The following pictures below are out of order but the answers for problem 1, and problem 2.2 are in the first image. In the second image the initial vector, transmission matrix, and the emission matrix are written in code. The final image contains the solution for 2.3 and 2.4 which are, 0.5400 and Rainy, Overcast, Rainy, Overcast, Sunny.

Problem 2.2

.4 Sunny Start

$S001$ $.4 \times .3 \times .3 \times .3 \times .7 \times .7 = 0.0059$ S S S

$S002$ $.4 \times .3 \times .3 \times .3 \times 0.1 \times .7 = 7.56 \times 10^{-4}$ S R S

$S003$ $.4 \times .4 \times .4 \times .3 \times .5 \times .7 = 0.0672$ S O S

$S004$ $.3 \times .2 \times .3 \times .9 \times .1 \times .7 = 0.0011$ R R S

$S005$ $.3 \times .3 \times .3 \times .9 \times .7 \times .7 = 0.0119$ R S S

$S006$ $.3 \times .5 \times .4 \times .9 \times .5 \times .7 = 0.0189$ R O S

$S007$ $.3 \times .1 \times .4 \times .1 \times .5 \times .7 = 4.2 \times 10^{-4}$ O O S

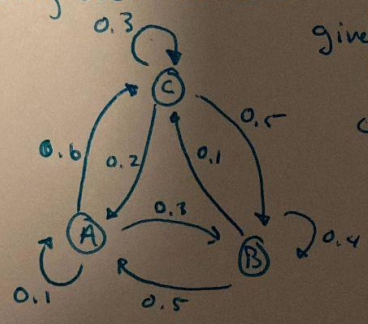
$S008$ $.3 \times .5 \times .3 \times .1 \times .1 \times .7 = \sout{0.0018}$ 2.52×10^{-4} O R S

$S009$ $.3 \times .4 \times .3 \times .1 \times .7 \times .7 = 0.0018$ O S S

Estimated states calculates

Rainy, Overcast, Rainy, Overcast, Sunny

Why does hmmviterbi work with "A, B, C" but not '1'



given A B C

$$\begin{matrix} & A & B & C \\ A & 0.1 & 0.3 & 0.6 \\ B & 0.5 & 0.4 & 0.1 \\ C & 0.2 & 0.5 & 0.3 \end{matrix}$$

Start $= [0.4, 0.3, 0.3]$ (A, B, C)

P1.2

$A \times B \times C \times A = .4 \times .3 \times .1 \times .2 = 2.4 \times 10^{-3}$

$B \times B \times C \times A = .3 \times .4 \times .1 \times .2 = 2.4 \times 10^{-3}$

$C \times B \times C \times A = .3 \times .5 \times .1 \times .2 = 3 \times 10^{-3}$

```
%% Problem 2
states = ['Sunny', 'Rainy','Overcast'];
n_states = length(states);
observations = ['Dry','Wet'];
n_observations = length(observations);
start_probability = [ 0.4, 0.3, 0.3];
transition_probability = [ 0.3, 0.3, 0.4; 0.3, 0.2, 0.5; 0.4, 0.5, 0.1];
emission_probability = [0.7, 0.3; 0.1, 0.9; 0.5, 0.5];
```

```
The probability of the Problem 2.3 sequence is: 0.540000

The solution for Problem 2.4 is the following:The given sequence: Wet Dry Wet Wet Dry
The hidden states of the given sequence: Rainy Overcast Rainy Overcast Sunny
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