

# Project 1: Applications of Simple Simulation Models

CSCI 570: Computer Simulations  
Spring 2017

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## 1 Introduction

This project is aimed at achieving the following objectives.

- Students can apply simple simulation models, such as the Single-Server Queue or the Simple-Inventory System model to analyze an application problem.
- Students can justify assumptions of the model, and provide analysis of the results.
- Students are able to write a concise project report with proper styling as specified in the provided template effectively and with proper citation and bibliography.

## 2 Requirement

Let us consider a small gas station shop. The shop has only one attendant. Your objective is to answer a number of questions pertinent to quality of customer service, shopping planning, and staffing. For instances, below are a number of questions the shop owner wishes to answer.

1. How long does a customer have to wait in line?
2. How much space does the shop need to reserve for the line?
3. How busy can the shop attendant be?
4. What if the number of customers increases or decreases?
5. What if we replace the attendant by a part-time student employee who is paid less, but less efficient? What if we replace the attendant by an experience employee who is more efficient, but is paid more?

Students must extend the Discrete-Event simulation program described in [1, Section 3.1.1] to complete the project. Students must meet the following requirements.

- 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 and graphs.
- The paper will be graded based on how well a student has met the objectives and answer the questions outlined above. Students must seek to justify the assumptions, and to describe the approach to answer the questions.
- Students must use include well-crafted and meaningful graphs in the report to support their analysis.
- Students must think at lease one *additional* question of their own and answer it in the report.
- With their own research, students must provide at least one example of this simulation model or its extension in design and analysis of *computer system or networks*. You may consult with the instructor about the appropriateness of the example you wish to provide before the submission.

### 3 Submission

Upload project report under “Assignment Submission” for the CSCI 570 Computer Simulation course in Blackboard by 5PM, Monday, March 6.

### References

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