Title: Investigation of Capacity Constraints in a Multi Warehouse Stock Allocation Problem
Duration: December 1st 2024 - February 28th 2025
Objective: Investigation and implementation of optimization methods for inclusion of capacity constraints in a multi warehouse stock allocation problem
Modality: Hybrid - 1 day / week at Melicidade (Osasco-SP)
Areas of Interest: Algorithms and Optimization
Technical Leader: Eduardo Xavier

About the Project:

Mercado Libre is one of Latin America's largest e-commerce platforms, operating a vast supply chain network where products are stored and distributed before being delivered to customers. One of its main challenges is to offer solutions for a complex optimization problem involving the determination of stock location and transfers among fulfillment centers. The goal is to strategically position products closer to customers to improve service delivery times and reduce transportation costs. The objective is to minimize total costs while adhering to network constraints, stock availability, demand forecasting, and scheduled inbounds. While this solution brings valuable operational benefits it lacks some important requirements, such as the satisfaction of operational constraints imposing limits in transfer. The objective of the project is then to study, implement and assess the possible benefits of incorporating capacity constraints in this problem. Due to the large nature of the input (millions of products, dozens of facilities) it may be necessary to tackle the problem in a distributed manner.

Duration Details: 12 weeks in total.

Tasks and Activities:

1) Technical Capacitation: familiarization with `golang`, the technical platform, and problem understanding.
2) In-depth study of the problem.
3) Theoretical formulation of capacity constraints in the problem.
4) Implementation of capacity constraints in the problem.
5) Computational experiments to assess impact on the solution.
6) Final Report.
7) Seminar.

Activity Schedule:

	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
(1)	X	X										
(2)			X	X								
(3)					X	X	X					
(4)						X	X	X	X	X	X	
(5)									X	X	X	
(6)											X	X
(7)												X

Benefits:
- *Monthly Payments:*
  - *Stipend:* R$ 3.375,00.
  - *Transportation Allowance:* R$ 800,00.
- An accident insurance will also be provided covering the entire period of the internship.