CPSC 335 Spring 2025

Homework 2

Prof. Sampson Akwafuo

Due on 03/21 by 11:59 PM on Canvas

(Please submit only one PDF file. No Executable code is required)

Q1 (20). Exercise 3-2. Brute force password guessing. Each of the following is a different kind of password. An attacker can always try to bypass password security by guessing every possible password that might exist. In the worst case (for the attacker), the correct password is the last one that they guess. So, increasing the number of potential passwords makes password protection more effective. For each password type, compute the number of passwords of that type that exist. Justify your answers (show your work).

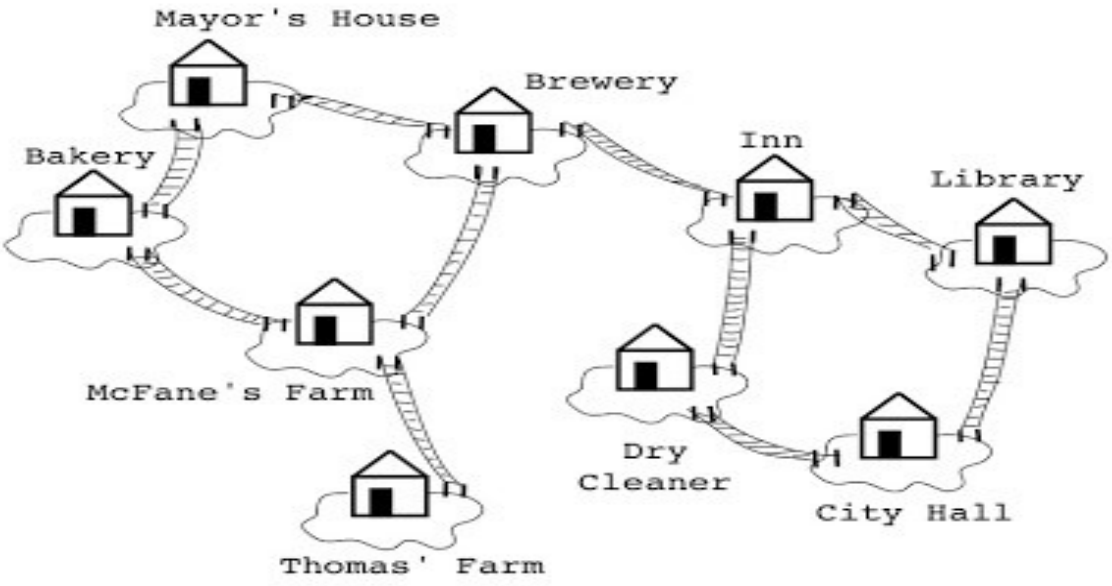
(c) Eight lower-case letters, upper-case letters, or digits.
(d) Nine letters.

Q2 (20). Design an algorithm that reverses a doubly-linked list, *without creating any new node objects.*

Q3: (30) Using induction method, prove the efficiency class of the following complexity functions:

(a) $3n + 4$
(b) n^2 +1
(c) $(n + 2)^6$

Q4 (30)



The diagram above represents a graph. Use the following abbreviations to represent the nodes: MH= Mayors house; BA= Bakery; MF= McFanes's Farm; BR= Brewery; TF= Thomas' Farm; IN=In; DC= Dry cleaner; LI=Library and CH= City Hall

(a) Using either adjacency matrix or list, what is the time complexity of adding a new facility, say School (SC). The community has decided to remove either the Brewery or Inn. What is the time complexity of doing this?

(b) The following roads are unidirectional (one-way):

MF-> BR= 23, DC->IN= 17, LI->IN=12, MF->BA= 9; IN->BR =5, what is the complete adjacency matrix? All roads leading to the Mayor's house are one-way and 18 miles each.
Other **non-given roads** are 30 miles in length (bidirectional).

(c) Produce the adjacency list and state whether the graph is dense, sparse and/or planar. Justify your answer.

You may work individually or in a group.