Deliverables:

- Monday May 26th: Slides & presentation in-person
- Friday May 30th: Report & Notebook

	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
WS 5th						Today	Tony to create dataset and commit to Github
WS 12th	Everyone modelling the problem individually (async, individual)					Catch-up 3pm	Revision
WS 19th	Report Writing & Slides Creation & Speaking Notes (async, collab)					Catch-up 3pm	Revision
WS 26th	Slides due			Presentation	Report & Notebook due		

Presentation:

- Groups will present their work during the last week of the subject, during tutorials and lecture.

Report: A typical report should contain the following sections:

1. Introduction: Motivate the problem. Present any relevant associated literature. Explain the goals of the project and which analysis you wish to make.
2. Problem definition: Formally define the problem. Which kind of simplifications are made? Which kind of problem variants do you wish to tackle?
3. Data: Present the data you are using. How was it collected/generated?
4. Model formulation and solution strategy: Present your model(s). Present your solution strategy: black box solver, iterative generation of constraints, decomposition method…
5. Results and analysis.
6. Conclusions and recommendations: Present a summary of analysis and conclusions to your stakeholders.
7. Individual contributions: the contributions of each member are clearly described. The report should be as brief as possible, but still present the most interesting developments and conclusions.

Your report should not have more than 7500 words.

Comments on our proposal:

The project seems reasonable, though some aspects may lead to non-linear formulations. I strongly recommend making progress with the modelling as soon as possible to allow time to address these challenges if they arise.

Please come to office hours to discuss any questions. Remember to check the literature and do a brief literature review. For the report, be as concise and precise as possible. I know the original specification said that the word limit was 7500 words, but I will mark more generously reports that stick to the 5000 words mark while still presenting all the important developments.

Proposal

Context

When you go into your favourite retailer, you rarely consider the immense effort and planning that went into ensuring those shiny new headphones were sitting on the shelf waiting for you.
In order for those headphones to be stocked, they travelled through a complex and interconnected distribution system from supplier to retailer. Distribution is a critical component of supply chain management, widely applicable in various industries such as consumer electronics, food and beverage, apparel, and personal care products. The process may vary, but in most practical applications a set of central warehouses (referred to as ”main warehouses”) must allocate goods to retail stores in an efficient manner to meet consumer demand.
The main challenges include:
• Over-distribution: Excessive allocation of goods to stores leads to inventory buildup and increased holding costs.
• Under-distribution: Insufficient allocation fails to meet consumer demand resulting in shortage costs.
• Limited warehouse capacity: Goods should be prioritised for stores with higher per-unit shortage costs and higher potential demand.
• Logistics cost variation: Stores usually incur lower logistic costs when receiving goods from closer warehouses.

2 Data
To solve our problem, we will need to collect/mock data on the set of warehouses/stores/goods, estimates for per-unit holding/shortage/transit costs, exogenous consumer demand, the ”size” of each type of good, and the capacity of each warehouse.

3 Problem
In this scenario, we consider the warehouses and retail stores to be owned by the same company, so we can ignore the effect of wholesale vs. retail pricing.
The objective of the company is to minimise the total cost associated with the distri-

bution of goods to its retail stores from its warehouses.
The decisions available to optimise are:
• The amount of good g to have present at warehouse w.
• The amount of good g to send to store s from warehouse w.
We can potentially extend this problem from a single-period problem to a multi-time-period problem where warehouses must also consider:
• The amount of good g to order at time t for distribution at time t + N , where it takes N periods for upstream orders to arrive.
• The amount of good g to retain at time t for distribution at time t + 1.

Modelling -> Report Writing & Analysis -> Presentation & Speaking Notes

1. Introduction
2. Problem definition (incl. Lit review)/Data
3. Model formulation & Solution strategy
4. Results & analysis
5. Conclusions and recommendations (critical for standing out as a project - tie to business outcomes)

Assignments

- Everyone is involved in Modelling.
- Dean to do Intro/problem def/lit review/data components of Report
- Dean to do slides
- Sahar to do model formulation
- Mia to do solution write up
- Zhouyi to do results/analysis
- Abdullah conclusions & recommendations
- Tony to create the dataset for us (today or tomorrow)