Who Gets the Book First?
Solving a Real-Life Student Dilemma with Linear Programming

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The Problem Context

It's the week before final exams. Stress is high. Assignments are due. And in the middle of all this pressure, there's one unexpected problem:

The book I need isn't available.

This isn't just my story, it's a familiar one for many students. In my university library, only a few copies of high-demand books like Engineering Mechanics or Thermodynamics are available, yet dozens of students need them urgently.

At NED University, 50 students across five departments needed two key books. But the library only had 10 copies of one, and 15 copies of the other. That's just 25 books… for 50 students.

And everyone needed them for exam prep.

So, how do we decide who gets the books?
Do we hand them out randomly? Go by GPA? Or urgency?

That's where Operations Research (OR) comes in. Instead of guessing, we can model this fairly with math.

The OR Approach -A Simple Explanation

I used Linear Programming, a branch of OR that helps optimize decision-making when resources are limited. Think of it like building a smart formula that tells us the best possible way to distribute the books based on what matters most: urgency.

Here's what I did (without the technical overload):

I grouped students into five categories (Groups A–E) based on urgency levels.

Group A had exams in 2 days, while Group E had exams next week.

Each group had 10 students.

The goal was to maximize urgency satisfaction by allocating books to those who needed them most without exceeding the limited number of available books.

I simplified the model using grouped data, making it more efficient and solvable through a software tool called TORA.

The Key Results

After modeling the problem in TORA using the Simplex Method, I ran the calculations.

☐ It took 6 iterations, but the results were clear:

Group	Book 1	Book 2
A	0	10
B	10	0
C	5	5
D	0	10
E	0	0

The urgency satisfaction score (objective value) came out to 210 — the best possible score under the constraints.

What This Means

- Group A, with the most urgent need, got full access to Book 2.
- Group B received Book 1, meeting their urgency.
- Group C was split evenly.
- Group D got Book 2.
- Group E, with the least urgency, didn't receive any books but this was necessary to optimize fairness.

This wasn't just a math solution , it was a decision-making framework built on equity and logic.

Real-World Implications

This model might seem small-scale, but it reflects a broader truth:

Whether managing library books, hospital beds, flight upgrades, or even electricity during a crisis, optimization matters.

By using Operations Research, we can:

Make better use of limited resources

Avoid bias in decision-making

Create transparent, justifiable policies

And most importantly, as a student, I learned:

OR isn't just about numbers.
It's about making tough decisions with clarity and fairness.

Over to You

Have you ever faced a moment where everyone wanted the same thing, but not everyone could get it?

How did you handle it or how would you handle it now?

Let's talk optimization in real life.

#OperationsResearch #LinearProgramming #EngineeringLife #NEDUniversity #StudentStories #DecisionMaking #TORA #MathInRealLife

Medium link:
https://medium.com/@mikasaspy/who-gets-the-book-first-solving-a-real-life-student-dilemma-with-linear-programming-6573afbb094d
Linkedin link:
https://www.linkedin.com/posts/maheen-aslam-6baa06280_realworldlp-operationsresearch-tora-activity-7320869675477704705-jUuL?utm_source=share&utm_medium=member_desktop&rcm=ACoAAER-JG4BfCTngD278M1GRtDpzBLhpsY4FQY