2021-03-25 CSCE582

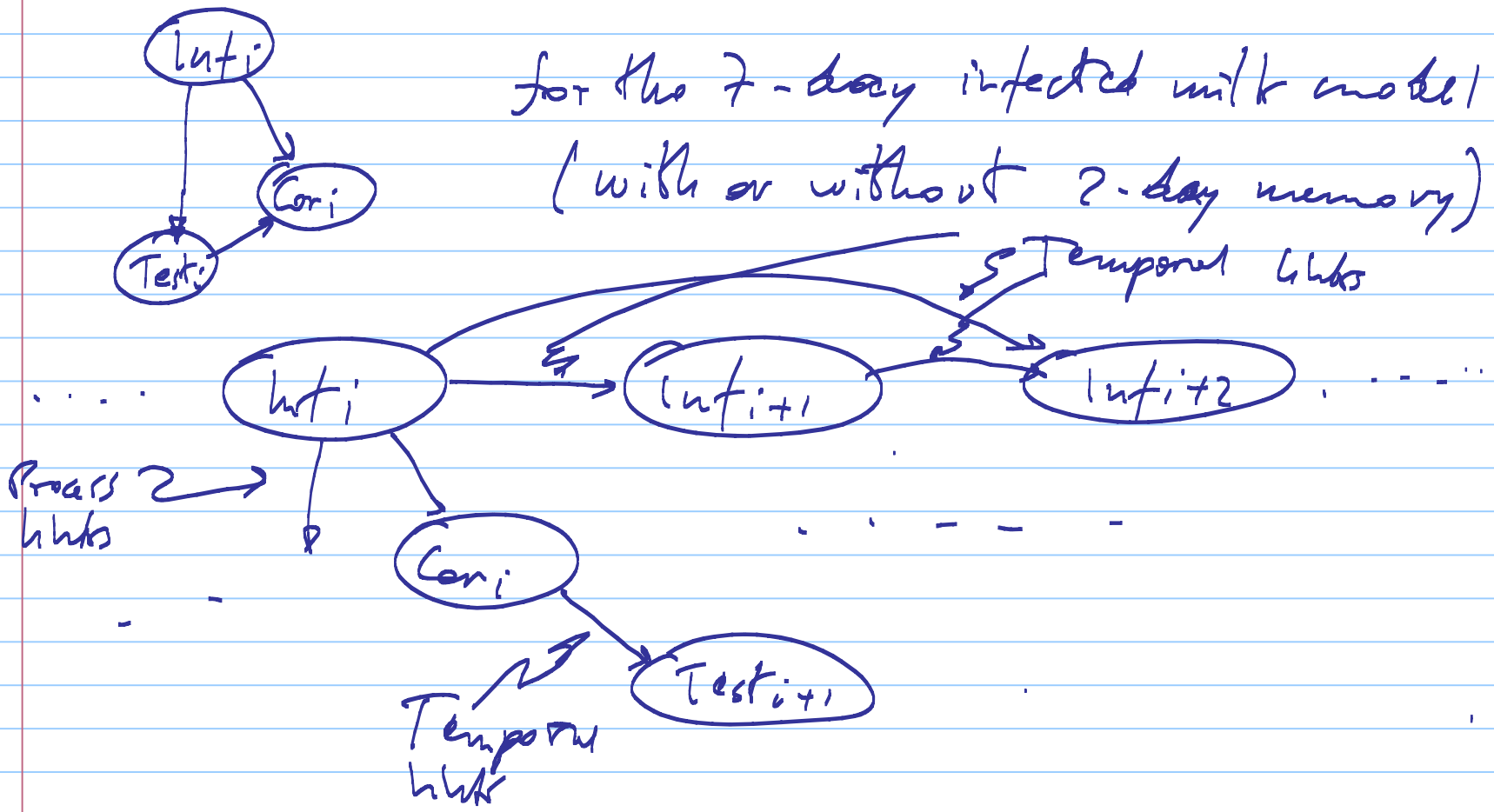
Possible graduate student work:

1. Prepare a PowerPoint presentation on CHILD. This would include a reconstruction in Hugh. (links on course website)

2. Prepare a PowerPoint on BOBLO. This would require also writing a good report from primary sources. (Starter links on course website)

3. Choose one paper from a special section of Integrated Environmental Assessment and Management (Vol. 17, no. 1, January 2021): Applications of Bayesian Networks for Environmental Risk Assessment and Management. (via the library)

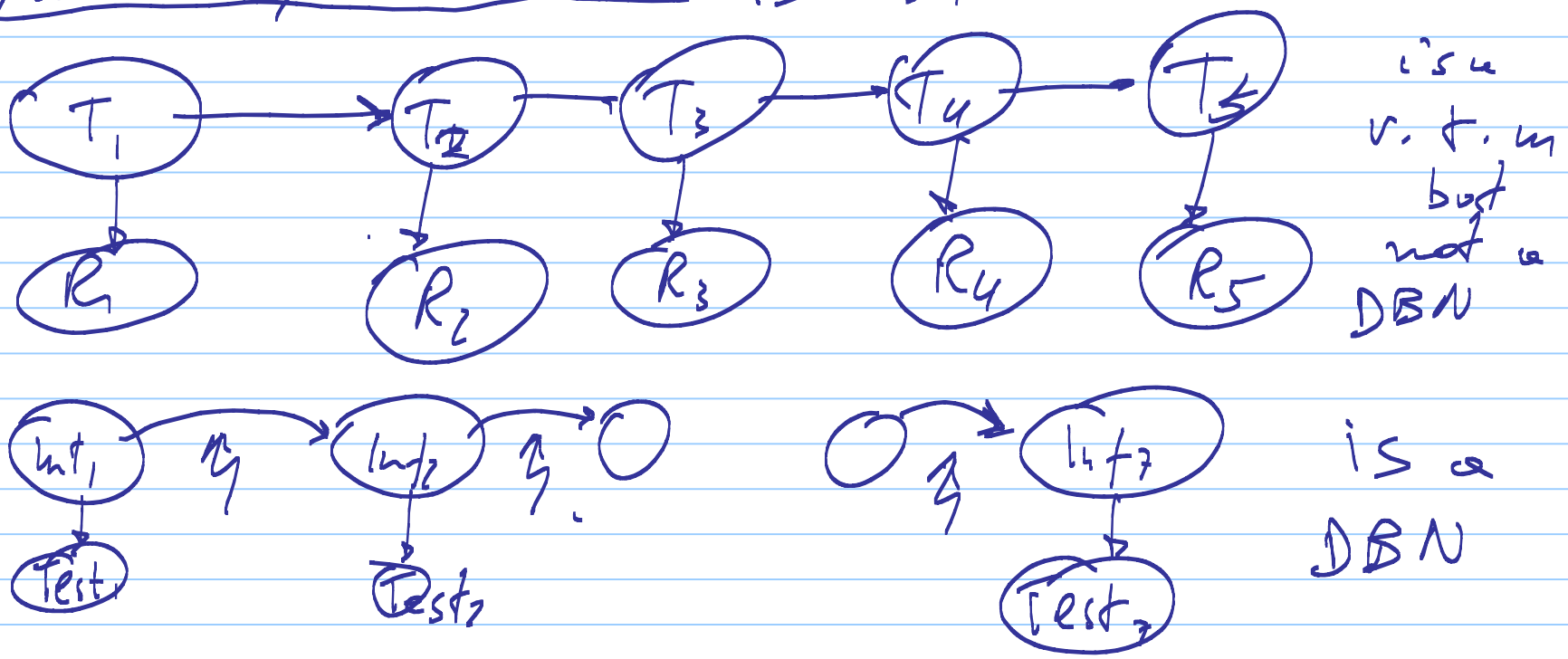
3.2.7 Dynamic Bayesian Networks [J07]



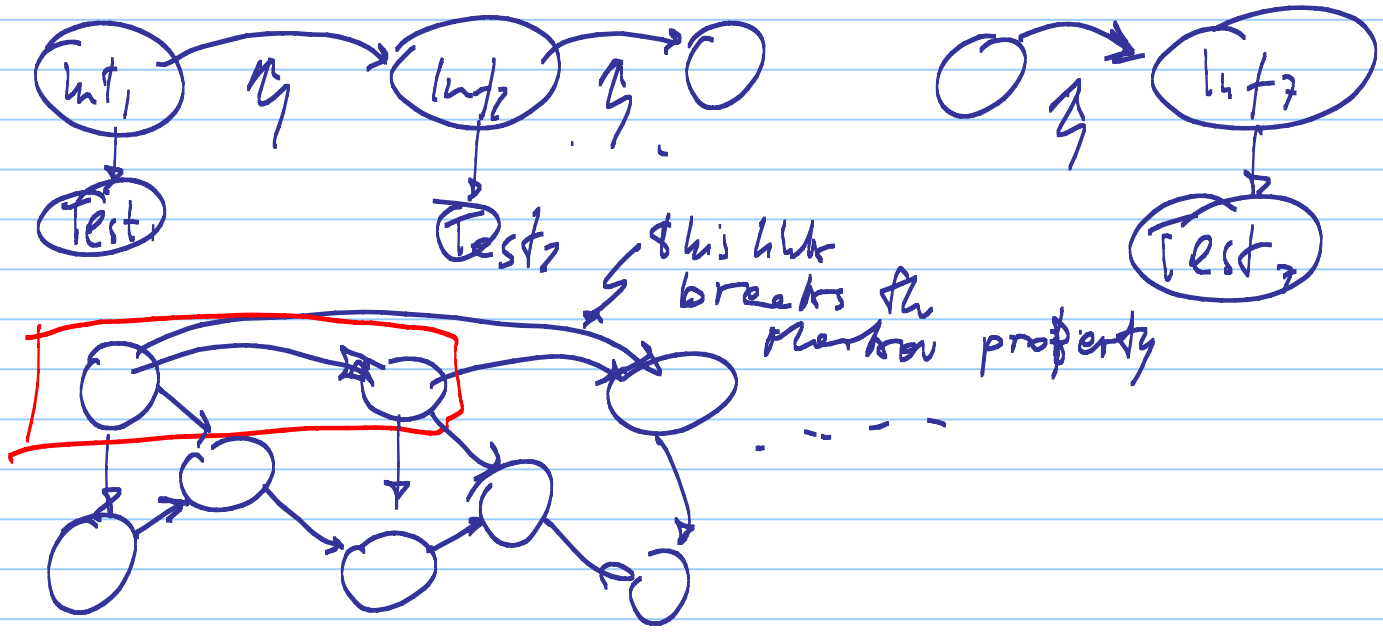
1) If the structure of each time slice is the same and the temporal links are the same, we have a repetitive temporal model.

2) If the CPTs are also the same, you have a

Dynamic Bayesian Network (DBN).



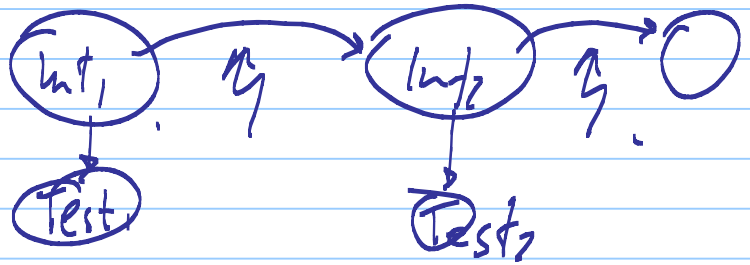
3) A HMM is a DBN where the Markov property holds:
the past has no impact on the future on the future
given the present.

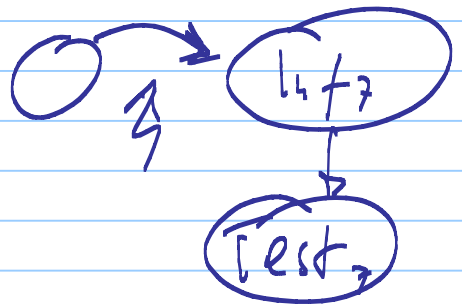


This DBN is an HMM

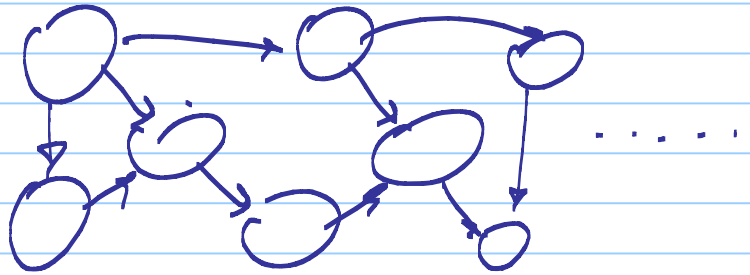
This DBN is not an HMM

4) A Kalman filter is a HMM in which exactly one variable has relatives outside the time slice



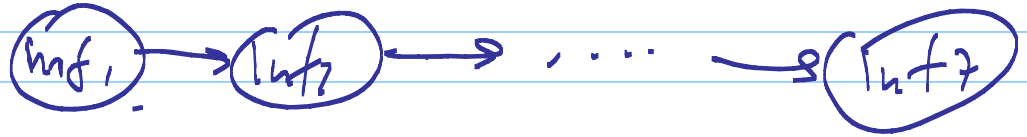


This HMM is a Kalman filter



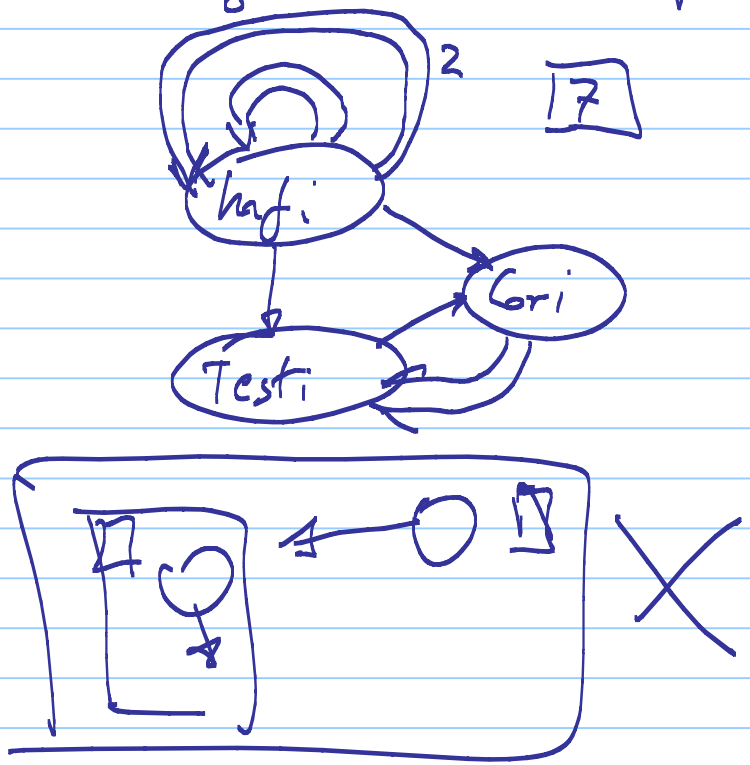
This HMM is not a Kalman filter

5) A Kalman filter consisting of exactly one variable in each time slice is a Markov chain



This Kalman filter is a Markov chain

Any DBN can be transformed into an HMM by extending the state space of the hypothesis variables, thus summarizing the relevant past with the present.



This notation (which is similar to that of plate diagrams) is not used in this sketch.