

School of Computer Science – Coursework Issue Sheet (required for each Saturn component)

Session	Spring 2017/2018	Semester	2
Module Name	Simulation and Optimisation for Decision Supp.	Code	G54SOD
Module Convenor(s) (CW Convenor in Bold)	Peer-Olaf Siebers ; Dario Landa Silva		

Coursework Name	Individual Coursework	Weight	75%
Deliverable (a brief description of what is to be handed-in; e.g. 'software', 'report', 'presentation', etc.)	<ul style="list-style-type: none"> Written report, capturing a description/explanation of the first four tasks AnyLogic simulation-optimisation model Demo video, explaining its design and demonstrating its simulation-optimisation capabilities 		
Format (summary of the technical format of deliverable, e.g. "C source code as zip file", "pdf file, 2000 word max", "ppt file, 10 slides max", etc.)	<ul style="list-style-type: none"> Report in pdf format, approx. 2500 words AnyLogic as alp file (or zipped if more than one file) Demo video, in common video format (e.g. mp4; mov) 		

Issue Date	5 March 2018
Submission Date	11 May 2018 at 3pm
Submission Mechanism	Uploading all files on Moodle
Late Policy (University of Nottingham default will apply, if blank)	The normal submission deadline is 11 May 2018 at 3pm. If submitting after this date, a penalty of 5 marks (the standard 5% absolute) out of the 100 marks available will be applied for each late working day. The late submission deadline is 18 May 2018 at 15:00 hrs. Submissions after this date will only be accepted if a justification is provided and supported by a valid extenuating circumstances form (ECF).
Feedback Date	2 June
Feedback Mechanism	Short feedback report on Moodle

Instructions	Please see attached sheets for instructions
Assessment Criteria	Please see attached sheets for criteria

G54SOD Individual Coursework 2017/2018

Workforce Management Decision Support for MIDWAY Fast Food Stores

MIDWAY is a franchise consisting of a chain of fast food stores. There are five restaurants of the franchise distributed across different locations in **Liverpool Harbour**. Although, each store operates in a similar manner, each of them has their own particular features related to the size, location, etc. SIMOPT is a business intelligence company that provides IT systems for the franchise to assist in the operation of individual stores. The focus of their provision is a system that allows store managers to estimate the food demand based on historical records, capture sales data, and manage workforce, among other functionalities.



However, SIMOPT wants to improve their business intelligence services by incorporating modern computational techniques into their systems. They want to explore data analytics, optimisation, simulation, etc. They have decided to start by developing an optimisation model to schedule employees working in an individual store based on the estimated demand. Most employees in this optimisation scenario are part-time, have mixed-skills and require flexible shifts. Then, given a set of shifts that need to be covered, the problem is to assign employees to each individual shift while satisfying various constraints. For each shift the length, start/end times, number of required workers and required skills or roles are given.

Given your expertise in simulation optimisation, you have been assigned in SIMOPT as the lead consultant to take this project further by applying a combination of simulation and optimisation that provides more insights and tools for an **effective and efficient management of the store's workforce**. The simulation and optimisation should also provide metrics and statistics for understanding the operational conditions over time, for example productivity, utilisation, etc. as well as for exploring variations on the operational conditions.

Split of Marks (in {...})

For this coursework you are asked to focus on the following:

1. Your personal summary of the group activity (not more than 500 words) {10%}
2. Conceptual model (following the instructions given in lecture 2) {20%}
3. Implemented model (allowing simulation and simulation-optimisation experiments) {30%}
4. Simulation-optimisation experiment (including statistical output analysis) (30%)
5. Demonstration video 10% (max 5 minutes, not more than 100mb)

The marks are given by assessing **quality** and **completeness** of the individual tasks (1-5) listed above. Please note that quality entails that you provide sound explanations of your activities and justifications for the decisions you made.

Here are some ideas to consider if you are aiming for very high marks:

- Modelling a collection of five restaurants at multiple locations within the harbour (some of which are busier than others) and staff optimisation using a central workforce pool
- Using a hybrid DES/ABS modelling approach (adding state charts to your agents; considering staff and customer stereotypes, etc.)

Coursework Submission Guidelines:

The **normal submission deadline** is 11 May 2018 at 15:00 hrs. If submitting after this date, a penalty of 5 marks (the standard 5% absolute) out of the 100 marks available will be applied for each late working day. The **late submission deadline** is 18 May 2018 at 15:00 hrs. Submissions after this date will only be accepted if a justification is provided and supported by a valid extenuating circumstances form (ECF).

You are asked to submit:

- A written report in pdf format (approx. 2500 words) capturing a description/explanation of the first four tasks listed in the previous section
- Your final AnyLogic simulation-optimisation model
- A demo video, explaining its design and demonstrating its simulation-optimisation capabilities (i.e. showing it running and showing the output it produces)

You should spend approx. **80 hours** (that's the equivalent of **2 full working weeks**) on this coursework. For getting some inspiration when starting your coursework please have a look at related models in the AnyLogic Help menu.

Students are reminded of the Policy on Plagiarism and must ensure that all material from other sources is clearly quoted and acknowledged.

Please refer to: <https://workspace.nottingham.ac.uk/display/CompSci/Policy+on+Plagiarism>

Limitations of AnyLogic PLE Software:

There may be some issues with running meaningful experiments with AnyLogic PLE due to its limit to only allow 50,000 entities to pass through the system. You could download the full version of AnyLogic for a one month trial, which should give you access to the full capabilities of AnyLogic. Alternatively you can recycle agents (as shown in Lecture 03). A link to the example can be found in Moodle.