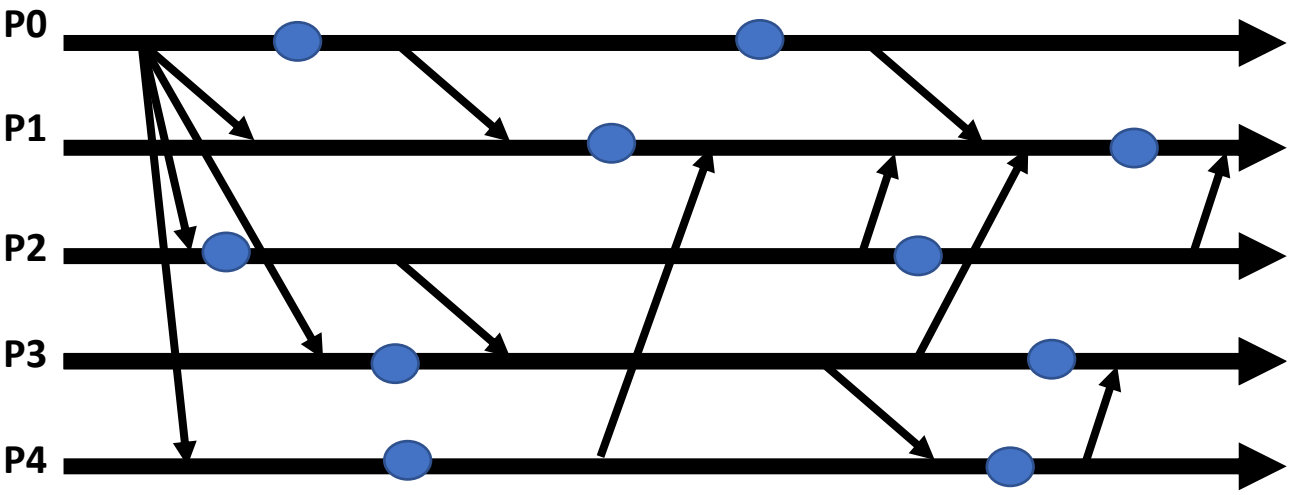
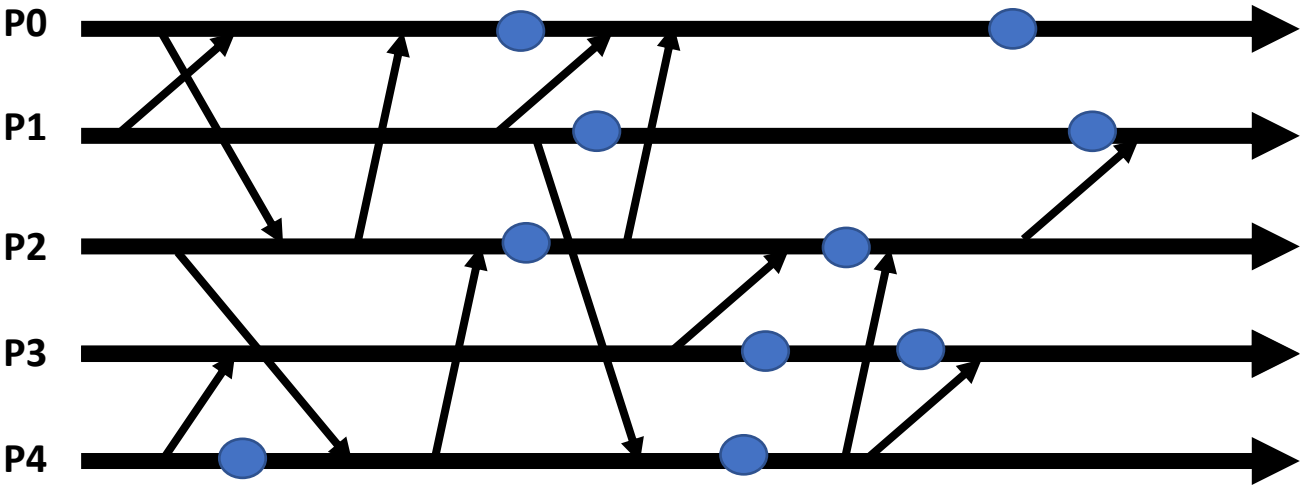
ECE 6930-004 HPC Fault Tolerance
Homework 2
Due: 5:00 PM 3 October 2018

Part 1 (15 points):

Draw the location of checkpoints to create one strongly consistent cut, one consistent cut, and one inconsistent cut. Clearly label each cut.





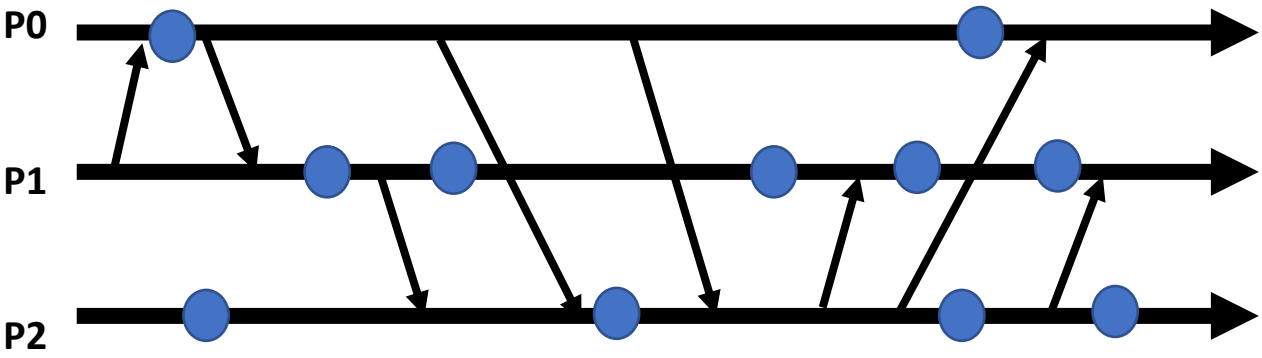
Part 2 (7 points):

What is the *domino effect*, and why is an important concern when checkpointing? Clearly state what causes it and discuss a solution to mitigate it.

Part 3 (8 points):

Given the initial vector timestamps for the three processes below, what is the final vector timestamp for each process? Countable events include: message sends, message receives, and local events (circles). Show your work for partial credit.

P0 = < 5, 1 ,1 >; P1 = <2, 4, 3>; P2 = < 3, 1, 3>



Part 4 (15 points):

Sending marker messages is expensive as it is essentially an all-to-all operation that does not scale. However, using marker messages allows the processes to coordinate to obtain a consistent checkpoint. Create and describe a checkpointing scheme that reduces the overall number of marker messages. Note: your scheme must still use marker messages to initiate the checkpointing operation. Does your scheme produce inconsistent, consistent, or strongly consistent checkpoints?