CSE 102 | **Midterm Examination**
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1. This is a closed book examination; one handwritten study sheet is allowed.
2. Please check the entire examination immediately to ensure that your copy has all seven pages.
3. Put your name on all pages of the examination.
4. All questions have equal mark value.
5. Neatness counts.
6. You must clearly show your work; take time to prepare a legible answer.
7. There will be no regrades on examinations written in pencil.
8. Good luck and have fun!

name ______________________________

student id ___________________________

oce or cs100 login ______________________

1.	____________	5.	____________
2.	____________	6.	____________
3.	____________	7.	____________
4.	____________	8.	____________
		total	____________

Disk Drives name ______________________

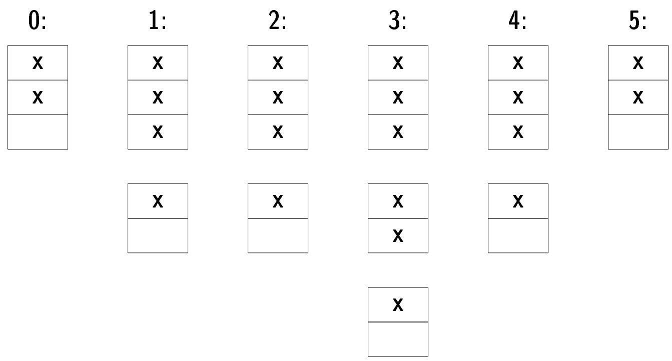
1. What is a disk drive *"cylinder?"*

2. What time components make up the average time to access all the data on a random cylinder? State, in words, how to calculate this access time.

3. What sequence of linear hashing configurations results when the following records are inserted in order into an empty structure? Show a configuration before and after each split operation — be sure to provide the values of *next*, *level*, and the storage utilization just before and after each split operation. Let $S_P = 1$, $S_O = 1$, $\alpha_{max} = 2/3$, and $N = 1$. Use the hash functions $h_i(x) = x \,\%\, 2^i$.

2, 4, 1, 3, 12, 11, 19

4. What is the successful search length for the following linear hashing structure? *N* is two, *level* is one and *next* is two. The x mark designates a stored record.



5. What is the unsuccessful search length of the structure above?

6. A sorted data file contains huge records one per node. Build an order 3 B+tree index for the following data using bottom-up construction.

19, 81, 24, 66, 41, 63, 99, 21, 15, 88, 90, 35

7. Explain why bottom-up B+tree index construction is preferred to top-down construction?

8. Our key space consists of the interval [2..22]. Our ibim index currently is configured such that *level* is six and *next* is ten. Which chains are accessed for the range query (4.1,5.7)? Designate the chains that must be examined record-by-record on the edges.