

# IE Network Student Competition Rules<sup>1</sup>

## GENERAL RULES

The intent of this Student Competition is to have students work as an Industrial Engineering or Business Analytics Solution team to solve challenging close-to-real-world optimization problems. You may choose either **What'sBest!** or **LINGO** software as your optimization tool, the actual optimization models and proposed solutions should be the original work of the student team. In what follows, a "student team" will mean at most three undergraduate and/or graduate students working toward their degrees. Each team must have a team advisor who will certify student status. Team members may seek advice about the competition from their advisor. However, the team advisor must not be directly involved in solving the case problems.

You may contact

Mr. Wicha Phramrit [wicha@m-focus.co.th](mailto:wicha@m-focus.co.th) 02-513-9892x153 or

Mr. Seksun Moryadee [seksun.mor@gmail.com](mailto:seksun.mor@gmail.com) 095-945-6445

at M-Focus if you have general questions about the competition or the materials provided in the kit. They can be reached by the e-mails above. All emails should have a subject line "**Lindo Competition Questions: <team name>**."

All problems should be solved using the free student/trial version of the software that can be downloaded from [www.lindo.com](http://www.lindo.com) web site. If you find that the software cannot solve your model, it could be that some information may be missing. Thus, you may need to make additional assumptions so that your model can be solved using the trial version of the software. *No commercial grade version will be made available for the Competition.*

## COMPETITION APPLICATION

Contact Ms. Archara Sangsaen (อัจฉรา แสงเสน) [archara@m-focus.co.th](mailto:archara@m-focus.co.th) at 02-513-9892 x103 for instructions of how to apply for the competition.

## What'sBest! or LINGO SOFTWARE DOWNLOAD<sup>2</sup>

1. Find out first if you use Excel 32-bit or 64-bit. You must download the software to match your Excel. Carefully read and follow the download instructions. When asked about Job Type, enter "IE Network Student Competition".
2. For What'sBest! download, go to <https://www.lindo.com/index.php/ls-downloads/try-what-sbest>

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1 Adapted from ARENA Student Competition Rules by M-Focus Co., Ltd. We appreciate Rockwell Software contribution in this regard.

2 If you encounter software installation difficulties, contact Mr. Wichien of M-Focus System Support at 02-513-9892.

3. For LINGO download, go to <https://www.lindo.com/index.php/ls-downloads/try-lingo>

## **REPORT FORMAT**

The format for the report must meet the following minimum requirements:

- Font size of no less than 12-point (English); 14-point (Thai)
- Margins: 2.5 cm for the top and bottom and 2.5 cm for the left and right
- Formal reports are strictly limited to six pages, not including the title page. You should be able to sum up the problem and clearly state your recommendations to the group in six pages or less.
- Additional material may be submitted as an appendix of no more than ten pages. The judges are not required to review any supplemental material, and you may not reference this material in the main report.
- You are encouraged to use graphical representations of problems and solutions when possible.
- The title page should follow the structure listed below:
  - Project Title
  - University Name: Team Member and Advisor Names
  - Team Name
  - Requested by and Submitted to
  - Client's Name
  - Date

All submitted materials will become the property of M-Focus and Lindo Systems, Inc.

## **Written Report Recommendations**

Effectively communicating your solutions to decision makers is very important if you want all your hard work and analysis to be used. Here are some hints for the report:

- Less is more. Get to the point! Just like we want our operations to be efficient, we also want our reports to be efficient. Summarize the key details of your findings and convey the decision-making process supporting your recommendation. Long-winded and unorganized reports are not effective.
- Tables, graphs and figures are helpful, but comparing scenarios and corresponding results can be confusing. Make it easy for the reader to understand the results of your study.
- Clearly state your optimization model formulation and assumptions. Also, you must clearly define variables, constants, and all notations used in the mathematical formulation.
- Do not go into detail on how you coded your model in *What'sBest!* or LINGO in your report.

- It is valuable to comment your formulation in your *What'sBest!* or LINGO models and make it easy for an engineering associate to understand, but leave these details out of your report.

## MODEL AND REPORT

The final submission in electronic form should contain:

- Written formal report containing mathematical model formulation and summary of recommended solution of the problem
- All *What'sBest!* or LINGO model files, clearly labelled with each question (A,B,...)

Your report should consist of the sections outlined below. Failure to include the requested sections and information may result in deductions from the report score.

### Executive Summary

The executive summary gives the reader a brief problem overview and provides essential conclusions and recommendations. This section must include a high-level summary of the results of your problem analysis.

### Analysis

This section describes how you applied *What'sBest!* or LINGO Optimization software and other Industrial Engineering techniques to the problem. At a high level, tell about the mathematical model formulations you created and the results, but do not explain the coding you wrote. Describe any assumptions that you had to make. Use this section to establish that your analysis is sound and credible.

Convince the audience that your model is valid, including sensitivity analysis of important parameters. The use of tables, graphs and figures is appropriate for this section.

### Conclusion and Recommendations

Define your recommendations to meet the problem objectives. This section should include more detail than the executive summary. Use your analysis to support the recommendations. Provide feedback on any further analysis that you feel might improve the performance of the system. Be creative and impressive!

### Implementation Plan

This section includes your suggestions regarding how the management team might implement your plan.

### Optimization Model

Please submit only one version of either your *What'sBest!* or LINGO models. The LINGO or *What'sBest!* files should be named in the following format:

for LINGO use "Problem\_xx\_TeamName.lng",  
for *What'sBest!* Use "Problem\_xx\_TeamName.xls",

where  $xx \in \{A,B,C\}$ . If you have separate files for your baseline and scenarios, please select only one version to submit. We will not be testing all the scenarios in your model. We will check it to ensure that the logic makes sense. It is your responsibility to ensure that your model will run on M-Focus laptop computers running Windows 10; we suggest that you test your model on a different computer other than the development computer before submitting it. M-Focus personnel will not spend time debugging your models in order to make them run.

## Modeling Assistance

- You can get started with LINGO by watching Training videos related to “**The ABC’s of Optimization Using LINGO**” as well as downloading PowerPoint files via M-Focus web site <https://www.m-focus.co.th/lindo/>.
- You can get started with What’sBest! by watching Training videos related to “**The ABC’s of Optimization Using What’sBest!**” as well as downloading PowerPoint files via M-Focus web site <https://www.m-focus.co.th/lindo/>.
- On Lindo web site ([www.lindo.com](http://www.lindo.com)), you can download User’s Manual of the software you are interested in as well as the book “**Optimization Modeling with LINGO by Linus Schrage.**” There are plenty of small concept examples in these materials that will teach you learn the basics as well as advanced modeling techniques using Lindo software technologies.

## COMPETITION SUBMISSION

Submissions via email must arrive at M-Focus on or before 6:00pm Thursday July 12, 2018. Any entries arriving after this date will not be considered. Three finalist teams will be announced on Wednesday July 18. Finalist teams are required to present their work on Tuesday July 24, 2018 between 1:30-4:00pm at the IE Network 2018 Conference in Ubol Ratchatani.

### Submission instructions:

1. Use WinZip or 7Zip to compress your files. The naming convention for your compressed file must start with “Lindo” and include your team name. For example, “Lindo TeamName.zip”
2. Please send the zip file to [wicha@m-focus.co.th](mailto:wicha@m-focus.co.th). The subject line of your email should start with” Lindo Optimization Modeling Competition 2018”.
3. If you do not follow the instructions above, we will not be able to judge your entry.

## JUDGING

A representative group from the Lindo community will judge the Lindo Optimization Competition. The determination of the three finalists will be made solely on the final report described above and the submitted optimization models.

Judging will be based on the following criteria:

- Analysis of the problem
- Logic of the solution
- Quality of the recommendations
- Application of Industrial Engineering tools
- Validity of assumptions
- Quality of the report (initial judging)
- Quality of the presentation (final judging)

For the top three finalist teams, presentation materials must be submitted before the final judging. The final judging will take place at the conference, and the results will be announced at the conference. The top team will receive 15,000 Baht. Second place will receive 10,000 Baht and Third place will receive 7,000 Baht.

Good Luck and HAVE FUN!