IE381/3081 – Modeling and Discrete Simulation Course

Marmara University, Istanbul, Turkey
January 11, 2021

Important Notice:

In this course, you are required to build a model and simulate your model. Therefore, there are two phase for the project:

- Phase 1 (Preliminary phase of the Project): In this phase you are required to identify the system that you would like to build the model and simulate. Step by step, you will build your model, verify and validate in this phase. Homework-1, Homework-2, and Homework-3 are included in the Phase 1.
- Phase 2 (Project): In the second phase, you are required to build the final model, simulate and perform evaluation. **Not included in this file.**

These 3 homework are part of the preliminary phase (Phase 1) of the Project. These 3 homework will be evaluated as homework, while the Project in Phase 2 will be evaluated as your term project.

Homework 1

Please determine a system that you want to model and simulate. (Please note that you will build a discrete model of a dynamic stochastic system.) You will also determine the requirements defined below.

- Determine system components (e.g. entities, their attributes, activities, events, and state variables)
- Determine the relations between system components
- Your model must include at least one queue.

In your work, please consider that a complete system components may not be defined at the moment, but the main and key components should be defined and included. The others furthermore can be added if needed.

Deliveries:

The following deliveries will be submitted via personal ***Turnitin*** account.

a) A ***report*** answering the questions given above.

Homework 2

Build the conceptual model of the system that you would like to model and simulate. For this purpose, you need to provide the following items as well:

- Define the objectives

- Re-determine/refine system components (e.g. entities, their attributes, activities, events, and state variables)(you worked on this in the previous homework)
- Determine the performance metrics (as well as other outputs)
- Determine the alternative system design(s) that you consider to test

Deliveries:

The following deliveries will be submitted via personal ***Turnitin*** account.

a) A ***report*** that includes
   - the conceptual model, and
   - the answers to the questions given above.

Homework 3

Build the computerized model of the system that you built the conceptual model previously. Please use the *Anylogic* simulation tool. Your computerized model will include the following items.

- system components
- the relations between system components
- generation of random variates
- 2D view of the model
- 3D view of the model
- the input variables (describe as the decision variables and uncontrollable variables)
- the type and the values (might be a pdf) of input variables (parameters).
- the output variables (parameters), e.g. average time spent in the system per customer, average number of customer waiting at a specific queue. In your project, you have to measure at least one delay-related output parameter.
- Output values and responses

Deliveries:

The following deliveries will be submitted via personal ***Turnitin*** account.

a) The ***model*** designed in AnyLogic. Please use the link for "Homework Code" in Turnitin

b) A ***report*** answering the questions given above.

This is an individual/group project for students. Collaboration and cooperation between groups are not allowed.

Due dates:

Homework 1	**Homework 2**	**Homework 3**
14 January 2021 until 23:59	15 January 2021 until 23:59	21 January 2021 until 23:59

Ask any unclear matter to the lecturer. Good luck…

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