Problem 3

(a)

Probability of data point from distribution

(b)

For any data point we have the likelihood

For all the data points we have the likelihood

(c)

E step:

From the problem 1 we have the likelihood

The distribution over Z is

We have this Q function

Parameters is already known before the step except which is computed at the beginning of the step

M step:

Updating the values for parameters

Convergence:

(d)

Because we have the components as Bernoulli distributions

With the density over Z is

We have

So the parameter and are all weighted MLE with Bernoulli distributions