

CSE310 HW06, Monday, 04/19/2021, Due: Monday, 04/26/2021

Please read the instructions carefully. **You have to use the companion answer sheet (which is a fillable PDF file) to type/select your answers to the questions described here.** Hand-written assignment (or photo of it) will not be graded. **Submit the filled PDF file of the answer sheet on Gradescope, following the link on Canvas.** You should name your file using the format **CSE310-HW06-LastName-FirstName.pdf**. **Make sure that your submission can be viewed clearly on gradescope for auto-grading.** Adobe Acrobat Reader can be found at <https://get.adobe.com/reader/>.

Q1 (26 points: 24 + 2) Given two sequences $X=\langle C, B, B, A \rangle$ and $Y=\langle D, C, A, C, B, A \rangle$, you need to use dynamic programming to compute a longest common subsequence of X and Y .

- (a) On the answer sheet, answer questions regarding the values of $m[i, j]$.
- (b) On the answer sheet, write the LCS computed.

Q2 (14 points: 2 + 6 + 6) Suppose that we are using hashing with open addressing, where the (linear) probing sequence is defined by

$$h'(k) = k \bmod 13$$

and

$$h(k, i) = (h'(k) + i) \bmod 13.$$

The following questions all refer to the hash table in the following.

j	0	1	2	3	4	5	6	7	8	9	10	11	12
$T[j]$	10	DELETED	9	DELETED	DELETED	8	7	6	5	4	3	2	1

- (a) What is the load factor of the hash table at the top of this page? Write your answer on the answer sheet as a fraction.
- (b) What are the cells (the j values) probed when performing Hash-Insert(T , 25) to the hash table at the top of this page.
- (c) What are the cells (the j values) probed when performing Hash-Delete(T , 8) to the hash table at the top of this page.

Q3 (10 points: 4 + 6) The following problems are concerned with hashing.

- (a) Let $A = \frac{\sqrt{5}}{2}$, and the table size be $m = 16384$. For $k = 654321$, what is the hash value $h(k)$ if you are using the multiplication method?

- (b) Suppose you are using chaining (with a linked list) for collision resolution. Assume that the table size is m and the number of elements in the table is n . What is the worst-case time complexity for insertion? What is the worst-case time complexity for searching? What is the worst-case time complexity for deletion?