

CS 35L SAMPLE FINAL
100 POINTS
180 MINUTES
OPEN BOOK OPEN NOTES

1. Mention if the following regular expressions have the same behaviour. If they represent the same set of strings then mention YES and provide an example of one such string. If they don't represent the same set of strings then mention NO and provide an example on one string that the first regular expression matches but the second one does not. [12 points]
 - a. $[xy]^+x^*z$ and $[xy]^*z$
 - b. $a^*b^*[ab]^*(ab)$
 - c. $(a|ba)^?$ And $(b)?a^?$
2. Mention two differences between static linking and dynamic linking? When would you prefer one over the other? [5 points]
3. What is the difference between buffered and unbuffered I/O? Give one example of each? Is it possible for unbuffered I/O to be better than buffered I/O? [8 points]
4. What are race conditions? Explain with an example. Can you modify your example to avoid race condition using a synchronization mechanism? [10 points]
5. How does locale affect the behaviour of sort? Explain with an example. [5 points]
6. Write a multithreaded program using pthreads to sort 100,000 integers. The program should create 10 threads using pthread library. Assume 100,000 integers are in an array called values. Use qsort to sort. You will have to write a compare function too [20 points]
7. You are required to allocate and deallocate memory to a 3 dimensional array using malloc and free. You are given a pointer-to-a-pointer-to-a-pointer as shown below. The sizes for the array dimension are 100, 200 and 300. Allocate memory using malloc() and deallocate memory using free() [15 points]
float ***M
8. What is the difference between a git rebase and a git merge [5 points]
9. Explain how SSH uses asymmetric encryption. (Explain both server side and client side) [10 points]
10. Explain why source control is required [5 points]

11. You have just built an executable (ELF format) out of a 'C' program that uses shared libraries. The executable runs without any errors while using functions from the shared libraries. But when you run the 'ldd' tool on the executable, it does NOT show the .so file for one of the shared libs, that contains functions you are using in the program. What is the reason for this? Briefly explain this behavior at a conceptual level. (NOTE: This is not because of the ldd file not being able to locate the .so file in the file system [5 points])