

Topics: You may choose your project topic from the list: Click and reserve your topic here. Topics are assigned on a first-come, first-served basis.

Alternatively, you are welcome to propose your own project, as long as it involves linear programming (LP) and demonstrates how LP can be applied to model a real-world problem. If you choose this route, you must clearly justify the parameter values used in your LP formulation. Avoid assigning parameter values randomly—doing so can lead to unrealistic models that are either too simple or infeasible to solve.

You are required to use CPLEX to solve your problem and to perform sensitivity analysis.

Important Dates

1. LP Formulation Submission: Submit a one-page (A4) write-up of your LP formulation by Sunday, June 29, 2025.
2. Presentation: Presentations will be held online and scheduled between July 7–16. Each student will have 15 minutes, including Q&A.
3. Final Report Submission: Submit your report on the day of your presentation. There is no required template.

Instructions for Project (You MUST read this!)

1. Your final submission must include the following two files:
 - (a) A PDF report of your project
 - (b) Your CPLEX Python script (Jupyter notebook format)
2. Your report should include the following components:
 - (a) Problem Description and LP Formulation
 - i. A clear explanation of the scenario or problem you are addressing
 - ii. A detailed discussion of how you model the problem using LP
 - iii. Description of any transformations or integer programming tricks applied to the LP before solving it with CPLEX
 - (b) Solutions and Sensitivity Analysis
 - i. Present the optimal solution(s) and its interpretation
 - ii. Include outputs from CPLEX's sensitivity analysis (See Remark below for details)
 - (c) Ensure that you clearly answer every question asked (specific to the problem chosen)
 - (d) Insights from Sensitivity Analysis
 - i. Use your sensitivity analysis results to propose recommendations or what-if scenarios
 - ii. Be thoughtful and creative in exploring how variations in input data or model parameters might affect the outcome

Remark. 1. If your problem is an integer/mixed integer problem, you are required to perform sensitivity analysis **on the LP relaxation**—that is, the version of the problem where all integer constraints are removed.

2. Sensitivity analysis is mandatory for all projects, even if not explicitly required by your problem description. You must:

- Include it in Section 2(b) of your report
- Use it meaningfully in Section 2(d) to guide your discussion or recommendations