

## **Project work instructions**

The objective of the project work is to carry out a simple simulation study consisting of defining aims of the study, constructing a simulation model, performing simulation experiments and analyzing simulation results. It is recommended to choose your own topic, but some possible topics are listed below. You can use the programming language of your choice. The work is performed in groups of 1 to 3 students, and the size of the group is considered in the evaluation of works.

The project work is reported in the form of a research report and a presentation. The report is expected to be about 8-12 A4 pages long. Appendices are not included in the page count. The presentation should be about 10 min plus 5 min for discussion.

Deadline for returning the report via MyCourses on **Sunday 10.4.**

The presentations will take place in the following week. There will be two possible sessions for the presentation. A poll about the presentation days will be announced on the MyCourses pages of the course after the last exercise session. Everyone should attend both sessions, unless they have a forcing hinder.

*The report should include:*

- Introduction
  - Background of the topic
  - Objective of the study
  - System description
- Model description
  - Main assumptions
  - Structure and logic
  - Input models
- Results
  - Simulation results
  - Analysis of results
  - Conclusion from results
- Conclusions
- References
- Appendix: Computer code

*The presentation slides should contain in a compact but informative form:*

- Objective of the study
- Description of the model constructed
- Main results and conclusions

***Possible topics of the project work***

- Analysis of the morning reception of a healthcare centre, e.g., YTHS
- Prediction of the outcomes of soccer matches
- Monopoly game – optimal strategy
- Tram traffic/congestion simulation
- Congestion avoidance in publish subscribe networks
- Collision avoidance in shipping lanes
- Simulation of rendezvous networks
- Simulation of border guard missions
- Optimal portföljåterbalansering genom simulering
- Waiting times in demand responsive transport, e.g., Kutsuplus, Uber
- Simulation of an elevator system
- Poker game simulation
- Dynamic traffic simulation
- Simulation of public transport from the perspective of the service provider and the customer
- Prediction of the need for labor in the care for the elderly.
- Alpha radiation and its passing through material
- Waiting times for bus 550
- Simulation based comparison of pricing mechanisms
- Simulation of the lighting system of a building
- Effect of the league/tournament system on results in team sports
- Simulation of the flight traffic of an airport
- Variance reduction methods in option pricing
- Simulation of a road segment/intersection
- Simulation and optimization of a Taxi service
- Optimal black jack strategy
- Simulation of the spread of a disease and effect of vaccination
- Solving the traveling salesman problem with simulation based optimization
- MS Excel as a simulation tool
- Simulation of supply-demand network
- Grocery store queue simulation, optimal strategies