Project 0: Exploring Applications of Computer Simulations

CSCI 570: Computer Simulations
Spring 2017

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1 Introduction

This project is aimed at achieving the following objectives.

- Students become aware that there is a difference between simulation, emulation, and experiments.
- Students understand that simulation is a type of modelling approach and there are many different modelling approaches.
- Students understand that simulation has many applications and application domains.
- Students learn that there are many free and commercial simulation software and be able to identify references for a few commonly used ones.
- Students are able to use a writing template effectively.

2 Requirement

Students will do a research on applications of computer simulations and write a report. The writing should reflect that the objectives are met. Note the following,

- Students must use the IEEE Transactions template at https://goo.gl/4vd3va.
- The project is an individual project. Refer the University honor code and the syllabus on academic honesty.
- The workload of this project is designed to be $1.5 \times 3 = 4.5$ hours. The length of the paper must be at least 3 pages long including references.
- The paper will be graded based on how well a student has met the objectives outlined above. A successful project seeks to answer the following questions,

1. What are the differences among simulation, emulation, and experiment?
2. How are the modelling techniques characterized?
3. What are the top 3 application domains of computer simulations based on your research?
4. In each application domain, what is the top application based on your research? What have people learned from simulations of the application?
5. Is there any commonly used simulation software for each of the application domains? How should the simulation software be characterized?

- Students may start their research by studying the following references, [3, Section 1.1], [1,2,4]. However, this list is not exclusive. Students should discover more on their own.

3 Submission

Upload project report under "Assignment Submission" for the CSCI 570 Computer Simulation course in Blackboard by 5PM, Monday, January 30.

References

[1] Google, Inc. List of top ranked publications matching "simulation". https://scholar.google.com/citations?hl=en&view_op=search_venues&vq=simulation, retrieved January 23, 2017.

[2] Thomas R Henderson, Mathieu Lacage, George F Riley, C Dowell, and J Kopena. Network simulations with the ns-3 simulator. *SIGCOMM demonstration*, 14, 2008.

[3] Lawrence M Leemis and Stephen Keith Park. *Discrete-event simulation: A first course*. Pearson Prentice Hall Upper Saddle River, NJ, 2006.

[4] MathWorks, Inc. *Simulink User's Guide, R2016b*. 2016.