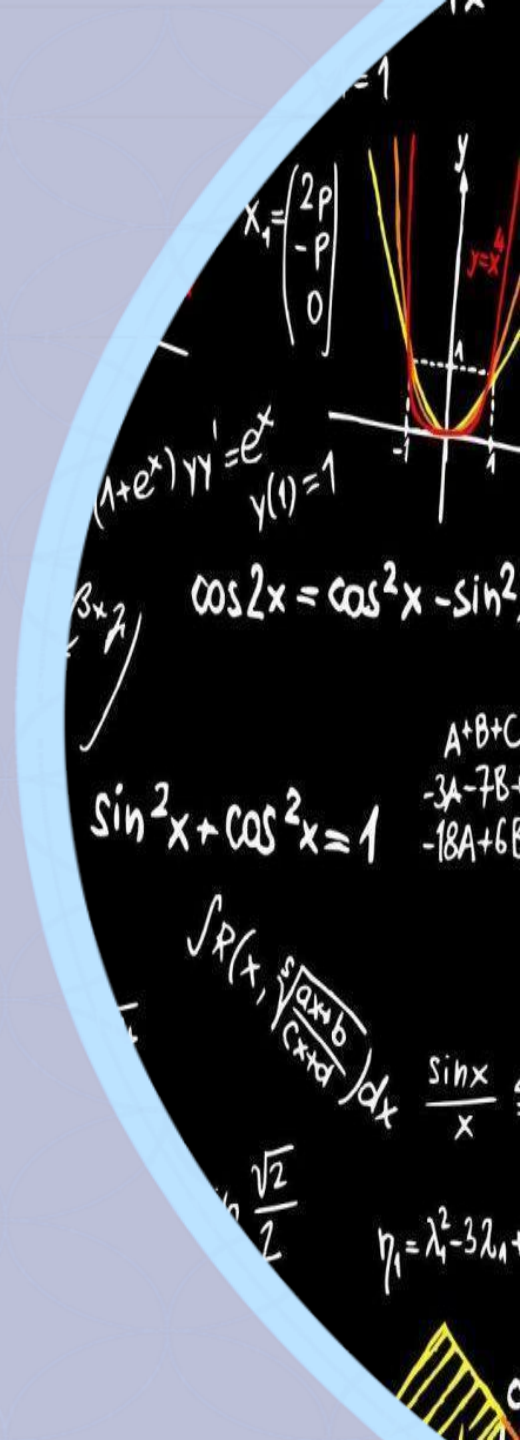
Mathematical Optimization Algorithms

Exercise 4: Process Optimization



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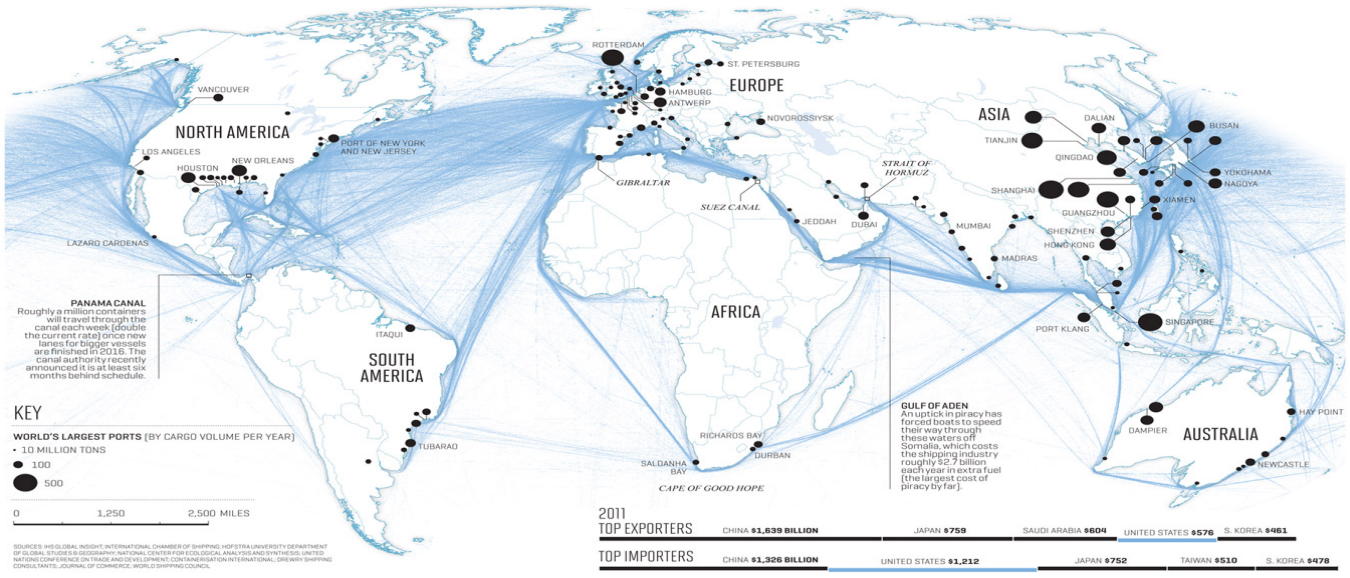
Contact Lenses Supply Chain Optimization

Scenario:

- You are a Data Scientist at a leading medical device company focused on eye care, with a specialization in manufacturing contact lenses.

Objective:

- The Head of Supply Chain has asked you to develop a set of optimization models to reduce operating costs associated with the distribution of contact lenses from production plants to distribution centers and warehouses.



Contact Lenses Supply Chain Optimization

Data

- Production 2023.xlsx
- Distribution PRD-GDC 2023.xlsx
- Locations PMP.xlsx
- Locations GDC.xlsx
- Locations WHS.xlsx
- Locations MKT.xlsx
- Demand 2023.xlsx (Q6)
- Shipment Constraints.xlsx (Q7)
- Prices 2023.xlsx (Q8)

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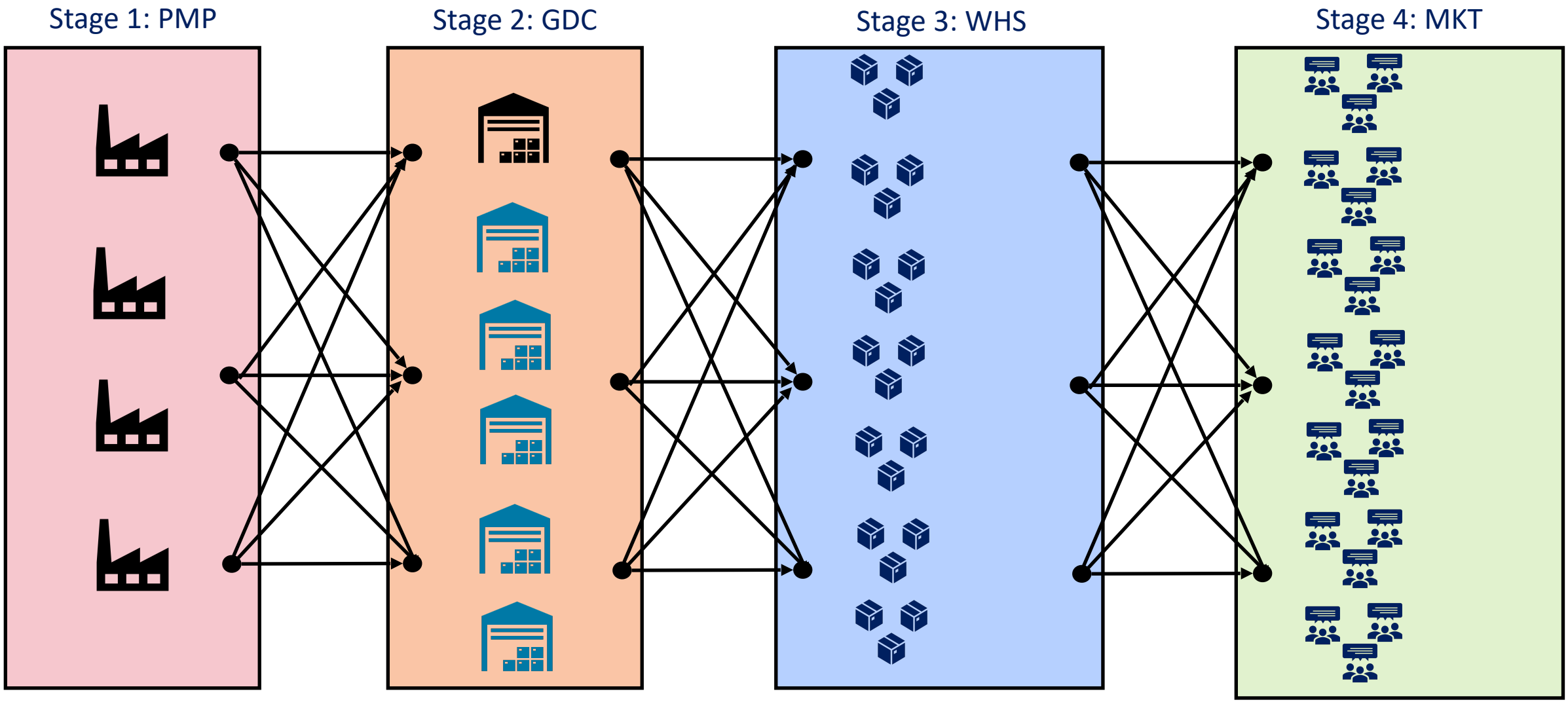
Supply Chain



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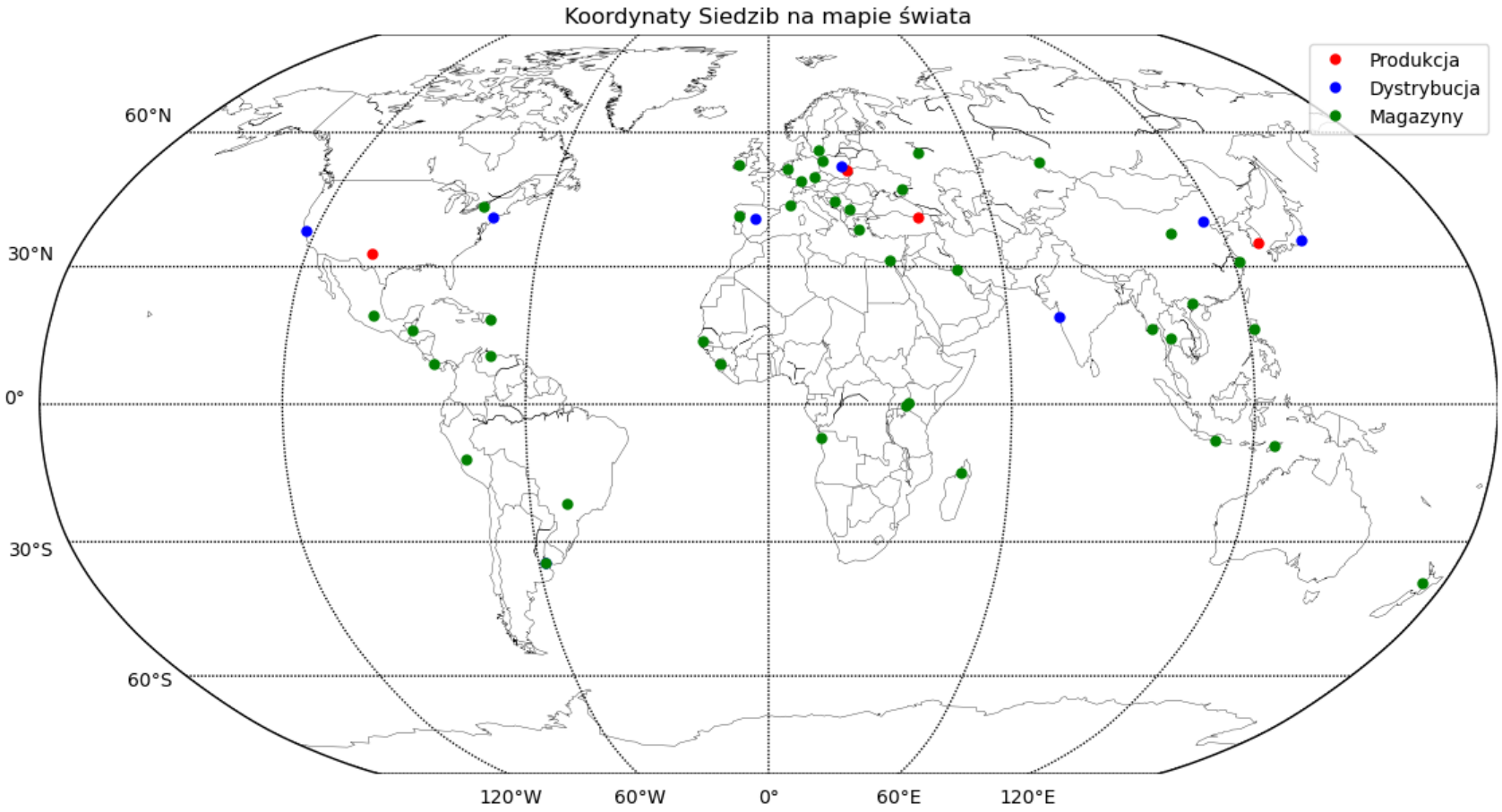
Distribution

- Manufacturing > Distribution > Warehouses



Contact Lenses Supply Chain Optimization

Questions

- Q1. Calculate the Cost of Supply from Manufacturing to Distribution.
- Q2. Calculate the Optimal Cost from Manufacturing to Distribution if the cost is 0.1 USD per Unit per 1000 km.
- Q3. Calculate the Optimal Cost of the Supply from Manufactuiring to Distribution to Warehouse if the cost is 0.1 USD per Unit per 1000 km.
- Q4. Create a Python Code to generate a Map with the locations similar to the one in the page before.

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Questions

- Q5. Calculate the Optimal Cost of the Supply from Manufacturing to Distribution to Warehouse to Market if the cost is 0.1 USD per Unit per 1000 km.
- Q6. Calculate the Optimal Cost of the Supply from Manufacturing to Distribution to Warehouse to Market if the cost is 0.1 USD per Unit per 1000 km, and you need to cover the Market Demands.
- Q7. Calculate the Optimal Cost of the Supply from Manufacturing to Distribution to Warehouse to Market if the cost is 0.1 USD per Unit per 1000 km, and you need to cover the Market Demands, and you cannot Shipped between the Source and Destinations Specified in File Shipment Constraints.
- Q8. Without taking into account the Constraints calculate the Maximum Revenue, and the minimum Supply Costs, just taking into account that all production units arrives to Market, check if the Supply is the same.

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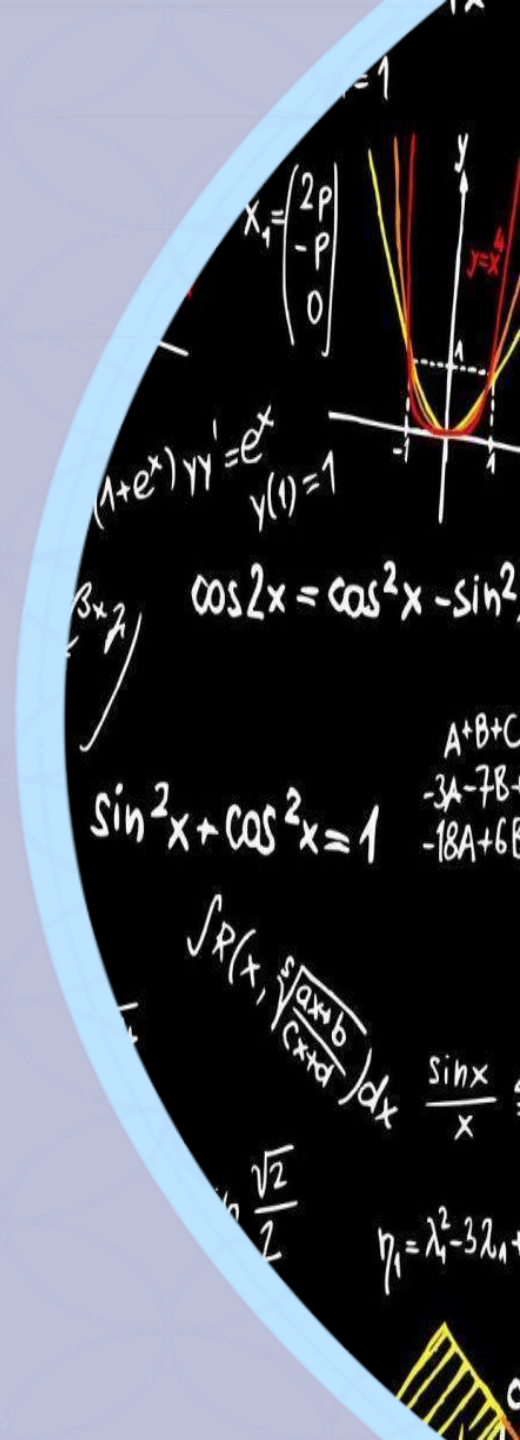

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