Homework 4 – Report

**Programming Exercises**

**Question 1**

**Part a**A close-up of a computer screen

Description automatically generated

**A white rectangular object with a white border

Description automatically generatedA graph showing a number of blue dots

Description automatically generated**

**Part b**

**A screenshot of a computer program

Description automatically generated**

**A computer screen shot of text

Description automatically generated**

A chart with a number of dots

Description automatically generated

**Part c**

A screenshot of a computer program

Description automatically generated

**Part diA computer screen shot of a computer code

Description automatically generated** **A computer code with text

Description automatically generated with medium confidence** A screenshot of a computer program

Description automatically generated A computer code with black text

Description automatically generated with medium confidenceA screenshot of a computer

Description automatically generated A graph with a number of dots

Description automatically generated

**Part dii**

A close-up of a white background

Description automatically generated A close-up of a word

Description automatically generated

These are the termination criterion that I chose. The first one ensures that the algorithm will stop after 100 iterations even if convergence isn’t reached to not have infinte loops and just in case the algorithm does not reach convergence. The second criteria determines how well the model fits the data by checking how small the change is. If the change is less than 0.01% then it means the model has reached convergence.

**Part diii**

**A screenshot of a computer code

Description automatically generated** **A white background with red text

Description automatically generated** A graph with dots and lines

Description automatically generated

**Part e**

**A screenshot of a computer code

Description automatically generated** **A screenshot of a graph

Description automatically generated**

The clusters are ever so slightly different, but still pretty similar other than a few points. A possible reason as to why there’s a differenc is because K-Means clusters in linear boundaries while GMM can have curved boundaries. In this case, that could explain why there’s a few points in the duration around 3.3-3.7 minutes that K-Means classified in the yellow group. Ultimately, GMM has a better performance.

**Question 2**

**Part a**

This part consisted of just downloading the face dataset onto my personal computer.

**Part b**

A screenshot of a computer code

Description automatically generated A computer screen shot of a computer code

Description automatically generated A close-up of a person's face

Description automatically generated A close-up of a person's face

Description automatically generated

**Part c**

**A screenshot of a computer program

Description automatically generated** **A close-up of a person's face

Description automatically generated**

**Part dA screenshot of a computer

Description automatically generated** **A close-up of a person's face

Description automatically generated** A close-up of a person's face

Description automatically generated

**Part e**

**A screenshot of a computer program

Description automatically generated** **A screenshot of a computer screen

Description automatically generated**

**Part f**

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**Part g**

**A screenshot of a computer

Description automatically generated** **A graph with a line

Description automatically generated**

**Written Exercises**

**Question 1**

**A white sheet with blue writing on it

Description automatically generated**

**Question 2**

**Part a**

**A screenshot of a computer

Description automatically generated**

**Part b**

**A screenshot of a computer

Description automatically generated**

**Part c**

**A screenshot of a computer

Description automatically generated**

**Part d**

**A screenshot of a computer

Description automatically generated**

**Part e**

**A white rectangular object with black text

Description automatically generated**