
Problem Set 1

We would like to distribute our favorite solution for each problem to the class as the official solution so please strive for clarity and elegance. If you would like to type your problem set, the raw \LaTeX version of this problem set is available on the 2.008 Web site.

Problem 1-1. Describe a machine

Use detailed sketches to describe the geometry and purpose of a machine that you have designed. You need only sketch the important components (i.e. individual screws can be omitted). The grader should be able to read your drawing within 2 minutes.

Problem 1-2. Non-production design and manufacturing

Pick a critical component of the machine/product from above (one that will not disappear in problem 3) and provide the process plan that you used to make the part. Pick a component that requires at least three different types of features (3 bolt holes are not different types of features). Provide sketches for each stage of manufacturing and include a description of the specific machining task, how the part is to be fixtured and which tools are used.

Problem 1-3. DFMA and process planning

Suppose you need to make 100000 of your machines per year. Describe how and why you would change the design. Consider the new design of the part you described in problem 2. Provide a new process plan for this part, including sketches. Briefly explain how the new process bears on cost, rate, quality and flexibility.

Some questions to consider and/or address: How much factory space do you need to make your part? How much skilled labor is required?