CS 6300 **Viterbi Algorithm Practice** **April 12, 2022**

Viterbi Algorithm Practice

You are trying to diagnose whether your computer is broken or not. On a given day, your computer's hidden state is either *broken* or *working*. Each day you make one of the following observations: *blue-screen*, *slow*, or *snappy*, depending on the state of your computer. You decide to use the following HMM to model your daily observations:

Initial Distribution

State	$P(X_\bullet)$
working	0.9
broken	0.1

Transition Distribution

State	Next State	$P(X_{t+1} \vert X_t)$
working	*working*	0.9
working	*broken*	0.1
broken	*broken*	1.0
broken	*working*	0.0

Emission Distribution

State	Observation	$P(O_t \vert X_t)$
working	*snappy*	0.7
working	*slow*	0.2
working	*blue-screen*	0.1
broken	*snappy*	0.1
broken	*slow*	0.4
broken	*blue-screen*	0.5

What is the most likely sequence of hidden states X_1, X_2, X_3 given the observation sequence (*snappy, slow, blue-screen*)?

1. First, compute the $m_1(x)$ values.
2. Next, compute the $m_2(x)$ values.
3. Finally, compute the $m_3(x)$ values.
4. Fill in the appropriate m_i values in the trellis below. Emphasize the back pointers by thickening the edges in the trellis from the final m_3 values for both states *working* and *broken*.