

Design Contest
ME72 Engineering Design Laboratory
Fall & Winter Terms, 2006-07
Objectives, Requirements and Functions Assignment

Assigned: **Thur, 12-Oct**

Due: **Tue, 17-Oct** by 5pm in 321 Thomas

Now that you know the rules and objectives for this years ME72 Design Contest, perform the initial steps of the design process (by yourself, without your teammate) for a team's contest devices for the contest.

Carefully avoid thinking of final design alternatives to the contest task.
Include the following:

Specifications and Constraints: how fast?, how high?, how durable?, *etc.* (put numbers here) Justify your requirements and specifications.

Functional Requirements: Consider the most general functions that the devices must perform, without considering how the functions might be accomplished. As we will discuss in class, at the very highest conceptual level, your device must accomplish a primary function, as well as many other important functions such as device safety, contest set up (such as swapping of the servo control unit). Please break down the primary function and the set-up-for-the-contest function into as many subfunctions as possible. Avoid thinking of solutions to the design task, instead think about clarifying the task into a set of functions (and sub-functions) that the devices must perform in order to accomplish the task.

Do not “parrot” back the details of the rules, but if there are one or more rules that you feel are important to amplify, as they relate to requirements and constraints, feel free to do so.

You may think of “Functions” as being separate from “Requirements”, *i.e.*, “Functions” are what the device(s) must do; “Requirements” are the numerical specification on how much of each function the device must perform. Here, “Functional Requirements” are both the functions (and sub-functions) that the device(s) must perform, along with the numerical quantity of each function that must be performed. After decomposing the main functions into sub-functions, make sure that you have specifications and constraints for each of the identified subfunctions and their constraints.

It might also be useful to include an additional list of Wishes.

Morphology Chart: develop a set of alternative embodiments to accomplish the various functions and subfunctions that were developed and analyzed above. Present these alternatives in a graphical chart form. Include a discussion of the pros and cons of the alternatives. A broad range of alternatives (a large design space) here will provide you with many alternatives as you proceed through design, fabrication, and testing of your device.

Keep a copy of this assignment so you can expand on it, together with your teammate, in the next assignment.