CSC3002F OS2 REPORT

SKSVPX001
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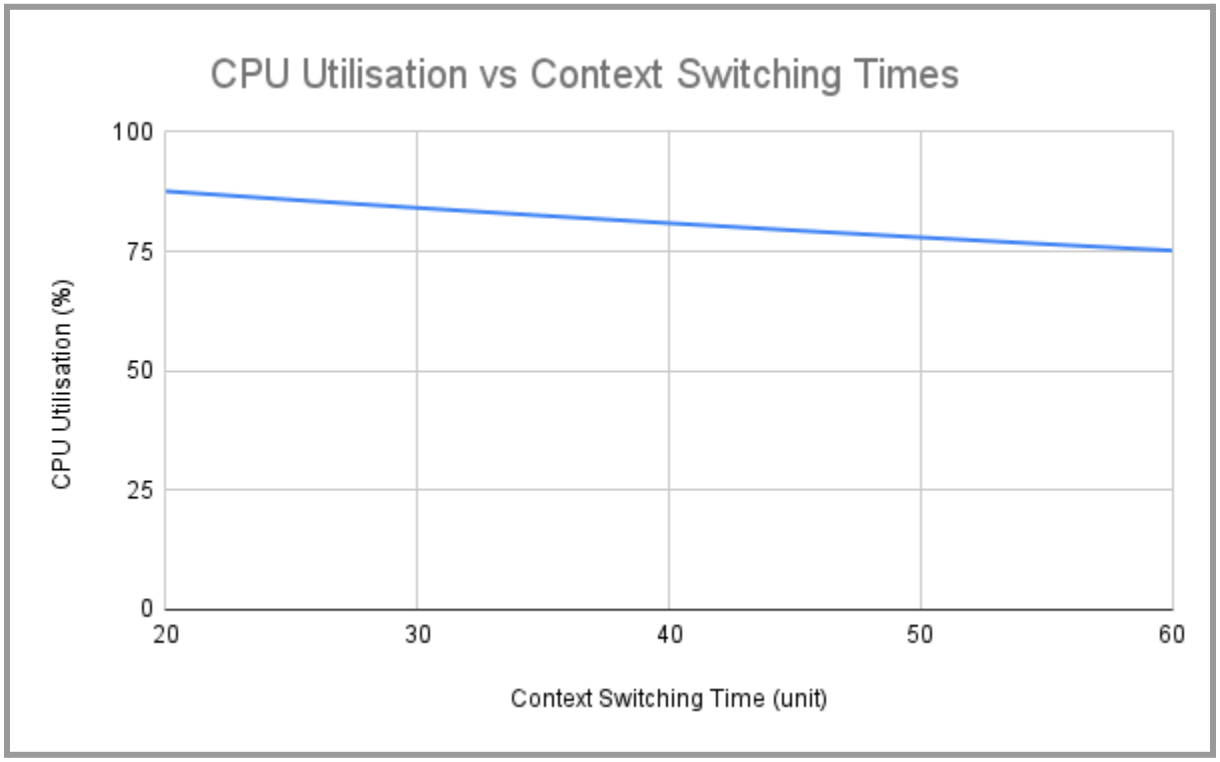
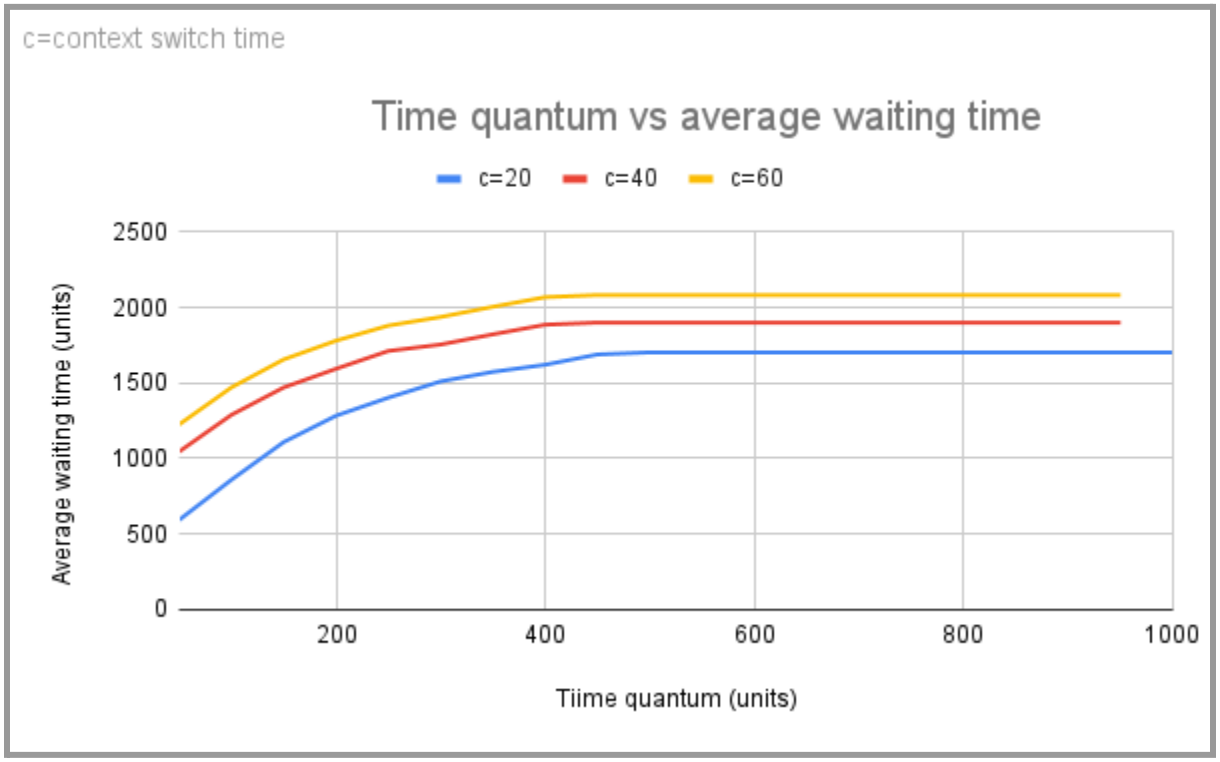
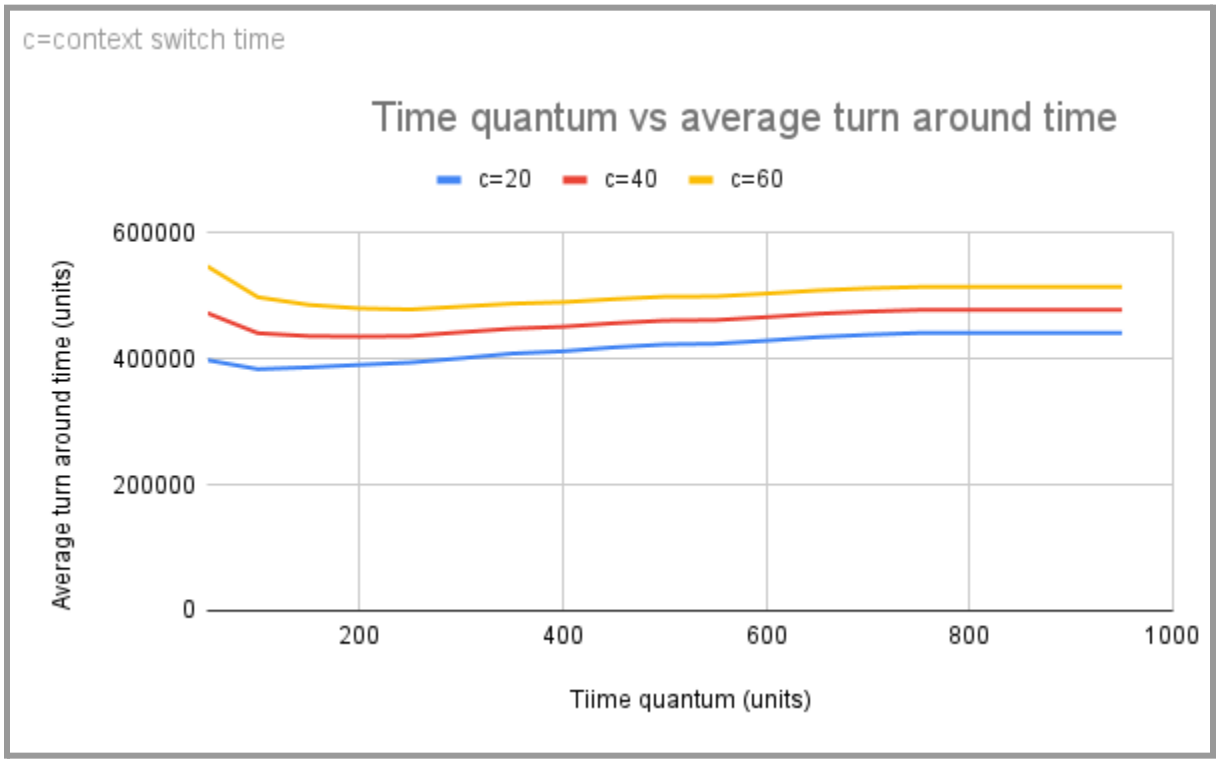




The reason for this observation is:

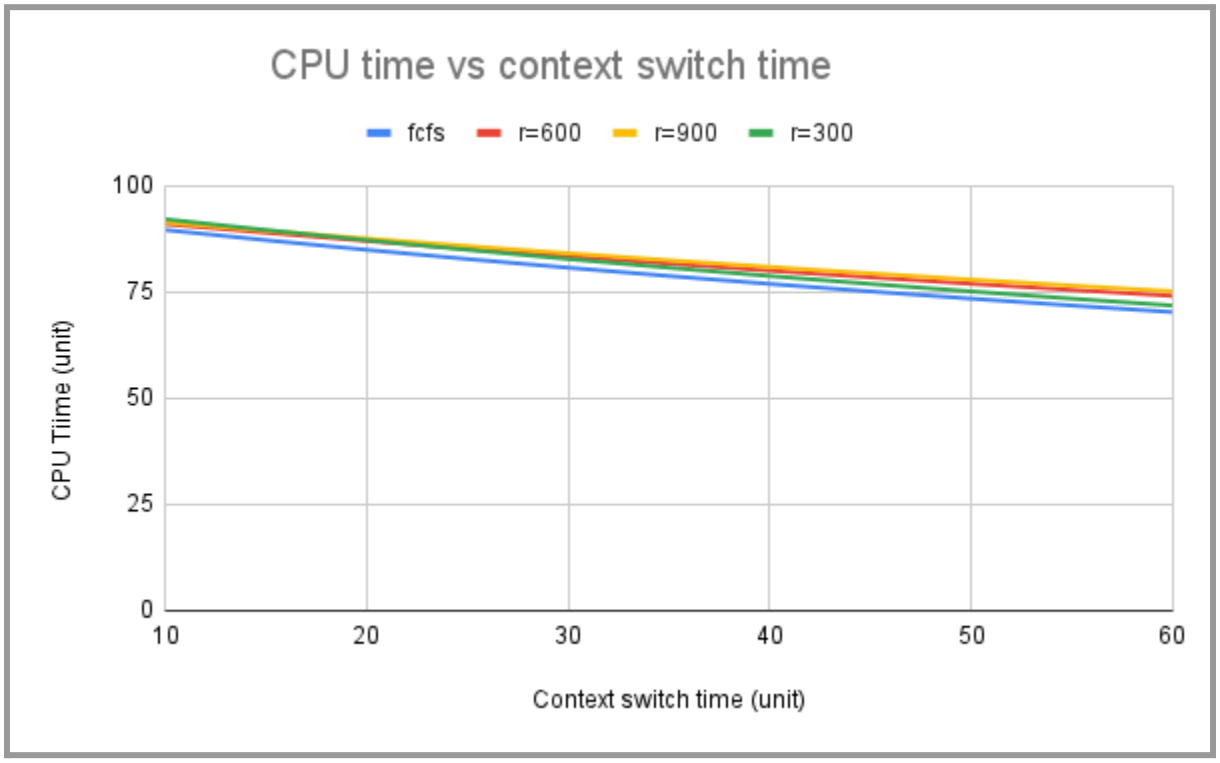
- Quantum Length: If the time quantum is set to a larger value, it allows each process to run for a longer duration. As a consequence, the waiting time for each process may increase since they spend more time waiting for their next turn. This is especially true when there are a large number of processes in the queue.
- Arrival Time of Processes: When processes arrive in a clustered manner, with several arriving at the same time, the waiting time can increase. In RR scheduling, processes are executed in a circular order, and if multiple processes with similar arrival times are waiting, they will be scheduled one after another. This clustering effect can cause an increase in waiting time for the subsequent processes.
- Context Switch Overhead: Context switching, which occurs when the CPU switches from one process to another, incurs some overhead. If the time quantum is small, it leads to more frequent context switches, resulting in additional overhead. As a result, the waiting time may increase as processes wait for context switches to complete before resuming their execution.



The reason for this behaviour in the simulation is:
- Increased context switching: In RR scheduling, the time quantum represents the maximum amount of time a process can run. Initially, as the time quantum decreases, the number of context switches between processes increases. This can lead to overhead and inefficiency in the system, resulting in longer turnaround times.

- Variability in process behaviour: Different processes have varying resource requirements, execution times, and dependencies. When the time quantum is reduced,

shorter processes may complete quickly, resulting in lower turnaround times initially. However, longer processes that require more time to execute may get preempted more frequently, leading to delays and increased turnaround times.



The reason for observing this behaviour is:
Time Quantum and CPU Time:

- When the time quantum is increased, each process gets a longer duration of uninterrupted CPU time.
- Therefore, as the time quantum increases, the CPU time available to each process also increases, resulting in a linear relationship between them.

Time Quantum and Context Switch:

- Context switch is the process of saving the current state of a process and loading the saved state of another process.
- In round-robin scheduling, context switches occur when a time quantum expires, and the CPU needs to switch to the next process.
- With a longer time quantum, each process can execute for a more extended period, reducing the frequency of context switches.
- As the time quantum increases, the number of context switches decreases because each process has more time to execute before being preempted.

- Therefore, there is a linear decrease in the number of context switches as the time quantum increases.

Relationship between CPU Time and Context Switch:

- With longer CPU time slices provided by a larger time quantum, the number of context switches decreases.
- Consequently, the amount of CPU time spent on context switches decreases since fewer switches occur.
- As a result, there is a linear relationship between CPU time and context switch, as both decrease together with an increasing time quantum.