HMM Report

General Structure

I asked for Metin Hoca's permission and used C# for the project as I was more familiar with it. There is a single executable file called HMM.exe for all parts instead of 3 separate ones. I wrote and tested the executable in win10, I am not sure if it will work on other operating systems.

The code has the following general structure:

- At the top, there is a main function that has a switch block in it that takes in the commands and calls relevant functions.
- Below there are IO functions for reading and writing .txt files plus writing to console.
- Next there are algorithms for every part with comments on top of the functions explaining which part it is for.
- At the bottom there is a HiddenMarkovModel class that holds 3 matrices A, B, and Pi. It has two constructors:
  - First one takes in `List<String> lines` from model.txt and parses it to create an instance. This constructor is used in Part 1 and 2.
  - Second one gets the A, B, and pi matrices and creates an instance. It is used in the learn algorithm to return the model.

Part 1 and 2

For part 1 and 2, I used the pseudocodes in the provided Tutorial – Stanford pdf file. I used the same variable names and added comments so that the algorithms are easy to understand.

Part 3

For part 3, I used this example: https://www.codeproject.com/articles/69647/hidden-markov-models-in-c as a starting point, and modified the code according to the assignment's requirements. Again, I added comments so that it is easy to understand. It is also adjusted for variable lengths of observations as asked in the instructions.