1. **[10]** Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is

   86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests, for each of the following disk-scheduling algorithms?

   a) FCFS  
   b) SSTF  
   c) SCAN  
   d) LOOK  
   e) C-SCAN

2. **[10]** Implement "Least Recently Used" (LRU) page replacement algorithm using

   (i) Stack,  
   (ii) Queue and  
   (iii) Link List data structure.

Which data structure seems to be the fittest for LRU implementation? Why?

3. **[10]** Write a simple "password cracking program" that can crack any alphanumeric password of length up to 4 (You can use brute force searching or any other mechanism). Also write code inside your implementation to track how much time and attempts it takes for each of these cracking.

   Implement the same for any alphanumeric password of length up to 6. Track time and number of attempts before the password is cracked.

   Provide source code, executable and screen shots in a zip folder.

4. **[10]** What is "salt" in Operating System terminology? What is the purpose of using a "salt" along with the user-provided password? Where should the "salt" be stored, and how should it be used?