

# Operations Research, Spring 2016

## Final Project

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In the final project, you are invited to conduct an OR study on a real problem. You are expected to find your own problem, formulate a model that describes the problem, collect relevant data, solve the model, and make interpretations and suggestions from your solutions. What we really want to see are (1) how you apply OR to solve real problems, (2) how you select a suitable topic and appropriate methods, and (3) how you present your ideas and results. Good luck and enjoy!

### 1 Teams

Please form a team of six to nine people for this project. One student cannot participate in two teams.

### 2 Tasks

In this project, each team needs to apply OR techniques to solve a real problem until helpful suggestions are made or insightful implications are found. The topic will be chosen by team members. While there is no restriction on the topic, it will be nice that the topic is (1) relevant to our daily life and (2) can be understood easily by everyone in class.

While you are choosing your own topic, you are welcome to discuss with the instructor to ensure that the topic is fine. Below are some example topics that were studied by former students:

1. (Personnel scheduling for IM Week) Facing time-variant demands for the coming IM Week, how to schedule your classmates to complete all the tasks? Do not forget that your classmates still have classes and cannot work for too long. Moreover, how would you model service level as a function of demand volume and personnel supply?
2. (Beer ordering and shipping for German beer festivals) Given the demand forecasts for three beer festivals and supply and transportation information in Germany, one needs to decide the order quantity and shipping routes. Should we minimize the expected total costs, minimize the risk of running out of beer, or do something else?
3. (The installment of ice cream machines in Family Mart) Given a chance to install ice cream machines to Family Mart stores, how to choose a few stores to maximize the total profit? Is it profit-maximizing not to install ice cream machines in all stores? Note that estimating demands is a big challenge!

As this is a project, most details should be left for you to decide. However, you are more than welcome to discuss your ideas with me. Please do not work on the above topics (or convince the instructor why you need to work on the same topic); find your own!

### 3 Technical requirements

Each team needs to write a proposal, make a presentation, and write a report.

1. Proposal: A proposal describes the problem you want to study and the tentative methods you want to apply. A hard copy should be submitted in class by **10:10 am, May 19**. Please indicate

each team member's name and student ID on your proposal. Limit your proposal to *two pages* (including everything), i.e., two single-sided sheets (not recommended) or one double-sided sheet (recommended).

2. Oral presentation:

- (a) Each team needs to do an oral presentation for around 20-25 minutes on *June 16*. You may decide the number of speakers by yourself (at least one, of course). Speakers are encouraged to present in English, though Chinese is still allowed. However, please do not try to present in English if you are not confident of doing that.
- (b) *All team members* should show up in class during the presentation of your team.<sup>1</sup> The one who is absent will get *zero* point for presentation.

3. Written report:

- (a) In your report, describe your problem, formulation, data, solutions, and suggestions.
- (b) Limit your report to *twelve pages*, excluding the cover page. This means twelve single-sided sheets (not recommended) or six double-sided sheets (recommended).
- (c) E-mail the *electronic files* of your report and slides to the TA Johnny Chen by *11:59 pm, June 17*. Submissions on June 18 will get one letter grade lower as a penalty. Submissions afterwards are not accepted.
- (d) Please *name your files* with your team ID that will be assigned to you after the submission of proposals. Failing to do so may get some penalties.

## 4 Grading policy

Below we describe how your works will be graded:

1. Proposal: A team gets full credits once a proposal is submitted. The proposal is for the instructor to know how students form teams and, more importantly, give comments and feedback to some teams when it is helpful.

**Note.** The key is to find your teammates and submit a piece of paper!

2. Presentation: According to the quality of your presentation, a letter grade will given to you by the instructor AND students. Grades from all students will be averaged (A for 4, B for 3, etc.) and counts for 60% of the grade; the grade from the instructor counts for 40%.

**Note.** The key is to choose a good topic, give a clear and interesting talk, and generate useful conclusions.

3. Report: According to the quality of your written report, the instructor will give you a letter grade (with + and -).

**Note.** The key is to apply appropriate methods correctly and write a formal report.

4. Peer review: Each student will give a letter grade based on the contribution of each other teammate. Excluding the highest and lowest grades, the remaining grades will be averaged.

**Note.** The key is to work hard and be responsible!

The four average grades for presentation, report, peer review, and proposal are then averaged with weights 35%, 35%, 20%, and 10%. A final letter grade (with + and -) will then be determined based on the standard conversion rule.

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<sup>1</sup>Unless one has completed a formal petition for being absent in class due to sickness, duty, etc., and gets the instructor's approval.