Simulation Project – P2 | MODSS

Introduction

Students will create a simulation project where they have the freedom to choose the system for simulation. The project should involve a thorough analysis, employing an event-driven approach, and subsequent implementation using a general-purpose programming language. Whether or not you opt to build upon your previous investigation in P1 will be assessed on a case-by-case basis. All participants are required to submit their code along with a detailed technical report via Moodle, adhering to the deadlines specified in the respective section. Additionally, there will be individual presentations to the teaching team. It's worth noting that slide preparation is unnecessary; instead, the session will revolve around a comprehensive discussion centered on the functioning of the software.

The study should offer flexibility in:

- Defining the system's characteristics, such as the number of operational counters, functioning machines, customer service times, and processing times.
- Analyzing various scenarios, including adjustments in the number of service counters or occurrences like machine breakdowns.
- Evaluating the simulation results, which encompass wait times, delays, and buffer sizes.
- Ensuring that the technical report comprehensively addresses all stages of the simulation study.

Stages in a Discrete Event Simulation Study

- Understanding the system
  - ◊ Provide a comprehensive system description
- Clearly identified objectives
  - ◊ Specify the study's simulation objective clearly
- Gathering data
  - ◊ If the system exists...
  - ◊ Identify sources of randomness
- Define the system model
  - ◊ Entities
  - ◊ Activities
  - ◊ Events
  - ◊ Activity Cycle
  - ◊ Define probability distribution for each source of randomness
- Represent the model in simulation software
  - ◊ Program in a generic programming language (chosen by the students)
- Validate the model
- Plan experiments
  - ◊ Plan which experiments will allow drawing conclusions regarding the study objectives
- Conduct experiments

- Analyze results
  - ◊ Apply confidence interval analysis
- Draw conclusions
- Document the study

Delivery

The project will have several milestones, as described next. **All materials can be delivered in English or in Portuguese**.

M1: Weekly Progress Report

The team should present the project progress during the Lab classes and will receive feedback.

M2: Project Final Report (Week 15)

Deliver, until 14/06 the final project report and produced artefacts using Moodle. The report can be delivered in English or in Portuguese. Only one member of the team should submit a file with the following name: `final_submission-<group number>.zip`.

M3: Project Presentation (Week 16)

The project presentation schedule will be announced during the term.