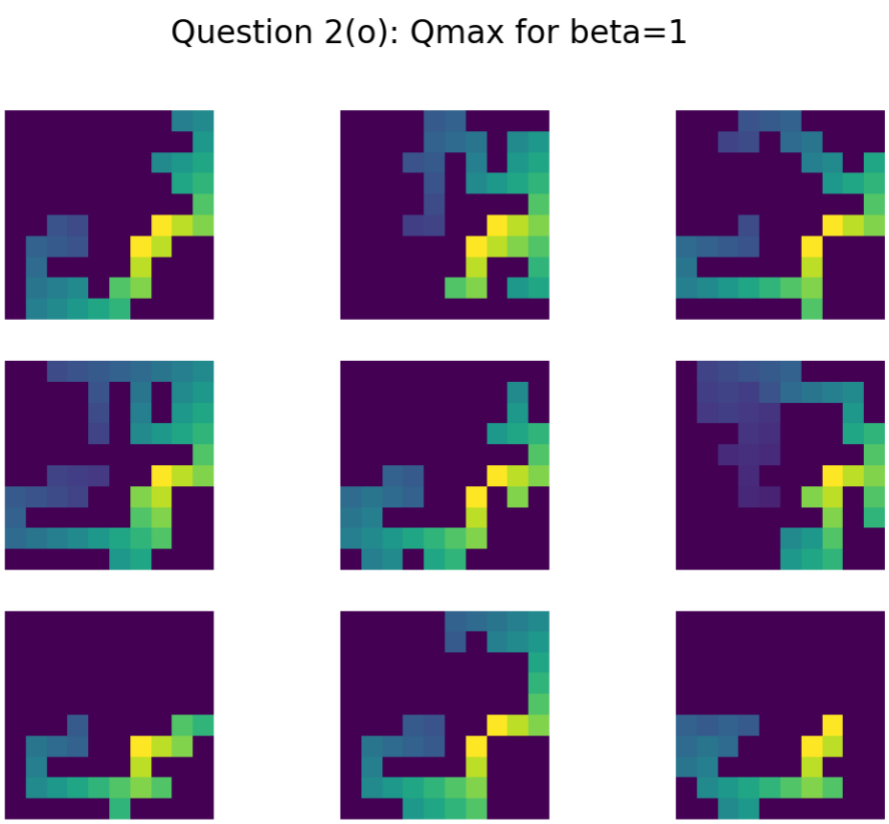
Part (k):

Question 2(k): 100 runs of Q learning beta=0.01
Average Episode Length
Episode
0
200
400
600
800
1000
0
10
20
30
40
50

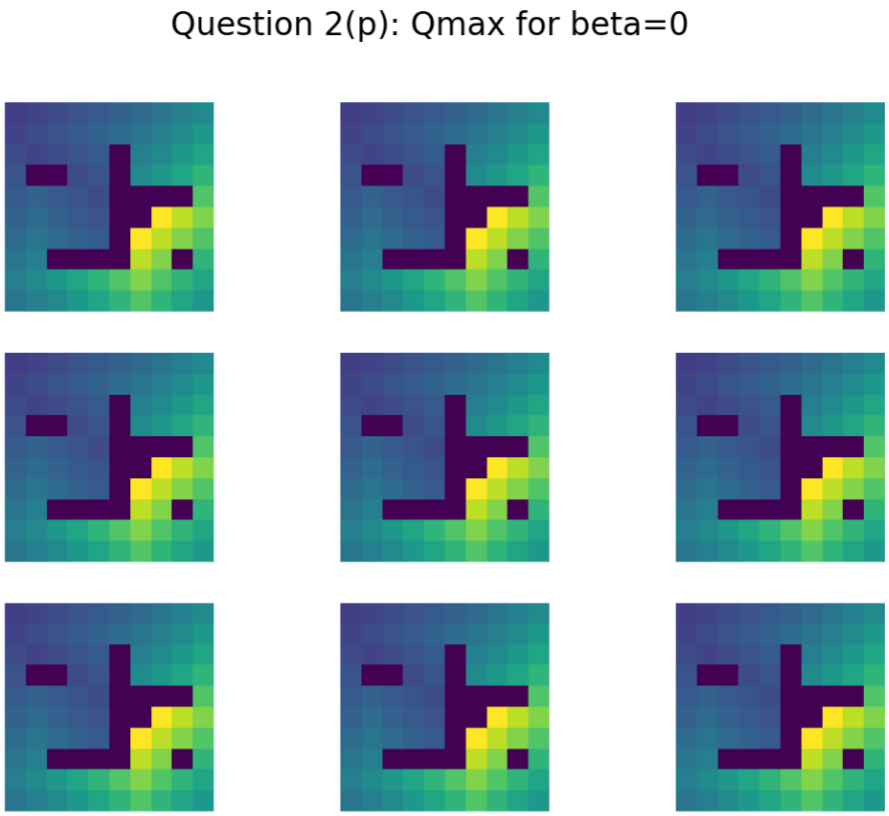
Part (m):



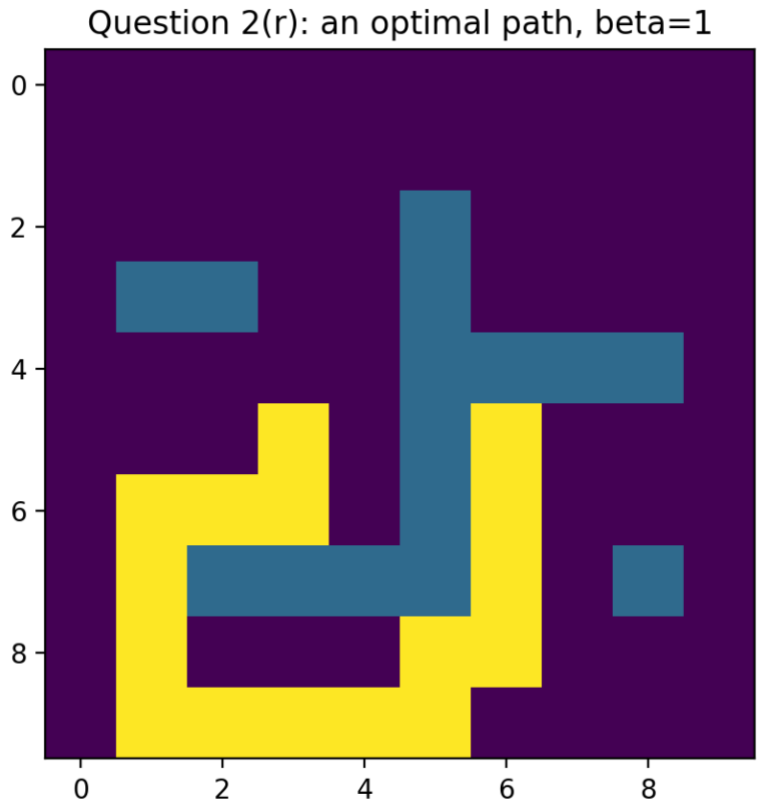
Part (o):



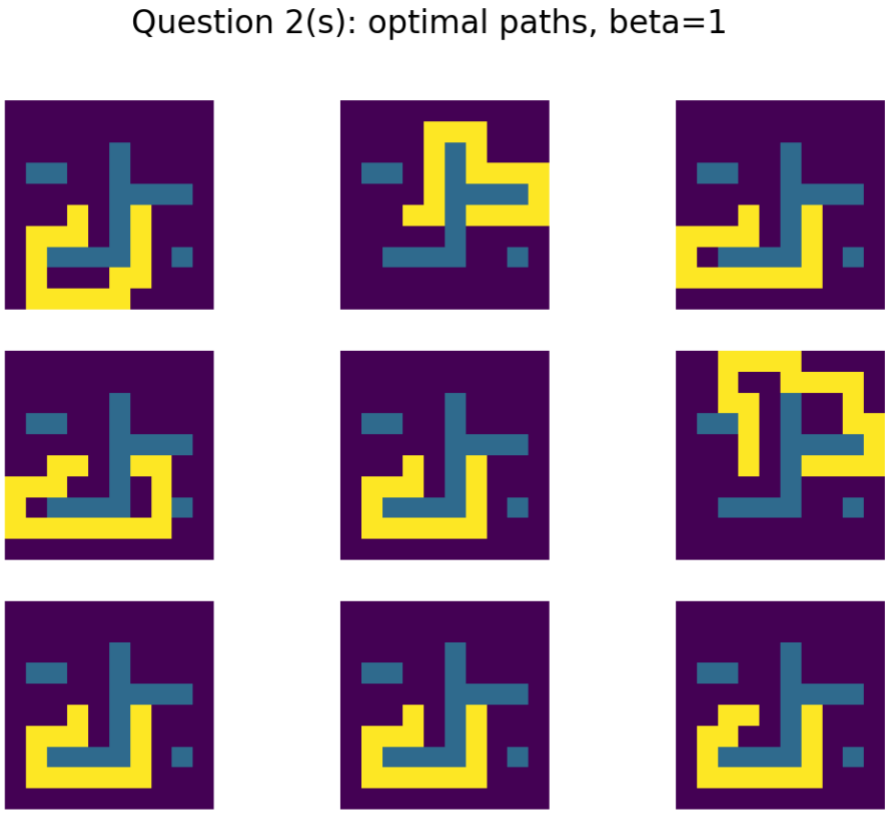
Part (p):



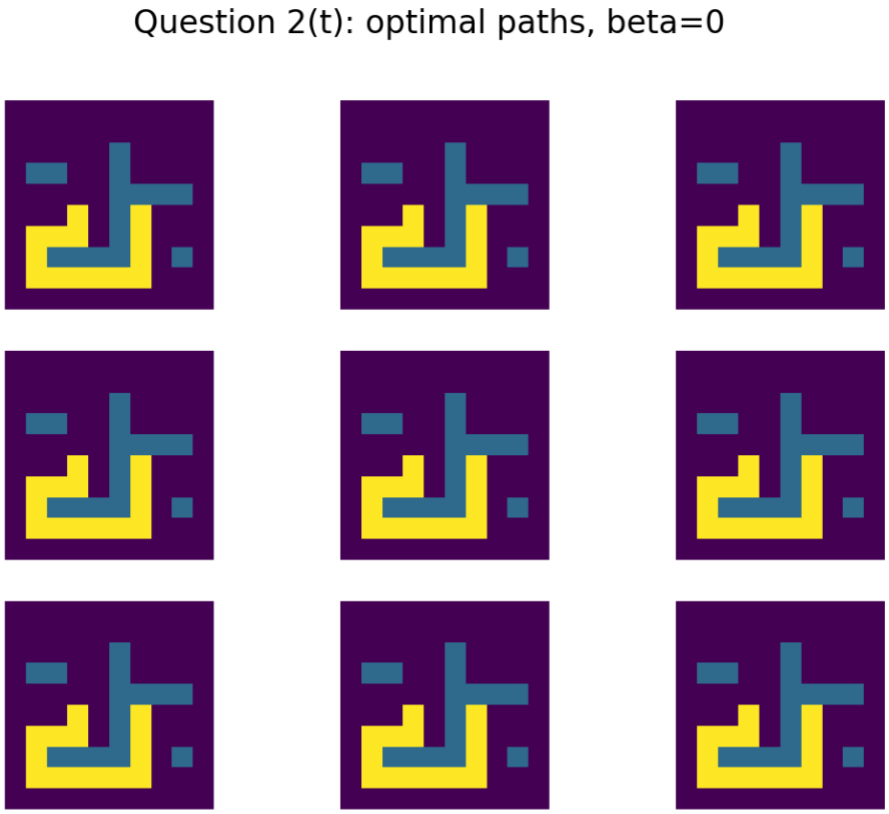
Part (r):



Part (s):

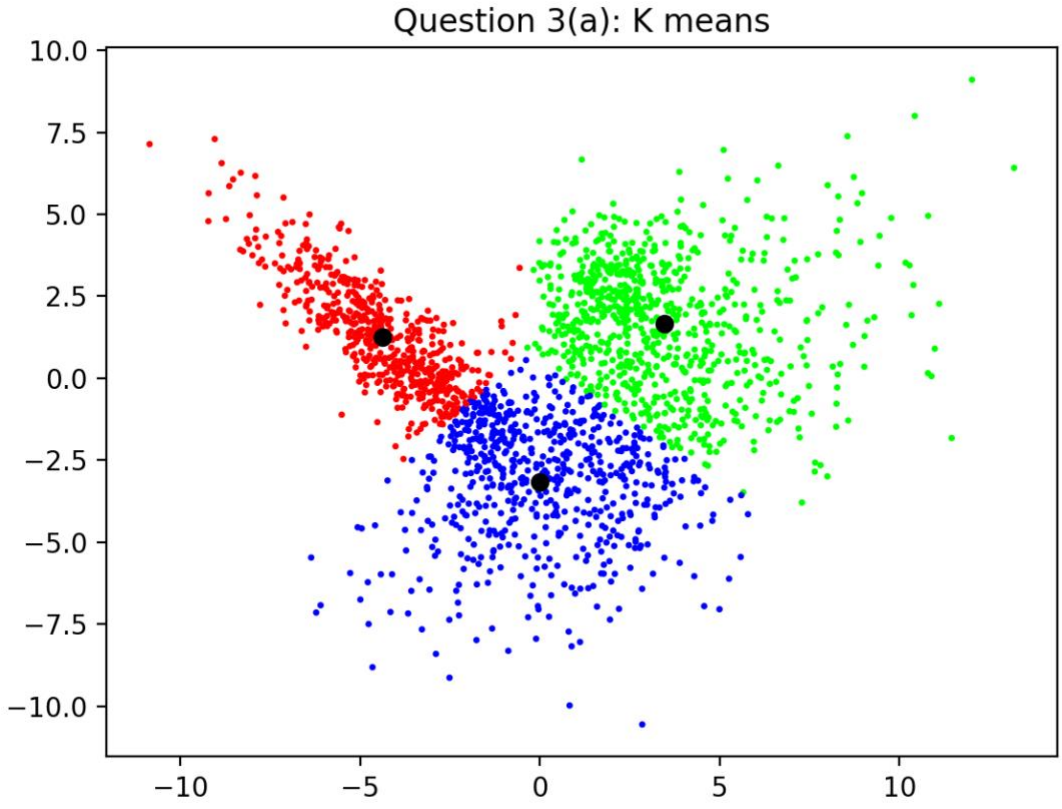


Part (t):

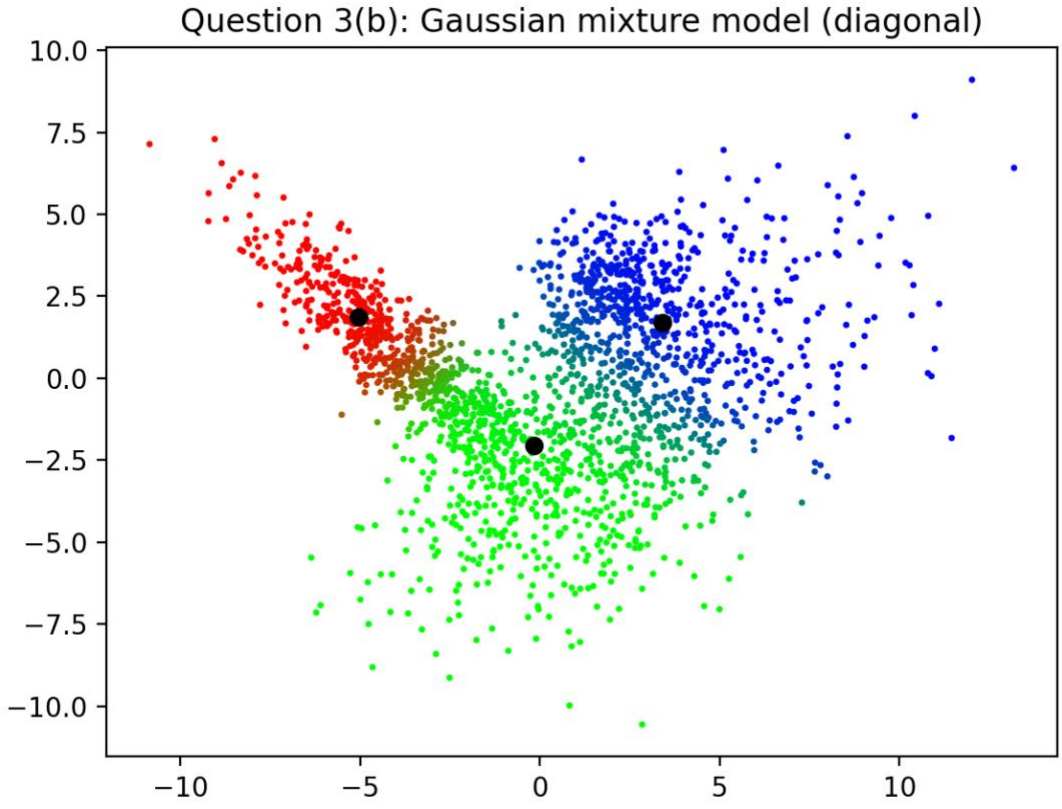


Question 3:

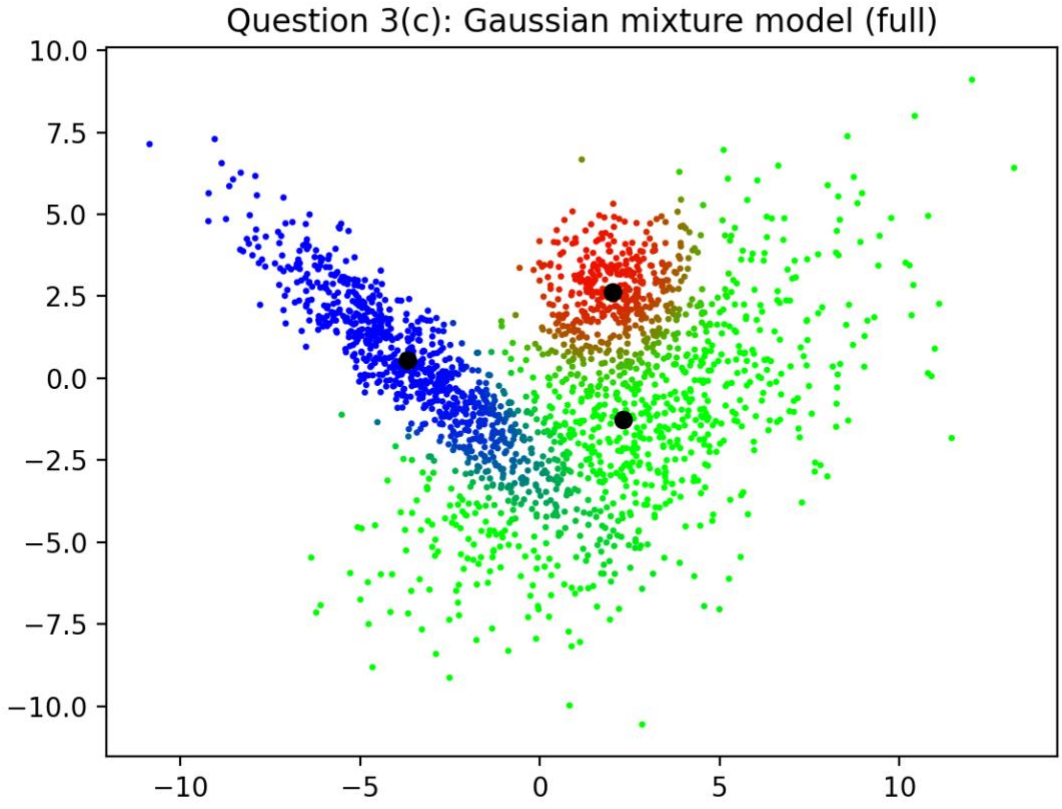
Part (a):



Part (b):

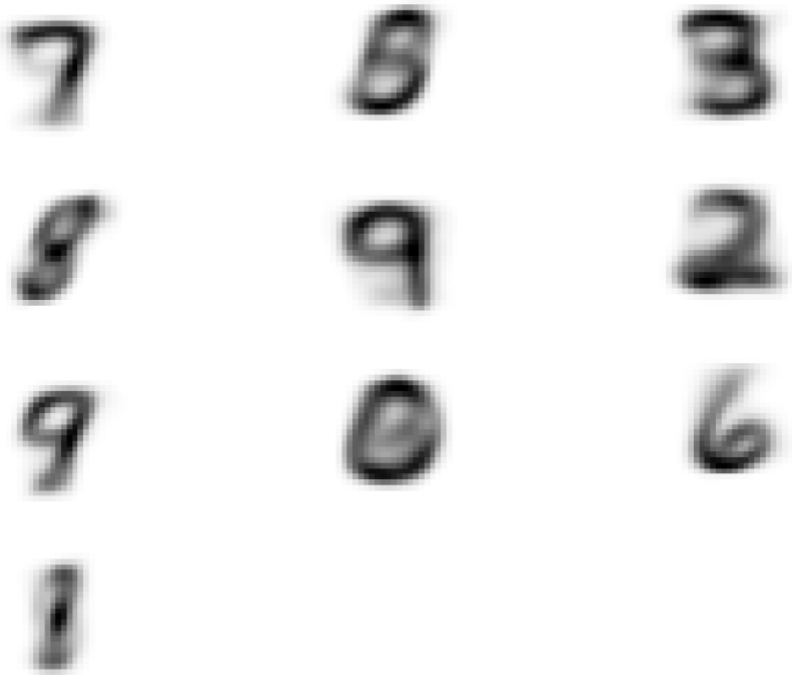

Question 3(b): Gaussian mixture model (diagonal)
10.0
7.5
5.0
2.5
0.0
−2.5
−5.0
−7.5
−10.0
−10
−5
0
5
10

Part (c)


Question 3(c): Gaussian mixture model (full)
10.0
7.5
5.0
2.5
0.0
−2.5
−5.0
−7.5
−10.0
−10
−5
0
5
10

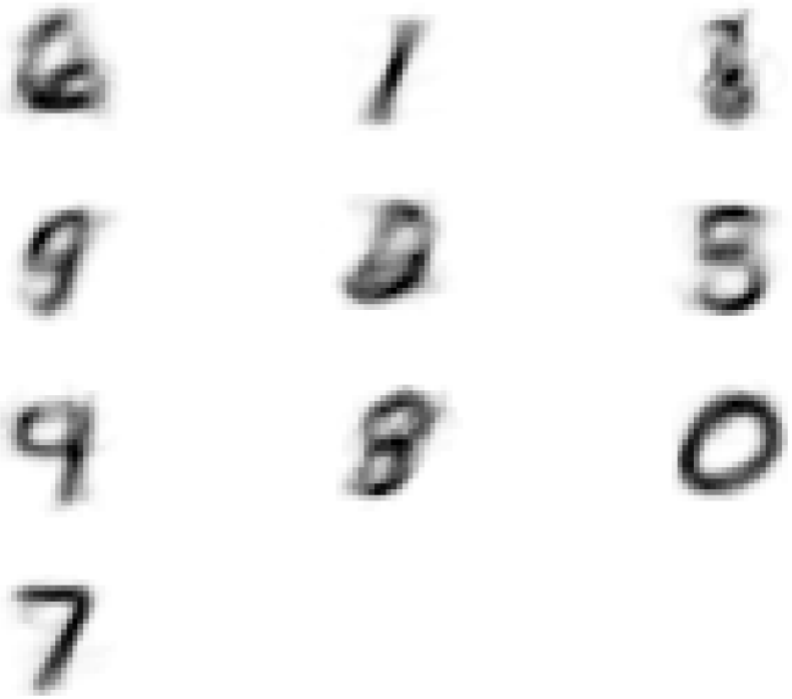
Part (h):

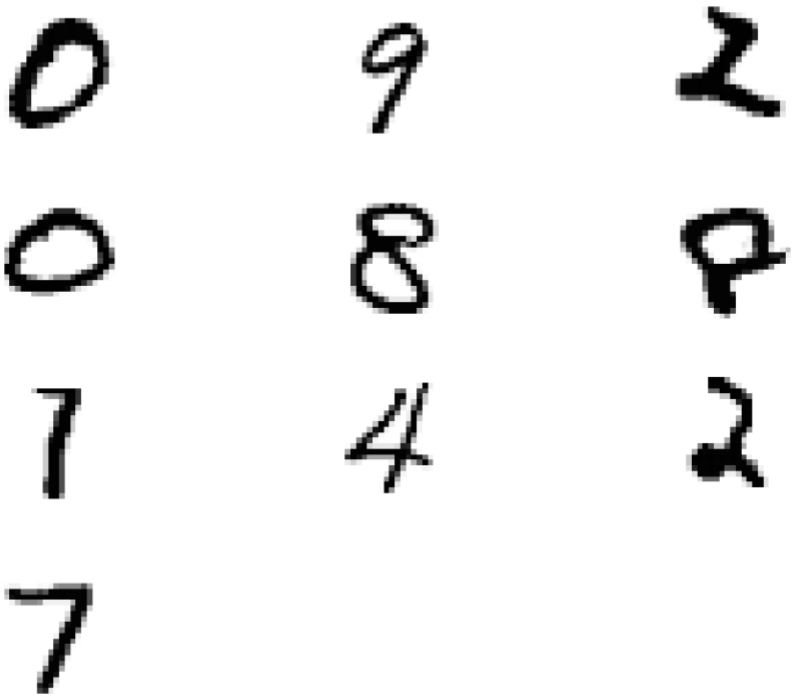
Question 3(h): mean vectors for 50,000 MNIST training points



Part (i):

Question 3(i): mean vectors for 500 MNIST training points



Part (j):

Question 3(j): mean vectors for 10 MNIST training points