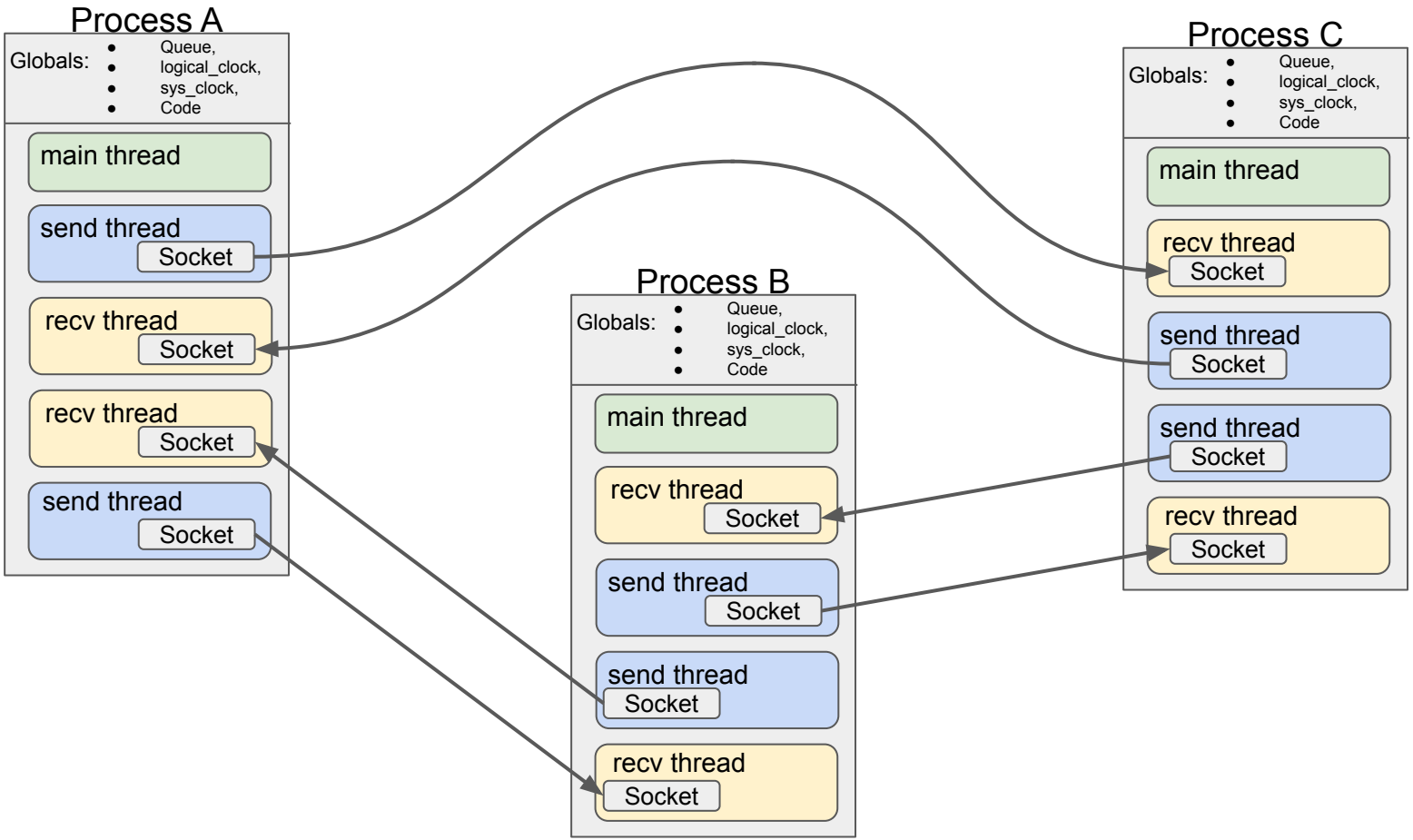
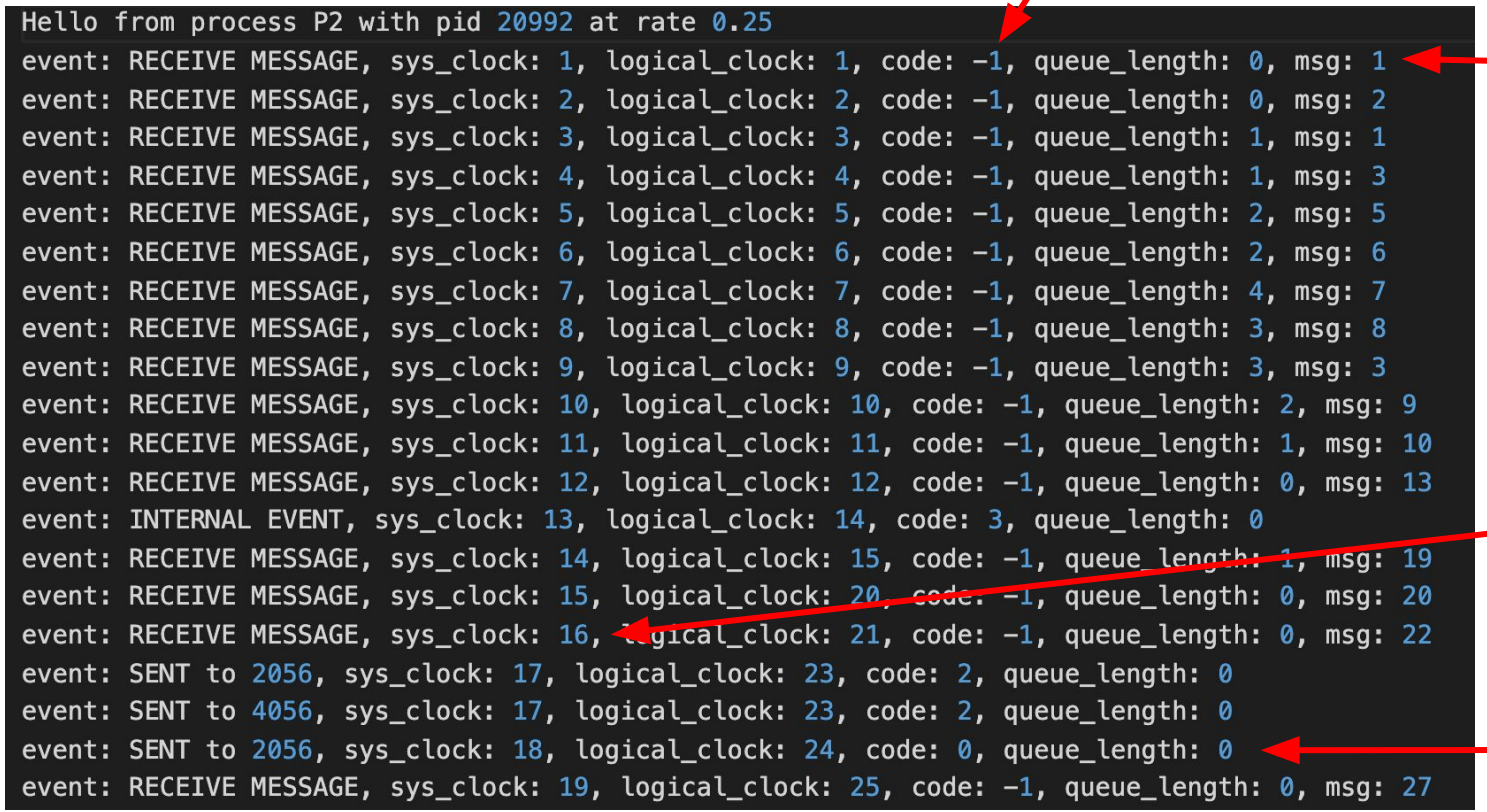
Design


Process A
Globals:
Queue,
logical_clock,
sys_clock,
Code
main thread
send thread
Socket
recv thread
Socket
recv thread
Socket
send thread
Socket
Process B
Globals:
Queue,
logical_clock,
sys_clock,
Code
main thread
recv thread
Socket
send thread
Socket
send thread
Socket
recv thread
Socket
Process C
Globals:
Queue,
logical_clock,
sys_clock,
Code
main thread
recv thread
Socket
send thread
Socket
send thread
Socket
recv thread
Socket

Example log



Random number generated or -1 when queue non-empty

Logical clock time received from other process

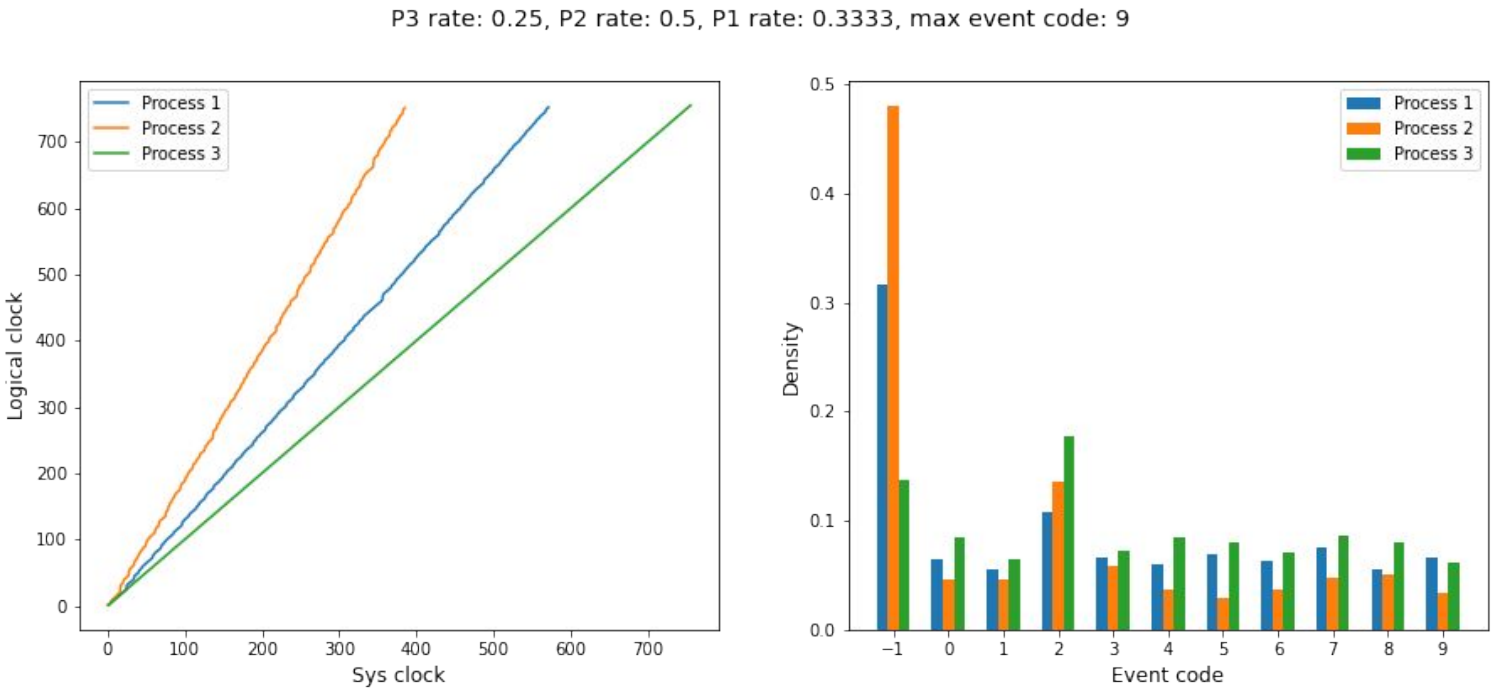
'True' system clock for process

Size of the queue after popping at event schedule time

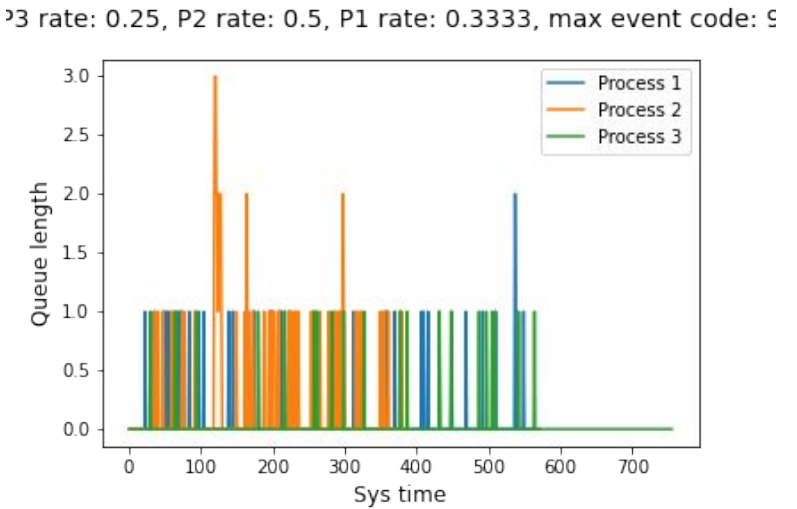
Experiments & insights summary

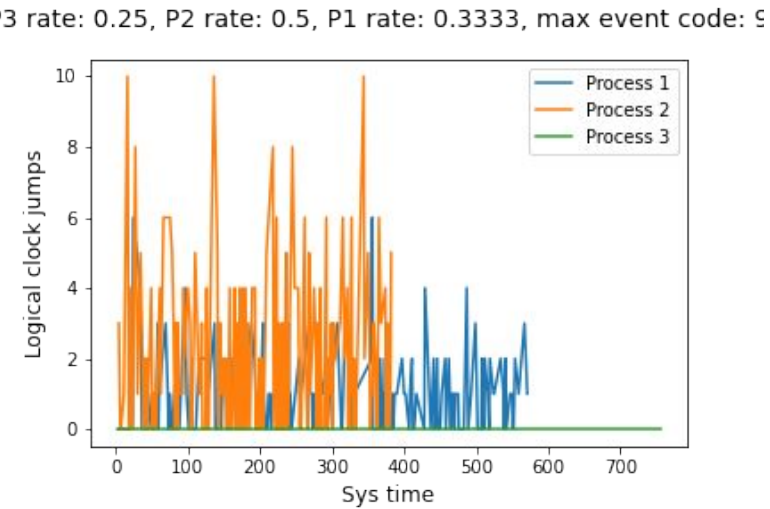
- Running processes with different (random) clock rates for 200s each
  - Plot of sys clock time vs logical clock time always has slope 1 (y = x) for the slowest of the communicating processes
  - The greater the relative difference between the clock rates, the greater is the difference between the slopes of the plot
  - Message queue grows larger for slower processes, especially if the faster ones are sending messages at a significantly faster rate
  - The fastest process is able to keep the message queue always between 0 and 1
- Running processes with different distribution of events
  - Decreases the proportion of internal events to communication events highlights the results above and we get much larger message queues for slower processes, wider difference in the curves between faster and slower processes
- Running processes with order of magnitude difference in clock rates
  - The results are the same as above but the difference between curves for processes with different rates is sharper

Processes at different random clock rates range (⅙, 1):

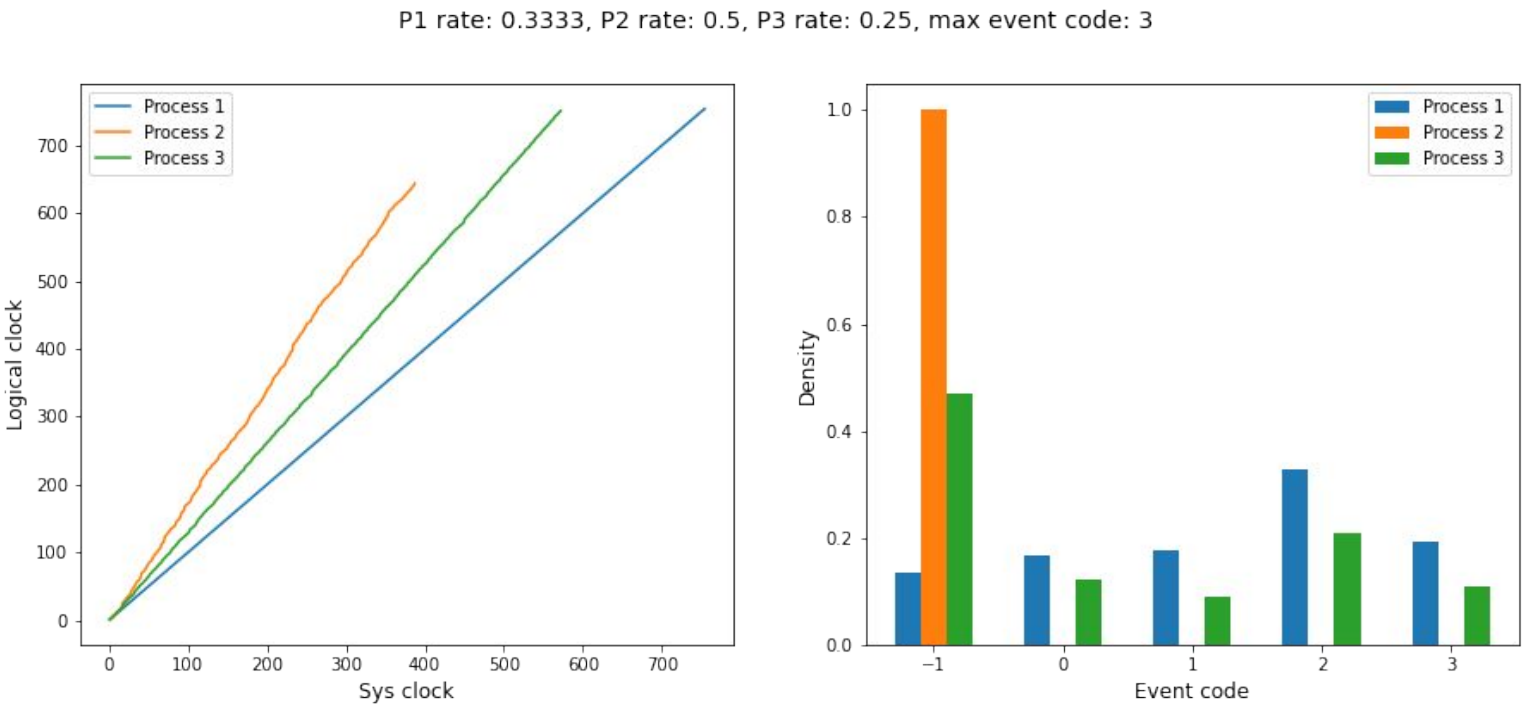


Processes at different random clock rates range (⅙, 1):



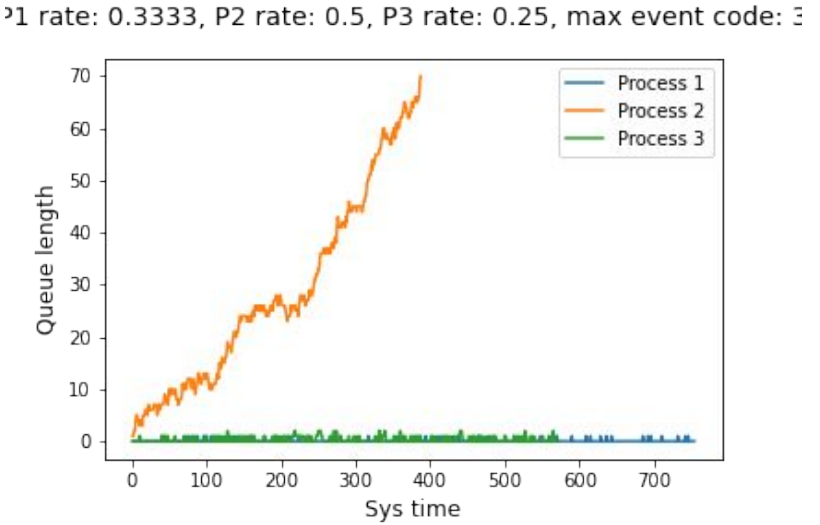


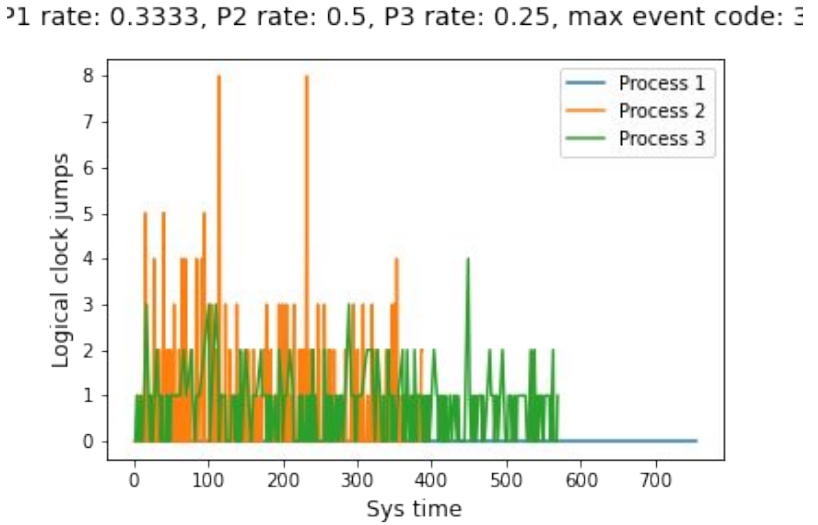
Varying distribution of events:



(same clock rates as previous slides but fewer internal events)

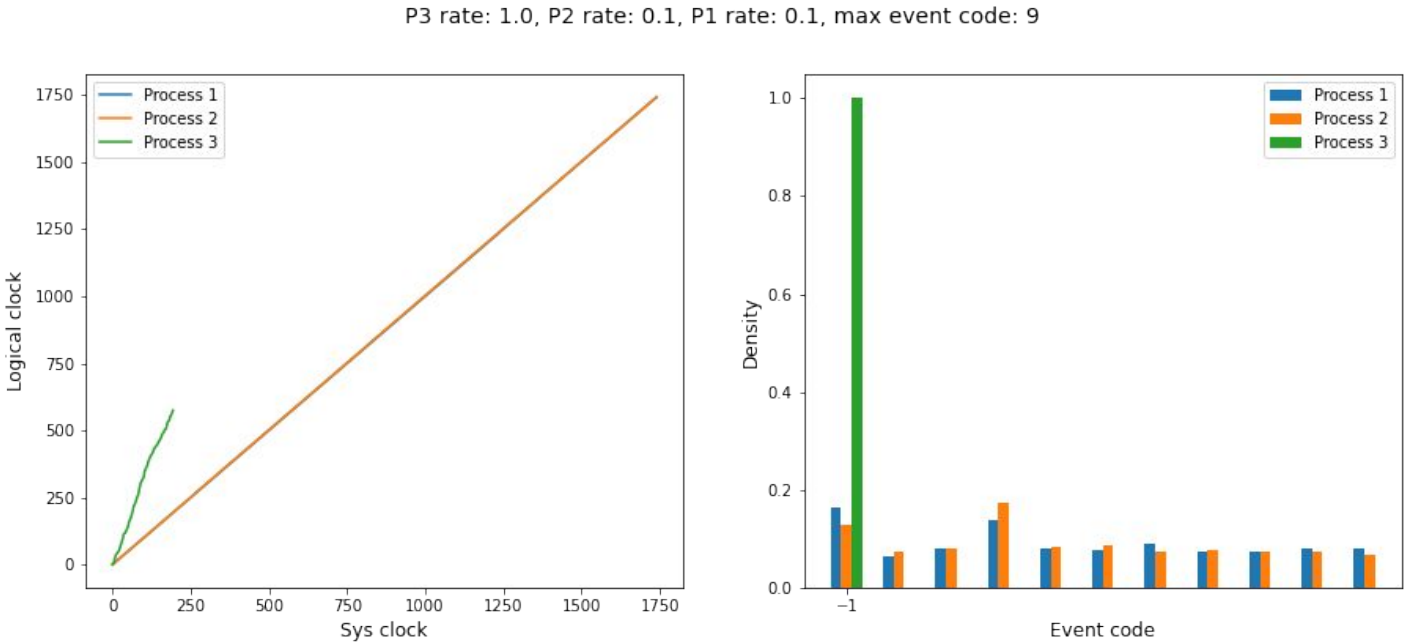
Varying distribution of events:



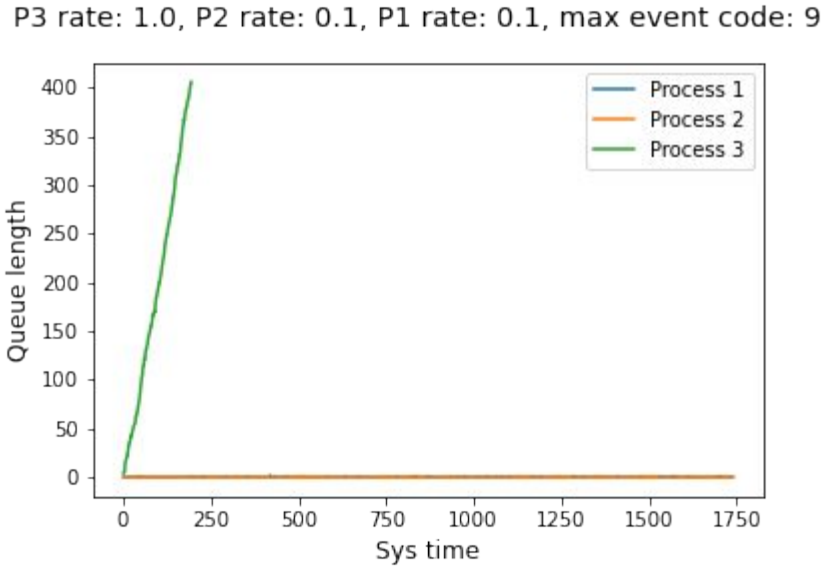


(same clock rates as previous slides but fewer internal events)

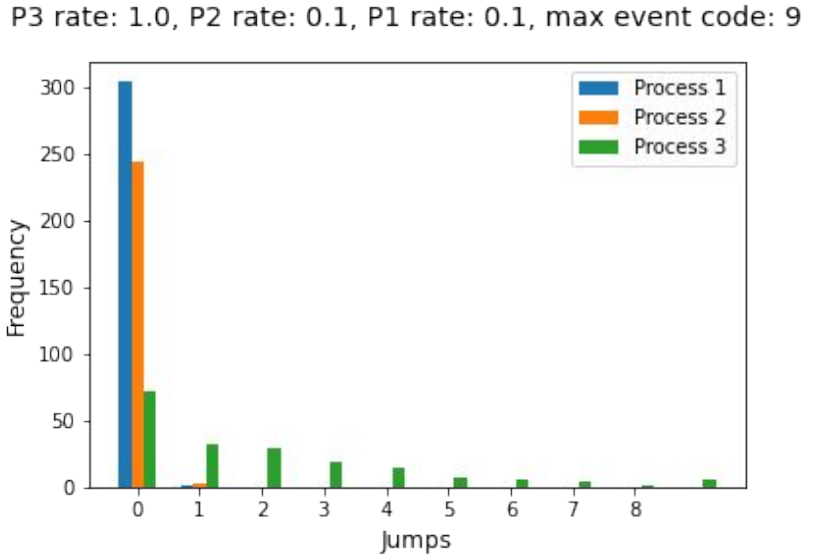
Order of magnitude difference in clock rates:



Order of magnitude difference in clock rates:



Tracking queue length per process



Tracking logical clock jumps per process