1. **Desired Needs Leading to Final Design Objectives**
    a. Develop a low-cost, automated sorting system to classify organoids.
    b. reduce slow and subjective manual sorting of brain organoids.
    c. Maintain organoid viability and sterility during transport, imaging, and sorting
2. **Major Constraints**
    a. **Safety/Regulatory Affairs:** Materials must be biocompatible and non-toxic, such as PDMS and glass.
    b. **Risks:** Improper handling of resin, PDMS curing materials, or cleaning chemicals may create chemical exposure risks.
    c. **Global Impact:** More consistent organoid sorting can improve disease modeling and drug screening.
    d. **Manufacturability:** The modular design makes it easier to replace or modify individual parts, such as the channel chip, tubing, valve, or camera system.
    e. **Quality Control/Marketability:** Low estimated prototype cost of about $400 improves marketability.
3. **Major Engineering Standards**
    a. **ISO 22916:** Relevant to microfluidic device dimensions, connections, and device classification.
    b. **ISO 10993-1:** Relevant to biological evaluation and biocompatibility of device materials.
4. **Ethical, Environmental, or Societal Concerns**
    a. Since organoids are used in human disease modeling, reliable quality control is important for reproducible research.
    b. PDMS, resin, tubing, and disposable components create lab waste, so future designs should consider reusable or lower-waste components.
5. **Active Teamwork and Leadership**
    a. Team members divided work across CAD/prototyping, PDMS manufacturing, image processing, device design, pinch valve development.
    b. The group worked toward deadlines by completing design iteration, prototype fabrication, and validation testing in stages.
6. **Motivating Factors**
    a. The main motivation was solving a real limitation in brain organoid research: manual sorting is slow, subjective, and can damage organoids.
    b. First time building a computer vision-based CNN system for a biological sorting device; motivated to learn image processing.
7. **Innovative/Entrepreneurial Ideas**
    a. The project combines millifluidic organoid handling, real-time imaging, CNN morphology classification, and Arduino-controlled pinch valve sorting into one low-cost platform.