Referee Assignments for the 33rd Conference on How to Ride the Lightning

ORIE 5380, CS 5727: Optimization Methods
Fall 2016, Project
Due December 2, 12:00 pm

Problem Description and Data
You are on the organization committee for the 33rd Conference on How to Ride the Lightning
to be held in San Francisco on July 27, 2017. Your boss Mr. Burton asked you to come up
with an optimization model to assign the papers that have been submitted to the conference
to the referees. There are 71 papers submitted to the conference. There are 21 referees to
review these papers. Each paper needs to be reviewed by 3 referees. You want to figure out
which papers should be assigned to which referees.

 Not all referees are experts in the subject matter of all papers. Before doing the assignment,
you sent the abstracts of the papers to the referees and asked the referees to tell you how
comfortable they are reviewing each paper. The answers from the referees are in one of the
4 categories: "yes, I can definitely review this paper," "I can maybe review this paper," "no,
I do not want to review this paper," "I have a conflict of interest with this paper, so it is
unethical for me to review this paper." Ideally, you would like the referees to be assigned to
the papers for which they said "yes, I can definitely review this paper" or "I can maybe review
this paper." If it is unavoidable, then a referee may be assigned to a paper for which she said
"no, I do not want to review this paper." However, you definitely do not want to a referee
to be assigned to a paper for which she said "I have a conflict of interest with this paper, so
it is unethical for me to review this paper." The attached spreadsheet gives the answers you
collected from the referees. The rows correspond to the papers and the columns correspond
to the referees. The entries indicate the answer of each referee for each paper.

 An important concern is that each referee should review roughly the same number of
papers. It may be impossible to ensure that each referee reviews exactly the same number
of papers, but it is important to be as fair as possible to all referees.

 Your goal is to use an optimization model to decide which papers to assign to which referees
so that the referees, to the best possible extent, get the papers they desire to review, each
paper gets reviewed by 3 referees and the referees are treated as fairly as possible.

Deliverables and Expectations
You will write a report describing the problem, your model and your results. You should think
of structuring your model in two parts. The first part is a non-technical part directed towards
Mr. Burton, who does not have expertise in optimization. In this part, you should describe
what your model does and your results without going into mathematical details. The second
part is a technical part directed towards optimization experts, who would like to understand
your model and possibly use it in their applications. In this part, you should clearly describe
your decision variables, objective function and constraints in mathematical terms and include
the code that you use to obtain the optimal solution.

 There is no one correct solution to this problem. You should construct an optimization
model that comes up with a "good" assignment of papers to referees. It is up to you how to

define "good" and how to come up with the cost parameters you need. You are encouraged to use the simplest model that does the job. You are required to use <u>Gurobi</u> to solve your optimization model. You can use Gurobi as a standalone solver or call Gurobi through Python. Even if you use Gurobi as a standalone solver, you will most likely need to write a computer program that prints your model into a text file that you can read from Gurobi.

Remember that you will be presenting the assignment of 71 papers to 21 referees. Your optimization model will require a few hundreds of decision variables. If you simply list the optimal values of these decision variables, then Mr. Burton will probably not be able to understand the solution. Furthermore, you want to convince Mr. Burton that the solution you propose is a reasonable solution, where the referees mostly get the papers they desire to review. Thus, you should think about presenting your results visually in tables or graphs, possibly using colors. Be creative!

The main body of your report should not exceed 10 pages, including both the non-technical and technical parts, but excluding the appendix. Give your computer code in the appendix, but give the details and the mathematical formulation of your optimization model in the technical part. Throughout your report, follow professional writing practices. Do not assume that the reader knows the problem. It is a good idea to start with an execute summary or abstract that gives a brief overview of the problem, approach and findings. After the executive summary or abstract, give detailed descriptions of the problem, approach and findings. Also, provide a justification of why your solution should be considered a good solution. If you use tables or graphs, then number these items and refer to these items within the text by using their numbers. Similarly, number the sections in your report.

You will be evaluated based on the technical aspects of your model, the plausibility of your solution and the quality of the presentation in your report. The quality of writing counts! Consider dividing your time equally between developing the optimization model and writing your report. You should not collaborate in any part of the project but feel free to get in touch with the instructor if you have any questions.

It may be interesting to know that the data that you use for this project is real data, reflecting the preferences of actual referees for papers in a real conference.