**Task 2:**

Please sketch out the process flow of the system, identify and list:

1. The components of the system
2. The input data needed to model the system
3. The simulation outputs collected to evaluate the system performance
4. Any assumptions that you have made in this model

**Task 2 answer:**

1. Components of the system

|  |  |
| --- | --- |
| System | Hospital |
| Entities | Patients |
| Resources | Doctors, nurses, beds |
| Attributes | Patient acuity level, doctor status (busy or idle), nurse status (busy or idle), bed status (occupied or available) |
| Activity | Triage process, Fast Track treatment, Main ED treatment, inpatient treatment |
| Events | Patient arrives at hospital, patient gets discharged |
| State variables | Number of patients waiting, number of busy staff (doctors and nurses), number of occupied beds |

1. Input data needed to model the system
   1. Patient inter-arrival rates
   2. Patient type (Fast Track or Main ED)
   3. Resources availability (nurses, doctors, beds)
   4. Nurses assessment times
   5. Doctors consultation times
   6. Laboratory test processing times
2. Simulation outputs collected to evaluate the system performance
   1. Average service time at each treatment area (Fast Track and Main ED)
   2. Average waiting time for staff at each treatment area (Fast Track nurse, Fast Track doctor, Main ED nurse, Main ED doctor)
   3. Total length of stay in hospital
   4. Patient outcomes (discharged or admitted)
3. Any assumptions made in this model
   1. 40% of patients who enter the hospital go to the Fast Track and 60% of patients go to the Main ED.
   2. Nurses take between 5-15 minutes to assess patients in the Fast Track, doctors take between 10-30 minutes to consult patients in the Fast Track, nurses take between 10-20 minutes to assess patients in the Main ED, and doctors take between 20-60 minutes to consult patients in the Main ED
   3. 60% chance of patients in the Main ED requiring laboratory tests
   4. 70% of patients get discharged to go home and 30% of patients get admitted
4. Process flow of the hospital system

Patient arrives at hospital

Patient waits for triage process

No

Patient leaves the hospital

Patient gets treated

No

Yes

Lab test done

Lab test required?

Patient gets admitted

Patient waits to be transferred to inpatient department

Patient discharged?

Patient waits for nurse assessment

Patient waits for nurse assessment

Patient gets consulted

Patient waits for consultation

Patient waits for consultation

Patient gets consulted

Yes

No

Yes

No

Yes

Yes

Doctor available?

Doctor available?

No

No

Nurse available?

Nurse available?

Main ED

Fast Track

Yes

No

Patient very sick?

Yes