OR 441 – Modeling and Simulation
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Case Study: *Heart Surgery Hospital*

A Hospital admits patients for heart surgery. There are different levels of heart treatment in the hospital according to patient heart conditions. There are four levels of patient's health conditions. First, the patient condition is High Critical (HC) which means the patient is really in very bad condition and there is a high risk for his health and the patient will stay longer days in the hospital. Second, Medium Critical (MC) means the patient is in bad condition and but the risk for his health is less than HC and the patient will stay less days in the hospital. Third, Low Critical (LC) means the patient's condition is under control and no risk for his health. So the LC patient will not stay long in the hospital. Lastly, Normal State (NS) means the patient's condition is very normal and need quick surgery. So the NS patient will leave hospital after he did the surgery.

Requests for heart surgeries arrive to the hospital random with constant arrival rate per month. The arrival distribution is known from past data. Since the resources of the hospital are limited, if a patient arrives requesting surgery and there is no bed for him, then the hospital will let the patient waits at his home until they call him for his appointment to come for the surgery. **You will do the simulation of the Heart Surgery.** More details will be given to you about the case in the exam paper (parameters/ distributions).

The main goal of this exam is to make you able to understand the problem and combine what you learned in the course to build the simulation model easily. So, **here is my advice to you:**

- Understand this case very good so you do not get surprised or spend time translating.
- The exam will take the complete 2 hours. So, be ready for retrieving any information you need from the slides quickly.
- If you study carefully, the questions on the **Case Study** above will guide you to build the simulation model correctly.
- Be serious and challenge yourself. Focus on what you know and your answers, do not waste time looking to your friend's paper or his computer. ***It will not help you at all***

All my best wishes to you for best performance
Khalid Nowibet