G54SOD Individual Coursework 2 (Spring 2019)

The Task:
This year we are offering two areas to work in, both related to the Smart Campus ideas discussed during the Group Activity. We give you the scenarios (**Smart Library** and **Smart UoN Hopper bus service**) but, while you have to use these scenarios, you are free to come up with your own cases to implement or to use one of the suggested cases below.

Scenario 1: Smart Library (suggestion: using DES)

- Case A: AI that guides students to the (potentially) shortest queue at checkout
- Case B: Staff optimisation using a central workforce pool (for different departments within the library)
- Case C: ...

Scenario 2: Smart UoN Hopper bus service (suggestion: using a combination of DES/ABS)

- Case A: Improving the service provided to users while also making a more efficient use of resources (buses and drivers)
- Case B: Introducing intelligent mobility
- Case C: ...

The suggested simulation methods above are only there for initial guidance; they are not meant to restrict your creativity. You can use any method we covered in the module. Feel free to discuss potential cases with your colleagues, but keep in mind that this is an individual coursework, so the conceptualisation, implementation, etc. need to be done by yourself.

Feel free to email Peer your potential case (in form of a short description of not more than half a page and a graphical representation of the planned system on the other half) by Thursday, 11 April, 6pm, and Peer will provide some feedback regarding his opinion about the feasibility.

Try to keep the model simple (appropriate for the purpose at hand) as it is only one proportion of the overall mark. You will also need to reserve time for all the other tasks. You can use the AnyLogic Example models for inspiration but you should not copy them directly.

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

1. Conceptual model (following the instructions given in lecture 3) {20%}
2. Implemented model (allowing simulation and simulation-optimisation experiments) {40%}
3. Simulation-optimisation experiment (including the design of experiment and statistical output analysis) {30%}

4. Demonstration video (max 5 minutes, not more than 100mb) {10%}

The marks are given by assessing **quality** and **completeness** of the individual tasks (1-4) listed above. Please note that quality entails that you provide sound explanations of your activities and justifications for the decisions you made.

The requirements for getting a pass mark are:

- Choice of a meaningful scenario
- A simple queuing system or a simple agent-based model that displays some meaningful statistics during runtime (providing metrics and statistics for understanding the operational conditions of the system over time)
- A meaningful experiment (exploring variations on the operational conditions)
- Some form of output analysis

If you are aiming for higher marks, consider some of the following:

- Innovative scenario choice
- Demand variability (e.g. on/off peak arrival rates)
- Using a hybrid approach (e.g. DES/ABS)
- Informative GUI displaying relevant outputs (e.g. satisfaction; utilisation)
- High calibre optimisation experiment(s) (assessing the performance and potential improvement on the operational conditions)
- Scholarly written report
- High quality video

Coursework Submission Guidelines:
The **normal submission deadline** is **20 May 2019 at 10:00 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 **27 May 2019 at 10:00 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 three foci listed at the beginning of the section **Split of Marks**
- 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:
AnyLogic PLE has some limitation. In particular the Pedestrian Library, Rail Library, and Road Traffic Library only allow simulation runs of one hour. Please do not use these libraries. Other major restrictions are that the number of agents you can create is limited to 50,000 and the number of classes you can create is limited to 10. Regarding agent numbers you learned how to bypass this restriction by recycling agents.