

Behaviors of Markov-Modulated Bernoulli Switches

Jun Kyu Ahn

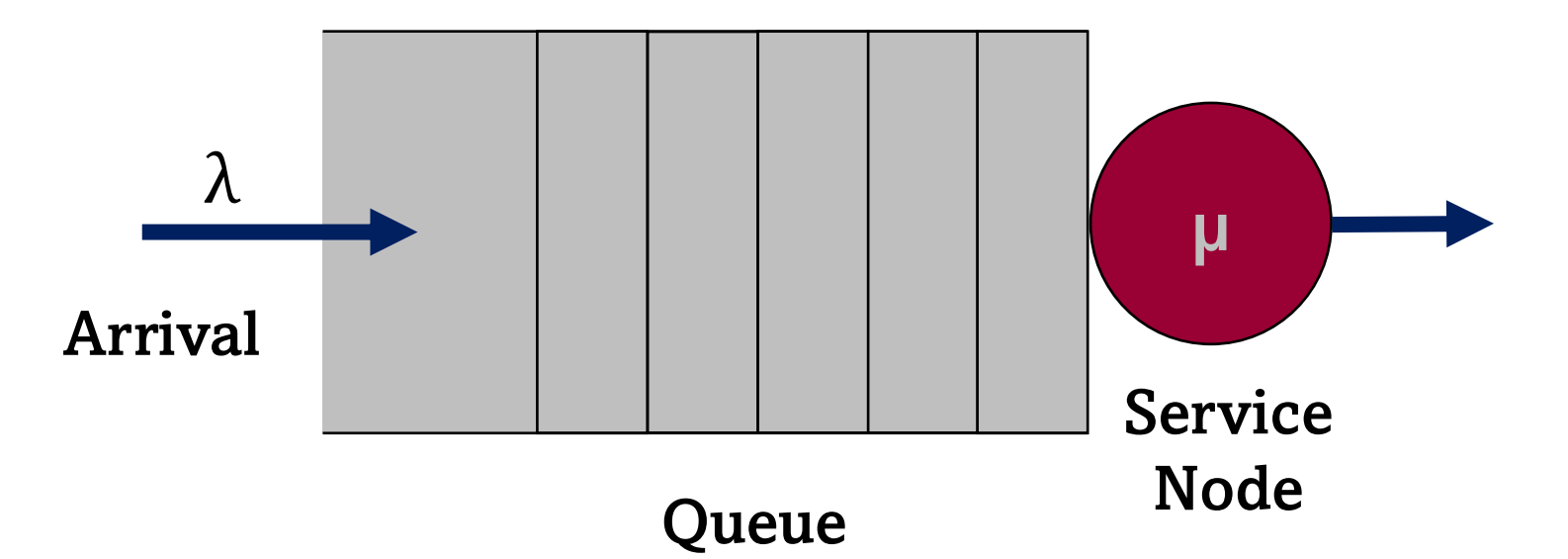


Georgia Tech College of Engineering
H. Milton Stewart School of
Industrial and Systems Engineering

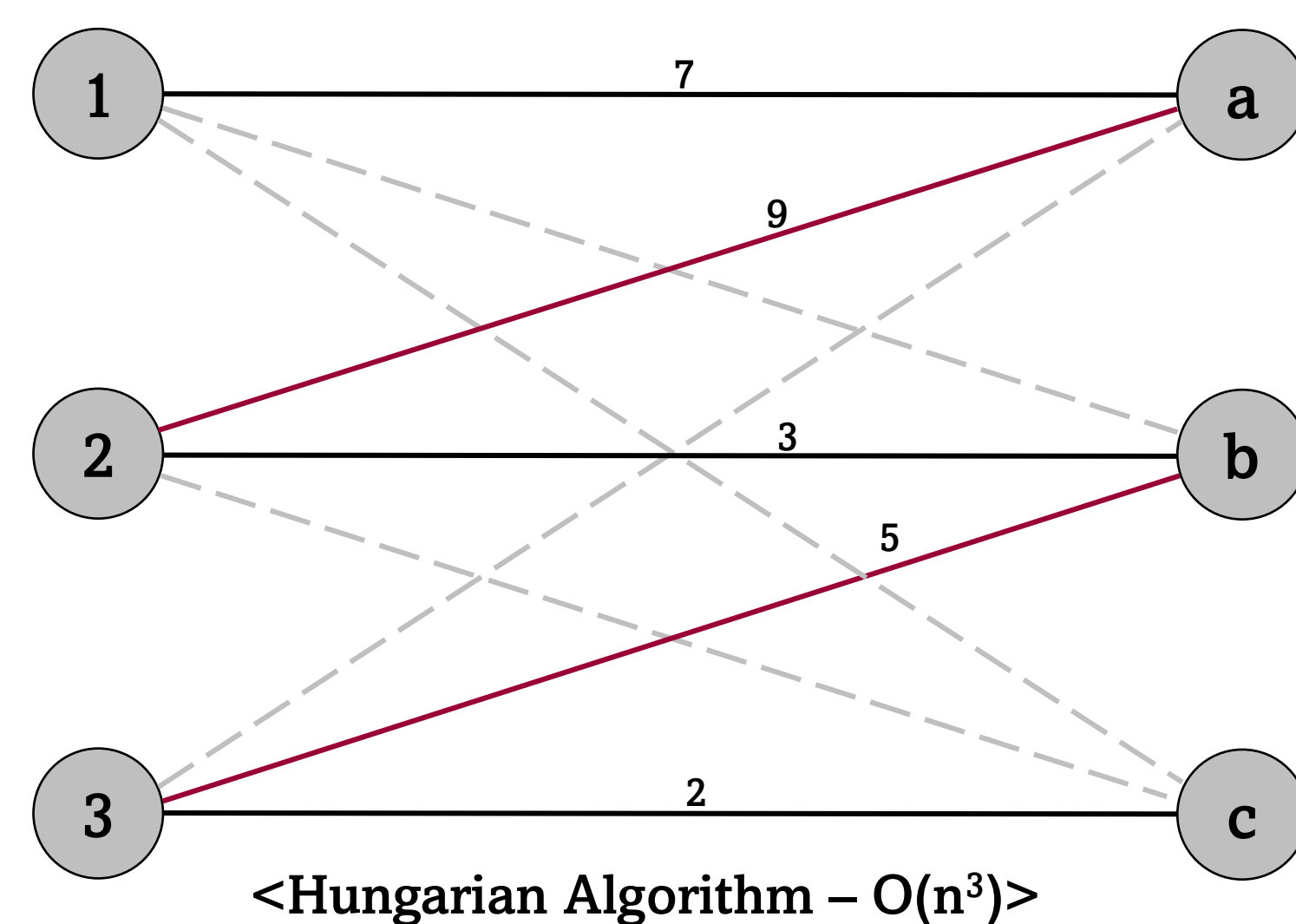
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Scholars Program

Advisor & Supervisor: Dr. Debankur Mukherjee, Dr. Siva Theja Maguluri & Eyal Castiel

Progress

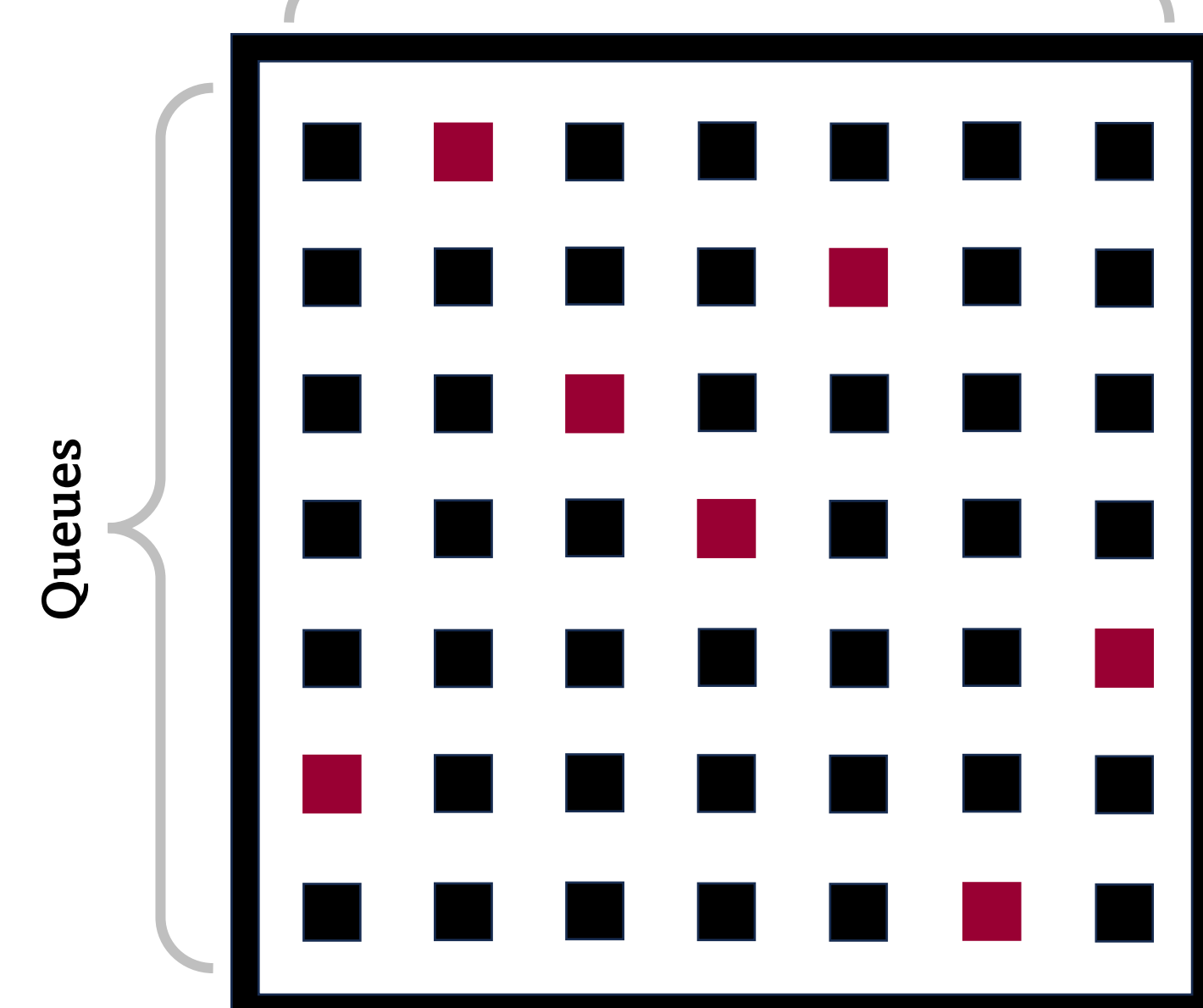


$$\text{Traffic Intensity} = \rho = \frac{\lambda}{\mu}$$



<Hungarian Algorithm – $O(n^3)$ >

Virtual Output Queues for Queue n



<Switch Network System with VOQs>

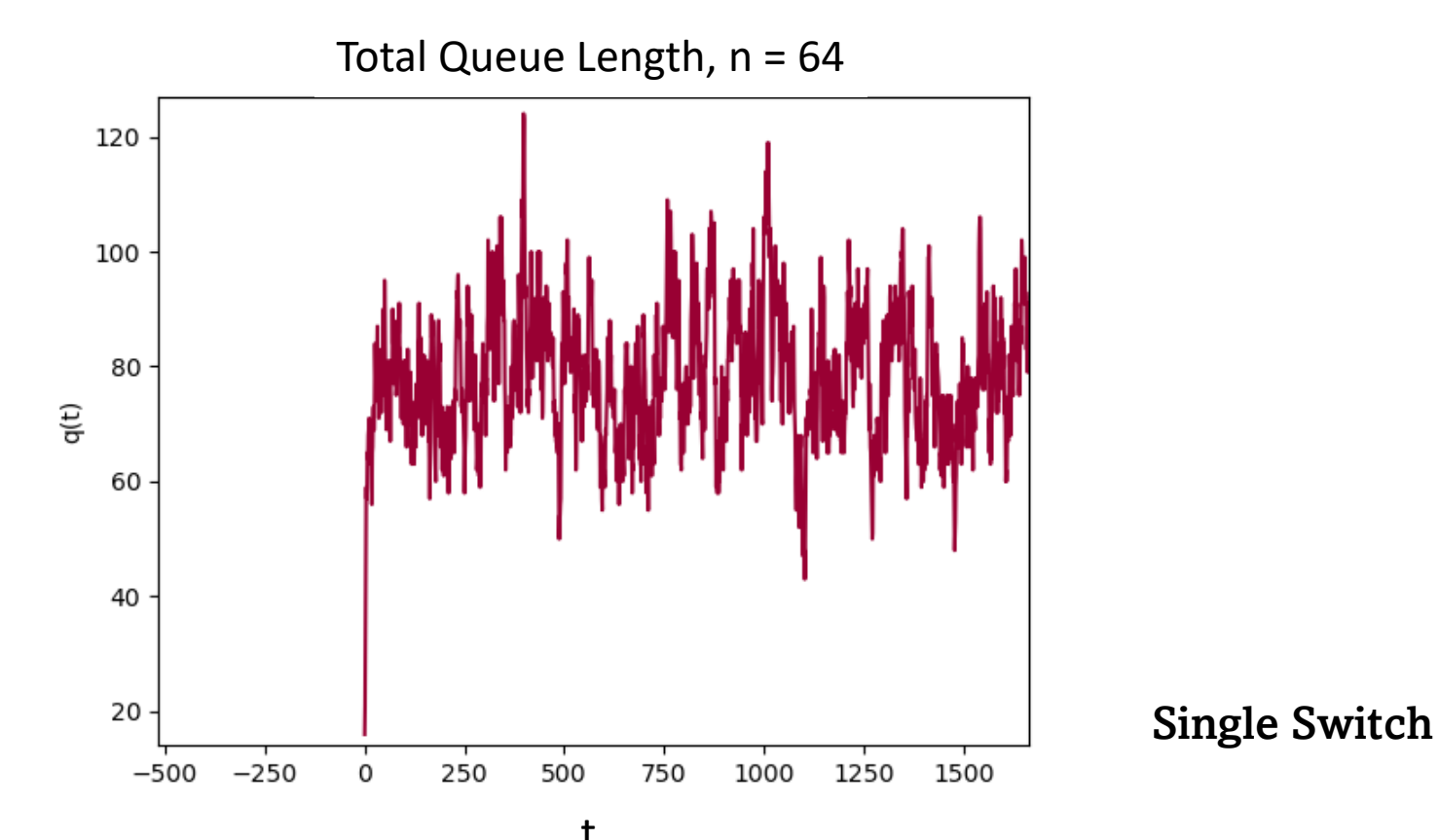
$$Q(t+1) = (Q(t) + A(t) - M(t))_+$$

<Markov Property>

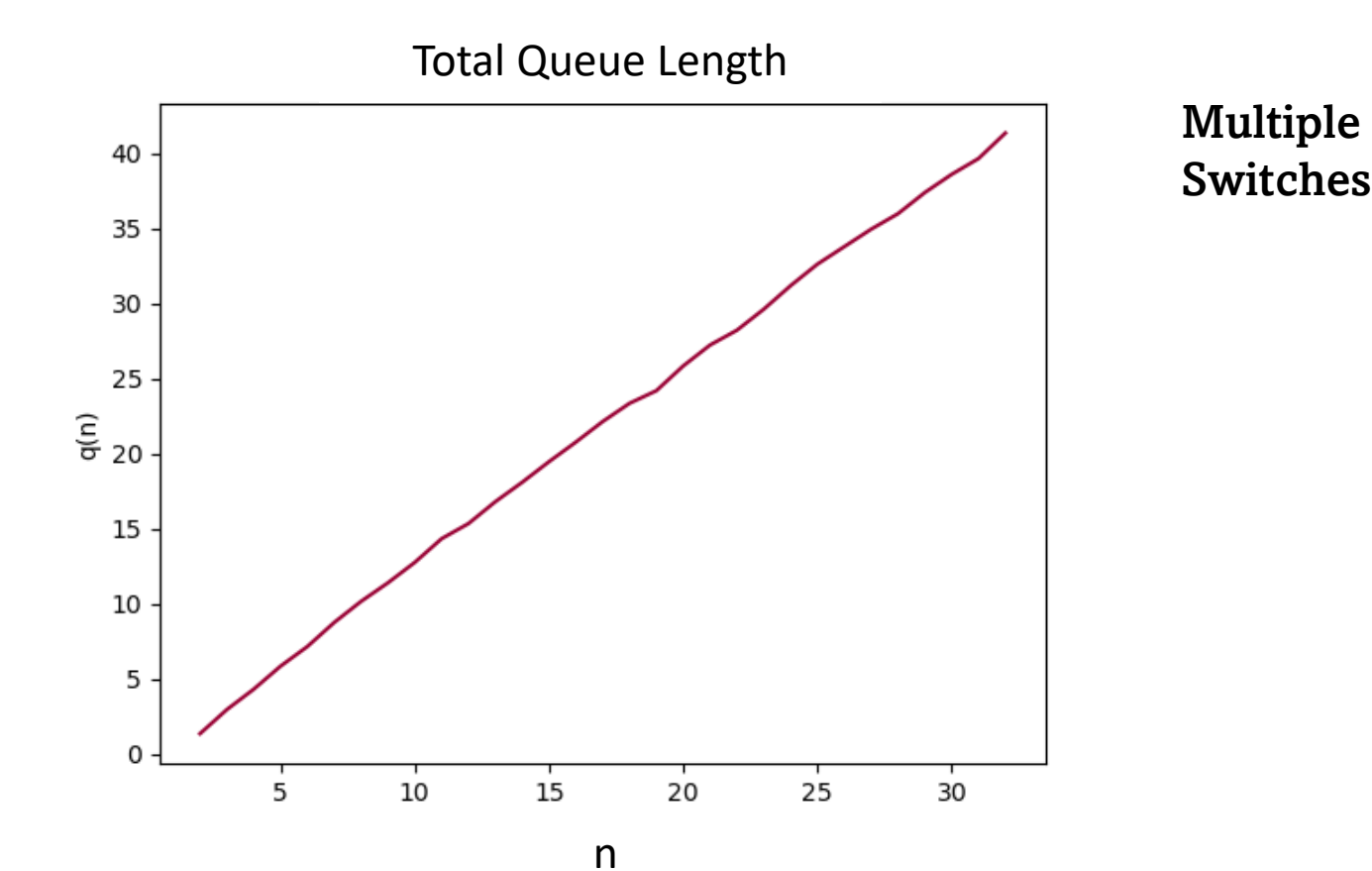
Hypotheses

The switch network will reach equilibrium, and the mean of the following observable variables will follow a trend of...

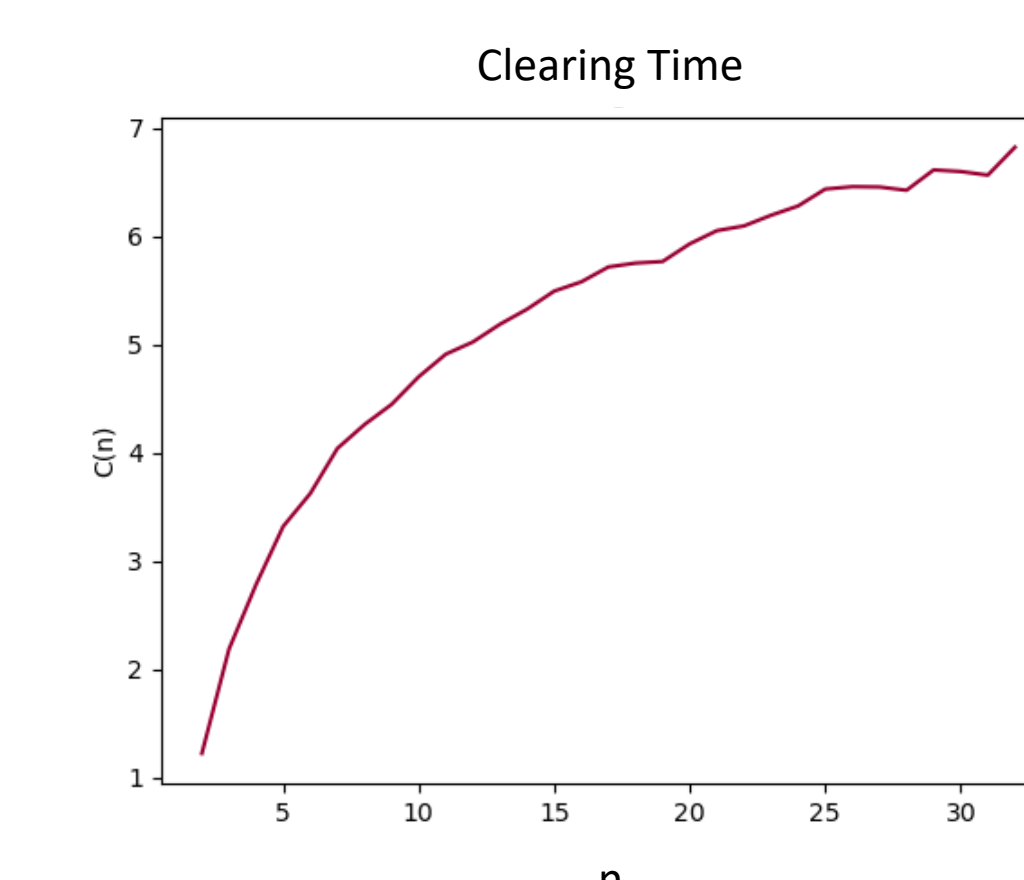
1. Linear ($\tilde{L}(n)$)
 - i. Total Queue Length
 - ii. Schedule's Weight
 - iii. Number of Non-Empty VOQs
2. Logarithm ($\ln(n)$)
 - i. Clearing Time
3. Constant (1)
 - i. Length of Maximum Virtual Output Queue



Single Switch



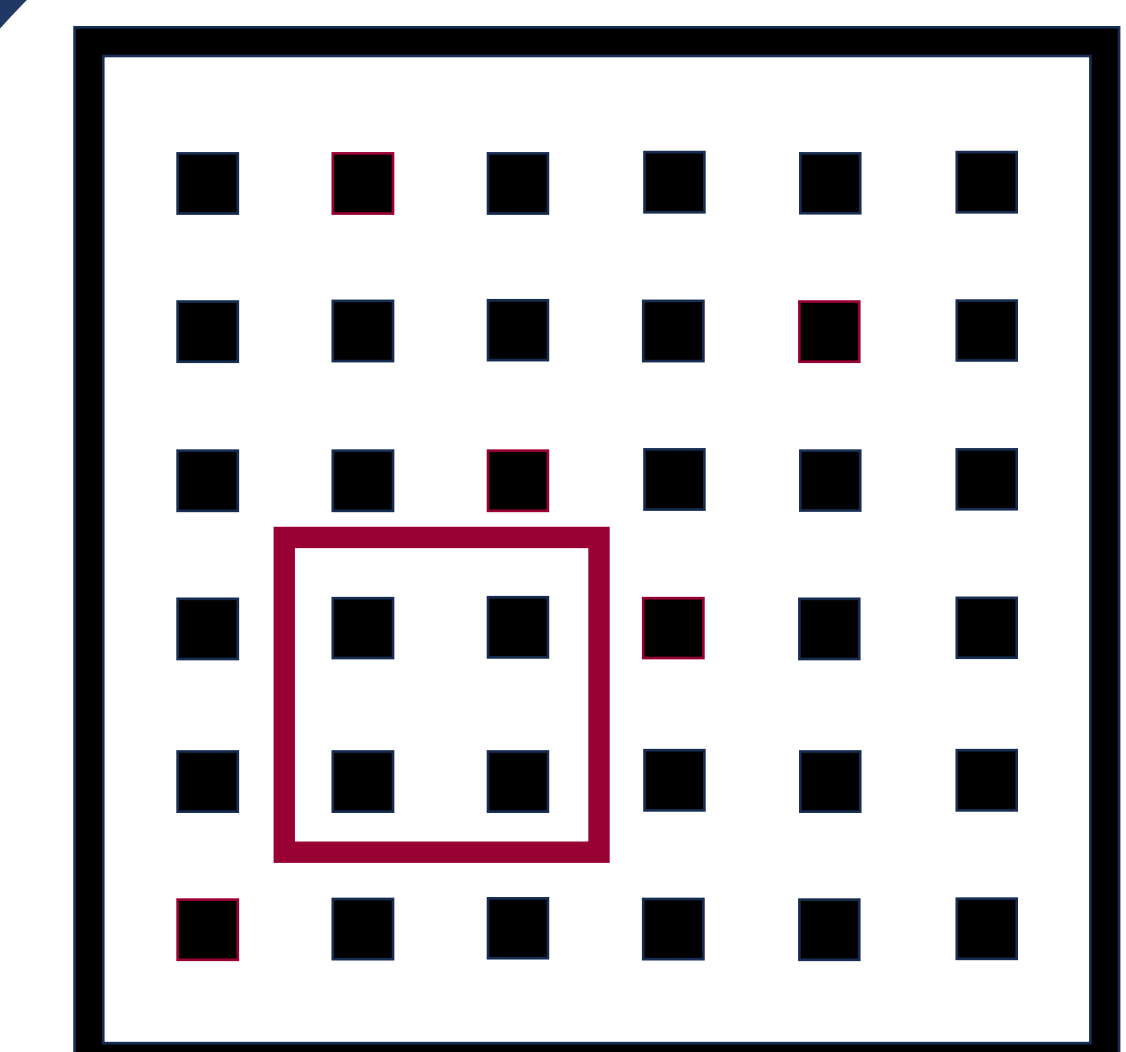
Multiple Switches



Future Objectives



Simulation
Optimization



Reference



GitHub