**Task 1:**

Discuss briefly how you would use simulation to evaluate the hospital system and how it can be used to redesign or improve system capacity. Keep your response to a **maximum** of **500** words.

**Task 1 answer:**

To tackle this problem of improving system capacity, I would first develop a simulation model that captures the current patient inflow. It would model patient arrivals by patient acuity levels, treatment times, resource allocation (nurses, doctors, beds), triage processes, treatment areas (Fast Track, Main ED), laboratory test requirements, and discharge or admission decisions. The model should include variability in arrival times, waiting and treatment times, and resource constraints to reflect the natural stochastic processes in real-life emergency care.

Next, I would use the model to test various scenarios to identify where the current system is lacking, such as increasing patient volumes or adjustments to staff allocations. From these simulation results, I can gain insights on how to optimise the current operations to improve workflow.

Following which, I would simulate different improvement strategies such as expanding the Fast Track capacity, adding more staff to the Fast Track, revising triage protocols to distribute patients more effectively, or increasing the number of beds in the Main ED. Each scenario can be stress-tested under various demand conditions to evaluate its robustness. This will help to determine the most effective methods for managing the increase in patient volumes.