The National University of Singapore
School of Computing

CS4226 – Internet Architecture

Tutorial 1

Week 3: August 25 - August 29, 2025

NOTE:

- **Please work through the tutorial problems before class and bring your solutions with you.**
- **If any part of a question is unclear, you are encouraged to ask on Piazza.**

Q1. Suppose one is rolling two dice. Which of these pairs of events are independent?

1. $E_1 =$ "First roll is 6" and $E_2 =$ "Second roll is 6"
2. $E_1 =$ "Sum of the rolls is 7" and $E_2 =$ "Second roll is 4"

Q2. A network link is shared by N users. At any time, each user is online with probability p independently. What is the probability that there are more than m users being online at the same time?

Q3. In the hope of having a dry outdoor wedding, John and Mary decide to get married in the desert, where the average number of rainy days per year is 10. Unfortunately, the weather forecaster is predicting rain for tomorrow, the day of John and Mary's wedding. Suppose that the weather forecaster is not perfectly accurate: If it rains the next day, 90% of the time the forecaster predicts rain. If it is dry the next day, 10% of the time the forecaster still (incorrectly) predicts rain. Given this information, what is the probability that it will rain during John and Mary's wedding?

Q4. A professor practices the following strategy with respect to taking on new students. On the even-numbered years, she takes on 2 new students. On the odd-numbered years, she takes on 1 new student. Assuming the average time to graduate is 6 years, how many students on average will the professor have?