

# CSE 6740 Homework 1

Anqi Wu, Spring 2024

Deadline: Feb. 06 Tuesday, 9:30 am

- There are 2 sections in gradescope: Homework 1 and Homework 1 Programming. Submit your answers as a PDF file to Homework 1 (including report for programming) and also submit your code in a zip file to Homework 1 Programming.
- All Homeworks are due by the beginning of class. Homework is penalized by 20% for each day that it is late (this applies additively, meaning that no credit is gained after 5 late days).
- We strongly encourage the use of LaTeX for your submission. Unreadable handwriting is subject to zero credit.
- Explicitly mention your collaborators if any.
- Recommended reading: PRML Section 9.1, 12.1
- Python and Matlab are allowed.

## 1 Probability [17 pts]

1. We select a positive integer  $l$  with  $P\{l = n\} = \frac{1}{2^n}$ . If  $l = n$ , we toss a coin with probability of heads  $p = e^{-n}$ . What is the probability that the result is heads? [4 pts]
2. In a network of computers, 15% of the computers are infected by a virus  $V$ . An anti-virus scan has the property that if a computer is infected with  $V$ , the scan will detect the infection to be positive 95% of the time. However, if the computer is not infected, the scan will still detect the infection to be positive 10% of the time. All the computers which are detected to be infected, are applied with a corrective software-patch, which causes corruption of computers' files 20% of the time. Given that a computer picked at random has corrupted files, what is the probability that it was actually infected with the virus  $V$  to begin with? [4 pts]
3. Charlie has a choice to take a bus or walk to attend CSE6740 lecture. If he walks, he gets late with a probability of  $\frac{1}{3}$ . However, if he takes a bus, he gets late only with a probability of  $\frac{1}{6}$ . Further, if he gets on time, he always keeps the same mode of travel the day after, whereas he always changes when he gets late. Let  $p$  be the probability that Charlie walks on the first day.
  - (a) What is the probability that Charlie walks on the  $n^{\text{th}}$  day? [4.5 pts]
  - (b) What is the probability that Charlie gets late on the  $n^{\text{th}}$  day? [4.5 pts]

# Homework 1 Rdf Lehigh Cse

**Xiaoyong Du, Wenfei Fan, Jianmin  
Wang, Zhiyong Peng, Mohamed A.  
Sharaf**

## Homework 1 Rdf Lehigh Cse:

## **Homework 1 Rdf Lehigh Cse** Book Review: Unveiling the Power of Words

In a world driven by information and connectivity, the ability of words has become more evident than ever. They have the capacity to inspire, provoke, and ignite change. Such is the essence of the book **Homework 1 Rdf Lehigh Cse**, a literary masterpiece that delves deep into the significance of words and their impact on our lives. Written by a renowned author, this captivating work takes readers on a transformative journey, unraveling the secrets and potential behind every word. In this review, we shall explore the book's key themes, examine its writing style, and analyze its overall effect on readers.

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