Week 09 Quiz

Plagiarism declaration

By submitting work for this quiz I hereby declare that I understand the University's policy on **academic integrity (https://academicintegrity.unimelb.edu.au/)** and that the work submitted is original and solely my work, and that I have not been assisted by any other person (collusion) apart from where the submitted work is for a designated collaborative task, in which case the individual contributions are indicated. I also declare that I have not used any sources without proper acknowledgment (plagiarism). Where the submitted work is a computer program or code, I further declare that any copied code is declared in comments identifying the source at the start of the program or in a header file, that comments inline identify the start and end of the copied code, and that any modifications to code sources elsewhere are commented upon as to the nature of the modification.

Due May 14 at 23:59 **Points** 10 **Questions** 10
Available May 5 at 10:00 - May 14 at 23:59 10 days **Time Limit** None
Allowed Attempts Unlimited

Instructions

You should attempt the quiz after the lecture and your tutorial.

- The quiz is available for a period of 10 days.
- You may attempt the quiz multiple times (if you happen to get a question wrong, you can do it again)
- Your score on the quiz will be recorded in the grade book.
- The quiz might not display equations correctly in some browsers. If you experience problems, we recommend that you use Firefox.

Note: you must complete at least eight of the weekly quizzes to meet one of the hurdle requirements in this subject.

This quiz was locked May 14 at 23:59.

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	44 minutes	7 out of 10

Score for this attempt: **7** out of 10
Submitted May 13 at 15:36
This attempt took 44 minutes.

Question 1

1 / 1 pts

Suppose we have a hash function h(k) = k mod 11 and a hash table T of size 11.

When the following keys 44, 77, 30, 92, 100, 54, 63 are inserted into T using linear probing (that is, in an open-addressing manner), the key 100 will be in table position?

Correct!

- (selected) 2
- 0
- 1
- 10

Well done. Too easy!

Question 2

0 / 1 pts

A hash table with 5003 entries is used with linear probing (that is, in an open-addressing manner). It currently holds 4000 keys/records. How many probes should we expect during a lookup for some key that is in fact present (that is, in a successful search)?

ou Answered

- (selected) 2

orrect Answer

- 3
- 4
- 5
- 6
- At least 7

No. What is the load factor? How do you calculate the expected number of probes?

Question 3

0 / 1 pts

Edsger Dijkstra studied the following problem which he called the Problem of the Dutch National Flag. We are given an array of pebbles, some blue, some red, some white. We want to rearrange them in the order of the Dutch flag, that is, first come the red, then the white, and finally the blue pebbles. Which sorting method is best suited for this task, that is, most efficient?

- Heapsort
- Insertion sort
- Mergesort

ou Answered

- Quicksort
- Selection sort
- Shellsort

orrect Answer

Sorting by counting

No, there's a better option. What is unusual about this particular sorting problem?

Question 4

1 / 1 pts

Which of the following statements about hashing is false?

Correct!

A good hash function maps similar data items or records to the same hash values.

A good hash function uniformly distributes data items across the entire set of possible hash values.

A perfect hash function allows for constant time search, insertion, and deletion, into and from a hash table.

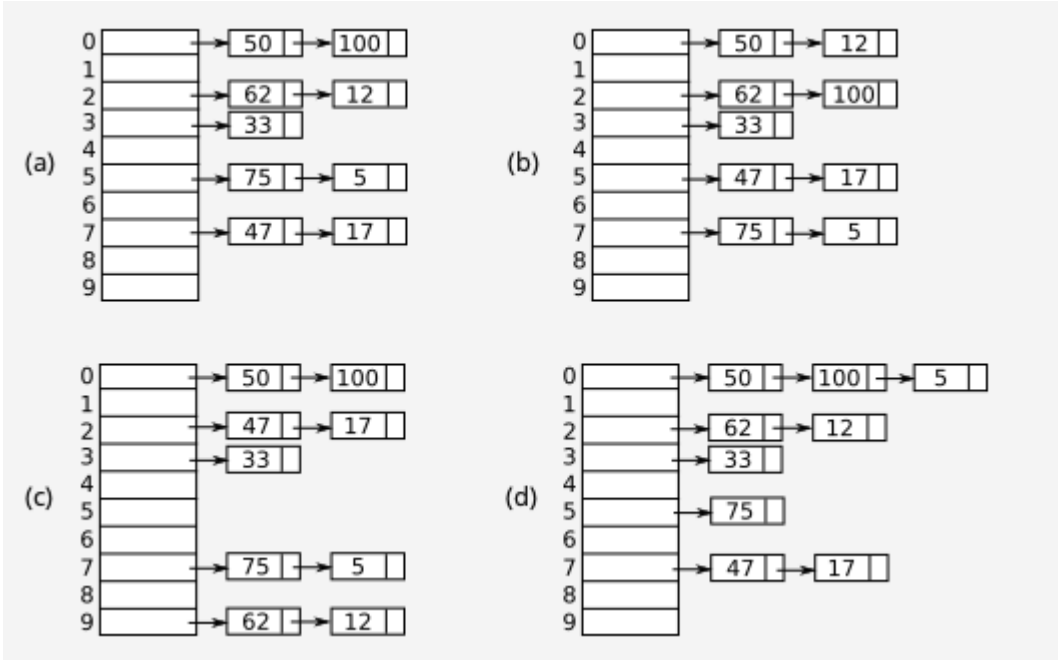
When using an open addressing method of collision resolution, all data records reside in a single bucket array.

Question 5

1 / 1 pts

Consider an emtpy Hash Table, and the simple hash function f(key) = key mod 10. (Note, we know 10 is not prime ...)

When using the separate chaining with linked lists method of collision resolution, which of the following hash tables is produced after inserting keys 12, 5, 100, 50, 75, 17, 62, 33, and 47, in that order, into the above table. Note that when inserting an item into an unsorted linked list, we insert it at the front of the list.



Correct!

- (a)
- (b)
- (c)
- (d)

CORRECT: Each time we insert a key K into our table, we add it to the linked list at index = K mod 10. In this example, we are inserting our keys at the front of the relevant linked lists.

Question 6

1 / 1 pts

Consider a hash table with hash function H (x) = x mod 11. To resolve collisions, double hashing with H'(x) = 7 - (x mod 7) is used.

The keys 0, 1, 8, 9 are already in the table.

index	0	1	2	3	4	5	6	7	8	9	10
key	0	1							8	9	

What index position will hold the key 52 when added to the hash table?

Correct!

- (●) 5
- ( ) 3
- ( ) 7
- ( ) 10

Question 7

0 / 1 pts

Considering collision handling approaches for hash tables, it is correct to say:

- ( ) Deletion of an item can always be performed in O(1) time when using linear probing.
- ( ) Deletion of an item can always be performed in O(1) when using separate chaining.

orrect Answer

Deletion of an item can always be performed in O(n) time.

ou Answered

Double hashing facilitates item deletion in comparison with linear probing.

Question 8

1 / 1 pts

What is the time complexity of rehashing values from a hash table of size *n* containing 2*n* elements, where separate chaining is used and each bucket points to a sorted linked list, into a new hash table of size 2*n* (the new hash table also uses separate chaining and each bucket points to a sorted linked list)?

Correct!

- $O(n^2)$
- O(n)
- O(1)
- O(2n) + n

Question 9

1 / 1 pts

How many character comparisons will Horspool's algorithm make in searching for the pattern 01010 in a binary text consisting of one thousand zeros?

Correct!

996

orrect Answers

996 (with margin: 0)

Question 10

1 / 1 pts

Given the string 001001001001 we wish to use some string search algorithm to see if the string contains the substring 111. The candidates are the brute-force method and Horspool's. The number of character comparisons the two will make are, respectively:

- 13 and 4
- Correct! 13 and 5
- 12 and 5
- 12 and 6
- 13 and 6
- 13 and 8

Yes, that's good.

Quiz Score: **7** out of 10