Assignment Questions

Sub Name: Operating Systems Sub Code: CoSc 2042

Answer any five questions

1. Describe the two general roles of an operating system, and elaborate why these roles are important.
2. Using a simple system call as an example (e.g. getpid, or uptime), describe what is generally involved in providing the result, from the point of calling the function in the C library to the point where that function returns.
3. Why must the operating system be more careful when accessing input to a system call (or producing the result) when the data is in memory instead of registers?
4. Describe how a multi-threaded application can be supported by a user-level threads package. It may be helpful to consider (and draw) the components of such a package, and the function they perform.
5. Why might filesystems managing external storage devices do write-through caching (avoid buffering writes) even though there is a detrimental affect on performance.
6. Describe the difference between external and internal fragmentation. Indicate which of
7. the two are most likely to be an issues on a) a simple memory memory mangement machine using base limit registers and static partitioning, and b) a similar machine using dynamic partitioning.
8. Describe page-based virtual memory. You should consider pages, frames, page

tables, and Memory Management Units in your answer.

1. Name and describe four page replacement algorithms. Critically compare them with each other.
2. Describe buffering in the I/O subsystem of an operating system. Give reasons why it is required, and give a case where it is an advantage, and a case where it is a disadvantage.
3. Explain how the producer-consumer problem is relevant to operating system I/O.
4. What is the difference between preemptive scheduling and non-preemptive scheduling? What is the issue with the latter?
5. The traditional UNIX scheduler is a priority-based round robin scheduler (also called a multi-level round robin schduler). How does the scheduler go about favouring I/O bound jobs over long-running CPU-bound jobs?
6. In a real-time system with a periodic task set,, how are priorities assigned to each of the periodic tasks?
7. What is an EDF scheduler? What is its advantage over a rate monotic scheduler?