- Objective: Design and optimize a library sorting station to improve efficiency, reduce motion waste, and apply IE principles to do so.
- Layout style: grid, to simplify drawings and distance measurements (point masses)
- Scope of simulation: 10 books needing to be shelved
- Book mix:
    - B1 — Fiction (no label)
    - B2 — Non-Fiction (needs label)
    - B3 — Fantasy
    - B4 — Fiction
    - B5 — Non-Fiction
    - B6 — Damaged → Recycle
    - B7 — Non-Fiction (needs label)
    - B8 — Fiction
    - B9 — Prep bin (for re-shelving)
    - B10 — Fantasy
- Use PowerPoint for diagrams and Excel for data

Project Outline:

Day 1 — Planning/Set-up

Goal: Set scope, tools, and prepare files.

- Choose layout style, define scope and book mix, set up tools and templates, rough layout sketch on PPT, plan movements for each book, and find a few distances

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Day 2 — Current State Documentation

Goal: Record non-optimal state for portfolio.

- Color code layout, fill rest of distances and finish log, draw spaghetti diagram in PPT with copy of current (colored) layout, identify and note obvious wastes

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Day 3 — Waste Analysis & Redesign Plan

Goal: Apply IE concepts to propose improvements.

- Find bottlenecks and motion waste, think of 3 options for layout modifications, pick best strategy, evaluate impact with charts, update diagram, justify swappings

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Day 4 — Optimized State Simulation

Goal: Produce the optimized picture.

- Simulate 10 books in new layout, find reduction of total distance travelled, summarize results, show before and after spaghetti diagrams and IE callouts

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Day 5 — Final Portfolio Formatting

Goal: Package into a clean, professional report.

- For Day 5: present modest 16.7% reduction and then introduce the TSP result of 9 steps with a 62.5% reduction (assume one worker and batch size no more than 3)
- TSP (Travelling Salesman Problem): Minimizing Travel: The primary goal is to find the path that minimizes the total distance traveled or the time taken to complete the route. Visiting Each Destination Once: Each shelf or location where you need to drop off books must be visited exactly one time in the route.
- Recommended operational changes for high impacts:
    - Move label station to the return cart or attach a mobile label printer.
    - Train staff to batch by doing one multi-drop loop rather than one return-per-book (or use simple routing order printed on the cart).
    - Cluster highest-frequency shelves near the return area.
    - Add a small staging bin for daily peaks so workers can batch easily.
- Arrange work into sections, add operational changes, suggest TSP method, export