POE Capstone Checklist: Automated Sorting System

Phase 1: Engineering Design (Pre-Build)

Goal: Complete a full design BEFORE building

Step 1: Define the Problem

☐ Write a clear **problem statement**
☐ Identify the **main goal** (what must the system do?)
☐ List key **requirements** (sorting, unloading, autonomy, etc.)

Step 2: Identify Criteria & Constraints

☐ List **criteria** (what defines success?)
☐ List **constraints**:

- size limits
- time limits
- required components (VEX Brain, sensors, pneumatics, etc.)

☐ Include **performance targets** (accuracy, number of items, etc.)

Step 3: Research & Investigation

☐ Research possible:

- sorting methods
- sensors (color, magnetic, weight, etc.)
- feeding/singulation systems

☐ Record **advantages/disadvantages** of each
☐ Identify at least **2 possible ways to detect steel vs aluminum**

Step 4: Brainstorm Solutions

☐ Sketch **at least 3 different system ideas**
☐ Each design must include:

- unloading/transfer system
- sensing method(s)

- sorting mechanism

☐ Label key components on sketches

Step 5: Decision Matrix

☐ Create a **decision matrix** comparing your ideas
☐ Use criteria such as:

- reliability
- complexity
- accuracy
- build difficulty

☐ Select the **best design** based on evidence

Step 6: Final Design Plan

☐ Create a **detailed system diagram** (subsystems labeled)
☐ Create a **flowchart** showing:

- sensor inputs
- decision logic
- outputs/actions

☐ Clearly show:

- how objects move through the system
- how sorting decisions are made

Step 7: CAD Model

☐ Create a **CAD model** of your system
☐ Include:

- major subsystems
- approximate layout
- space planning

☐ Ensure design fits within size constraints