# The Robotics Engineering Design Process

#### Step 1 – Identify the Problem

- Pick a strategy that will yield the most points.
- How do we fulfill the chosen strategy?

#### Step 2 – Identify Criteria and Constraints

- Functional Requirements:
  - "The robot can score tubes on pegs."
- Design Constraints:
  - Robot must weigh less than 120 lbs...
    - See Robot Rules...

#### Step 3 – Specification Ranking

- At some level, determine what is important...
- Use a weighted objectives table to determine what is important.

#### Step 4 – Brainstorm Design Concepts

- Draw up all ideas, try to visualize how to solve the problem.
- There are no bad ideas! One idea that doesn't work out may inspire another that does.

#### Step 5 – Prototyping

- Step 4 & 5 are linked together...
- This is the fun part Play Around!
- Sketch it, try it, tweak it... IMPROVE IT.

### Step 6 – Select an Approach

- What worked best?
- Define "best"?
- How do you decide?

### Step 7 – Detailed Design

- CAD Everything!
- Think "it" through.
  - Maintenance, Assembly...
  - The devil is in the details.

- Probably one of the longest stages in the process...

Step 8 – Manufacturing & Implementation

- Build the robot...
- Produce marketing packets
- Create a maintenance plan
- Step 9 Analyze Results
  - Finish early... test at home!
  - Check against your specs.
  - Check against expectations.

#### Step 10 – Refine the Design

- Determine if things can be improved.
- Don't be afraid to go backwards.
- Redesign and test out new methods.
- Use all the time you get constructively.
- DON'T GET STUCK TRYING THE SAME THING OVER AND OVER!
- The definition of insanity is doing the same thing over and over and expecting different results!

### Overview

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