Assignment 2 - COSC 3320

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Theory Problem 1

(a)

To check if an element in L_1 is in L_2 we must iterate over each element of L_1 (n elements), and then compare each element of L_1 with every element of L_2. Thus the lower bound is $O(n^2)$.

(b)

Theory Problem 2

Theory Problem 3

To determine the average number of scalar multiplications for a sequence of n matrices we will use the following informal algorithm:

$S[i,i] = 0$
$S[i,i+1] = p_i + p_{i+1} + p_{i+2}$
$S[i,j] = \text{avg}(S[i,k] + S[k+1,j] + p_i + p_{k+1} + p_{k+1}),\ \text{for } i \leq k \leq j-1$

Where $S[i,j]$ is the matrix representing the average work for a parentheses configuration grouping every element from i to j and p_i represents the ith dimension of the original matrix sequence. The average work is equal to the sum of scalar multiplications for possible k-values divided by the total number of k-values.

Since