1. (i) After calculating the mean vector and the two covariance matricies, I found that

$$\hat{\mu} = \begin{bmatrix} 5.843 \\ 3.057 \\ 3.758 \\ 1.199 \end{bmatrix}, \quad S_b = \begin{bmatrix} 31.606 & -9.976 & 82.624 & 35.640 \\ -9.976 & 5.672 & -28.620 & -11.466 \\ 82.624 & -28.620 & 218.551 & 93.387 \\ 35.640 & -11.466 & 93.387 & 40.207 \end{bmatrix}$$

and

$$S_w = \begin{bmatrix} 0.265 & 0.093 & 0.168 & 0.038 \\ 0.093 & 0.115 & 0.055 & 0.033 \\ 0.168 & 0.055 & 0.185 & 0.043 \\ 0.038 & 0.033 & 0.043 & 0.042 \end{bmatrix}$$