Operating Systems & Shell Programming Assignment Questions

Shell Scripting

1. Write a shell script to check whether an entered number is a prime number.
2. Write a shell script to check whether an entered string is a palindrome.

Process Synchronization

3. Implement the Classical Reader–Writer problem using Threads and Mutex.
4. Implement the Classical Producer–Consumer problem using Threads and Semaphores.

System Calls

5. Write a program demonstrating the use of the following system calls:
   - Process-related system calls: `fork`, `wait`
   - File-related system calls: `open`, `read`, `write`, `close`

CPU Scheduling Algorithms

6. Write a program to compute the finish time, turnaround time, and waiting time for the FCFS scheduling algorithm.
7. Write a program to compute the finish time, turnaround time, and waiting time for the SJF (Non-preemptive) scheduling algorithm.
8. Write a program to compute the finish time, turnaround time, and waiting time for the Round Robin scheduling algorithm.

9. Write a program to compute the finish time, turnaround time, and waiting time for the Non-preemptive Priority scheduling algorithm.

10. Write a program to compute the finish time, turnaround time, and waiting time for the Preemptive Priority scheduling algorithm.

Page Replacement Algorithms

11. Write a program to calculate the number of page faults for a reference string using the FIFO page replacement algorithm.

12. Write a program to calculate the number of page faults for a reference string using the LRU page replacement algorithm.

13. Write a program to calculate the number of page faults for a reference string using the Optimal page replacement algorithm.

Deadlock Avoidance

14. Implement the Banker's algorithm for deadlock avoidance and find a safe sequence for the processes.