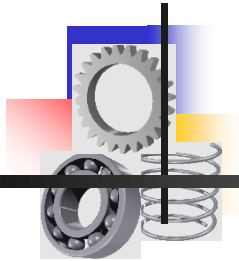
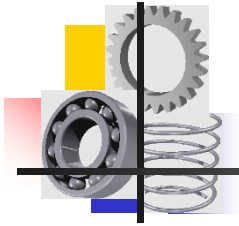


# Understanding Customer Requirements

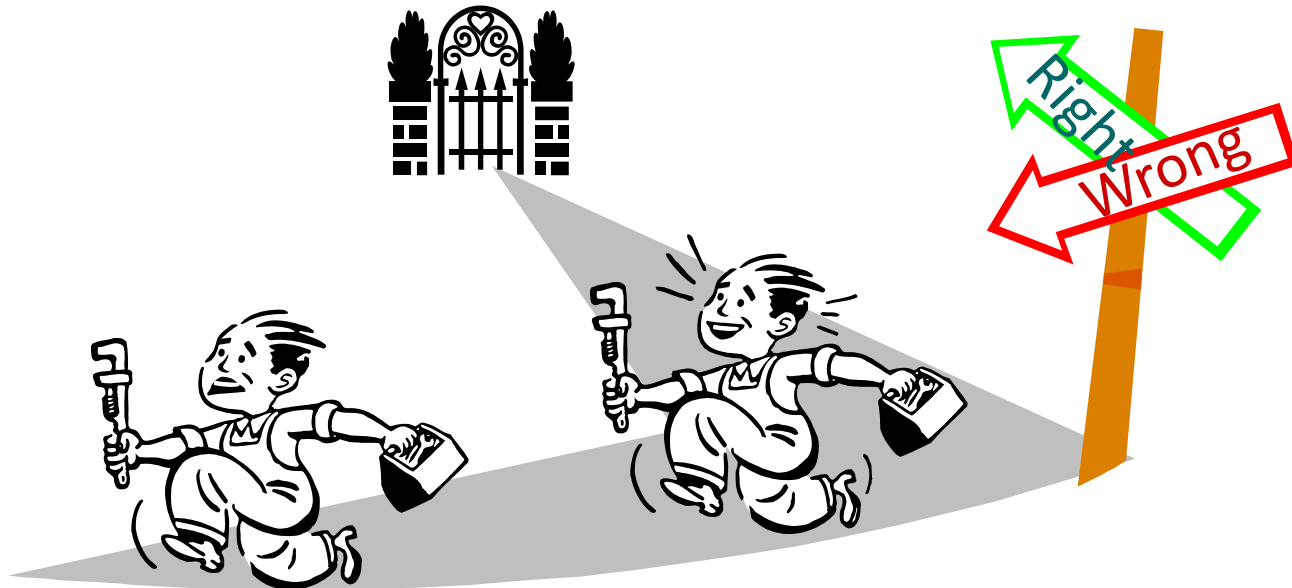


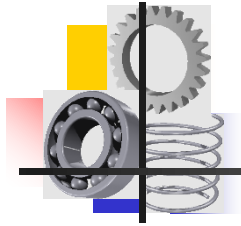
Quality Function Deployment



# Need to focus

Moving in the wrong direction at a fast pace is still moving in the wrong direction.

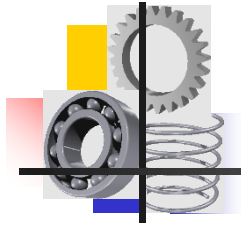




# Information on QFD....

---

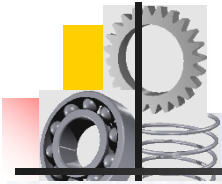
- Developed in Japan in the mid 1970s
- Introduced in USA in the late 1980s
- Toyota was able to reduce 60% of cost to bring a new car model to market
- Toyota decreased 1/3 of its development time
- Used in cross functional teams
- Companies feel it increased customer satisfaction



# Why....?

---

- Product should be designed to reflect customers' desires and tastes.
- House of Quality is a kind of a conceptual map that provides the means for interfunctional planning and communications
- To understand what customers mean by quality and how to achieve it from an engineering perspective.
- HQ is a tool to focus the product development process



What The Customer Wanted



As Sales Ordered It



As Market Planning Requested It



As Engineering Designed It



As Manufacturing Made It



As Field Service Installed It



What The Customer Wanted



As Sales Ordered It



As Market Planning Requested It



As Engineering Designed It

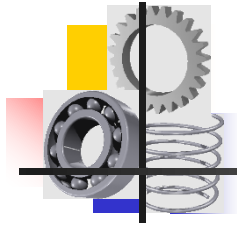


As Manufacturing Made It



As Field Service Installed It

**QFD Target**

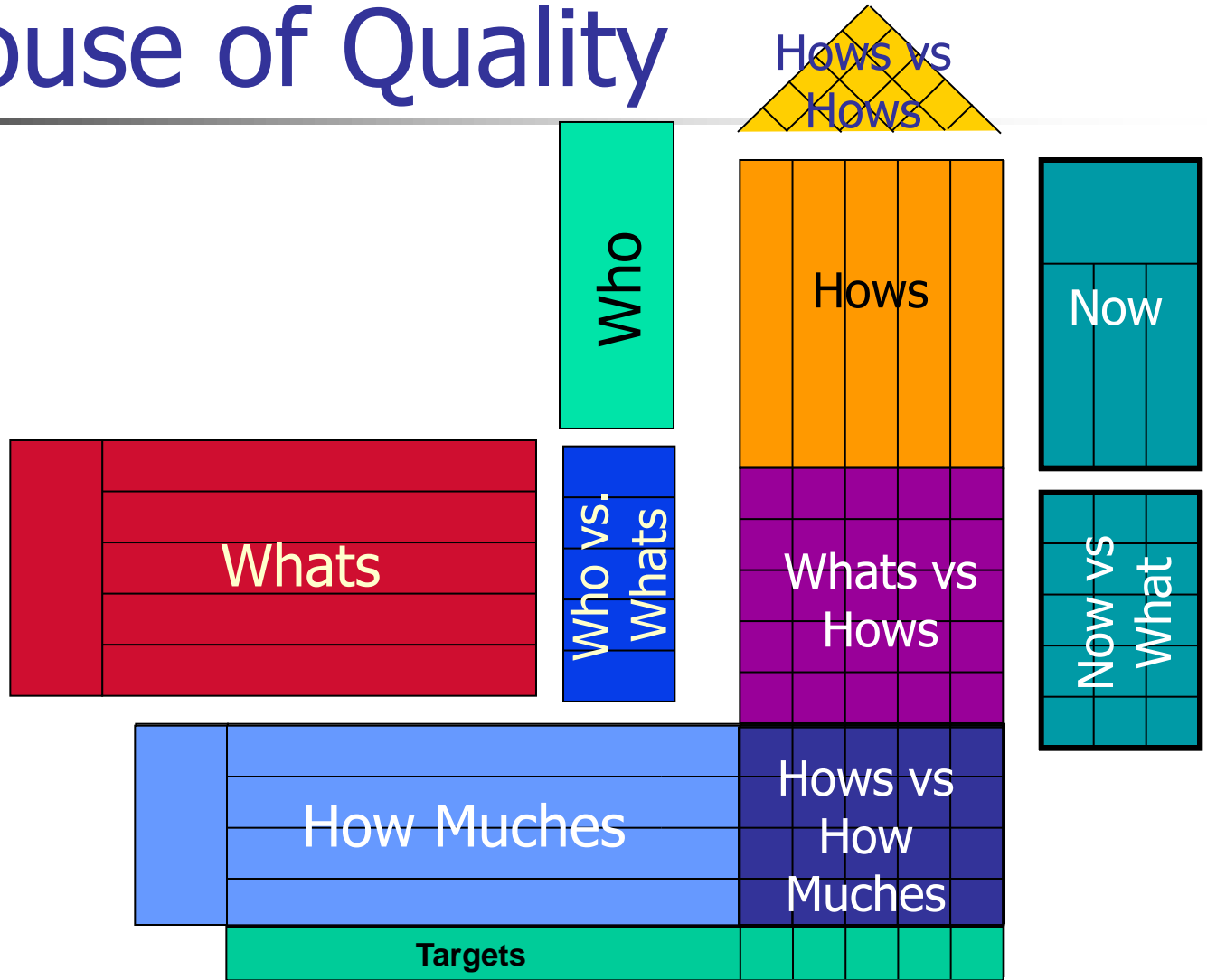
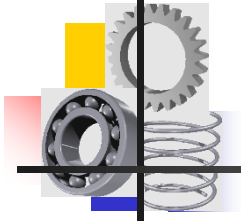


# Important points

---

- Should be employed at the beginning of every project (original or redesign)
- Customer requirements should be translated into measurable design targets
- It can be applied to the entire problem or any subproblem
- First worry about what needs to be designed then how
- It takes time to complete

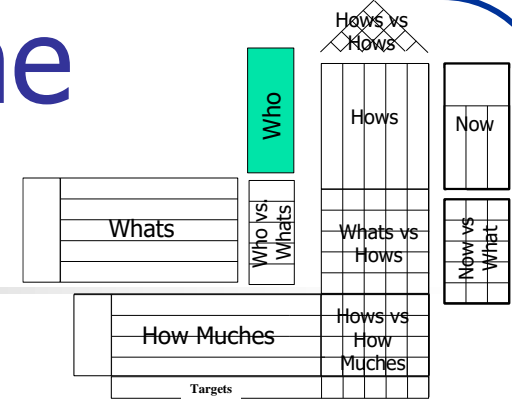
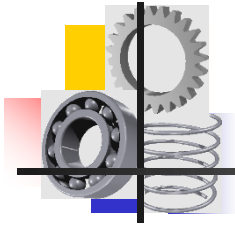
# Components of House of Quality







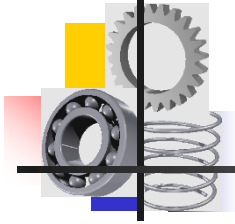
# Step 1: Who are the customers?



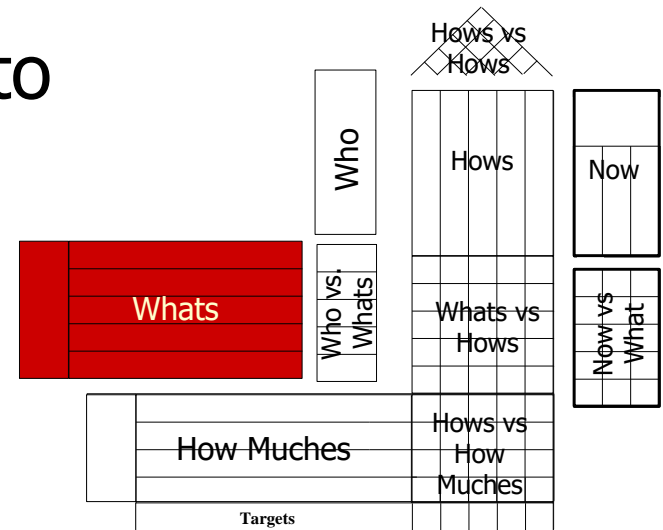
- To “Listen to the voice of the customer” first need to identify the customer
- In most cases there are more than one customer
  - consumer
  - regulatory agencies
  - manufacturing
  - marketing/Sales

Customers drive the development of the product, not the designer

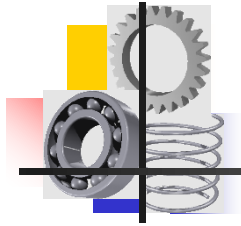
# Step 2: Determine the customers' requirements



- Need to determine what is to be designed
- Consumer
  - product works as it should
  - lasts a long time
  - is easy to maintain
  - looks attractive
  - incorporated latest technology
  - has many features



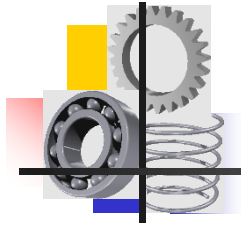
List all the demanded qualities at the same level of abstraction



## Step 2: cont...

---

- Manufacturing
  - easy to produce
  - uses available resources
  - uses standard components and methods
  - minimum waste
- Marketing/Sales
  - Meets customer requirements
  - Easy to package, store, and transport
  - is suitable for display

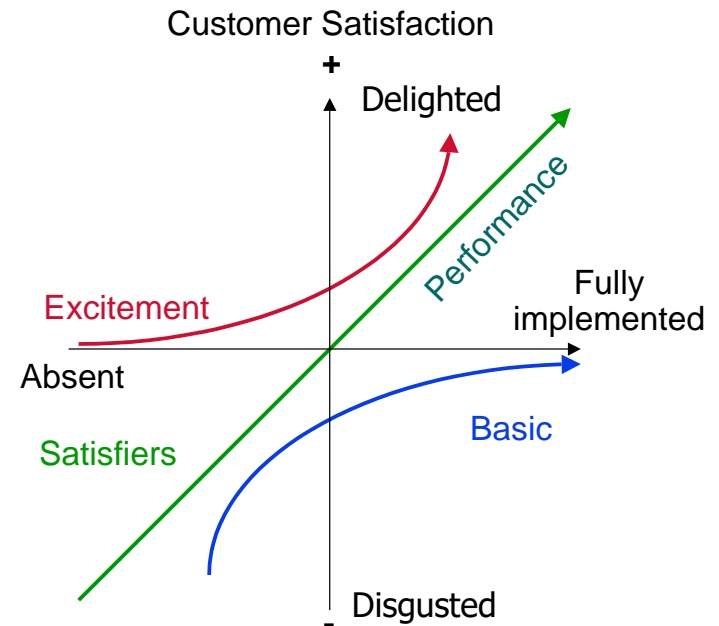


# Kano Model

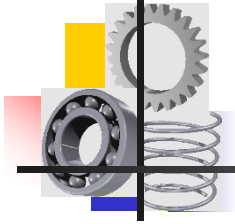
**Basic Quality:** These requirements are not usually mentioned by customers. These are mentioned only when they are absent from the product.

**Performance Quality:** provides an increase in satisfaction as performance improves

**Excitement Quality or "wow requirements":** are often unspoken, possibly because we are seldom asked to express our dreams. Creation of some excitement features in a design differentiates the product from competition.

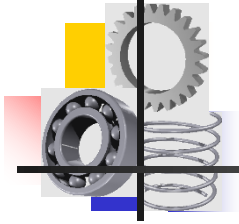


# Types of customer requirements

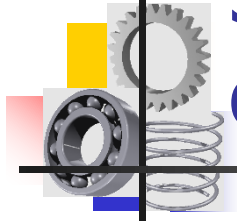


- Functional requirements describe the product's desired behavior
- Human factors
- Physical requirements
- Reliability
- Life-cycle concerns
- Resource concerns
- Manufacturing requirements

# How to determine the Whats?

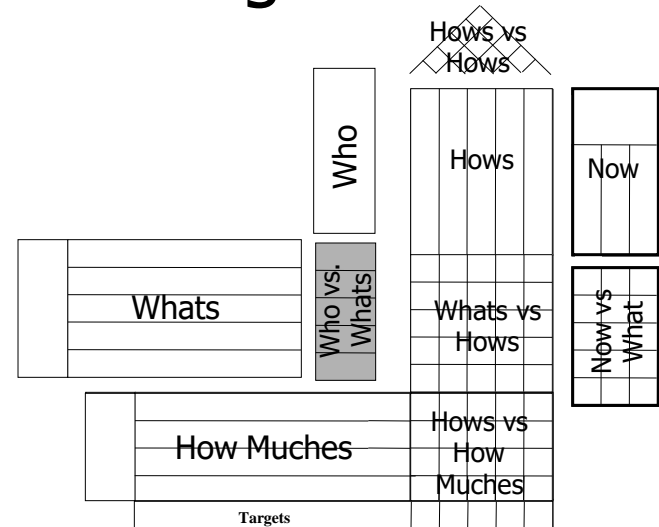


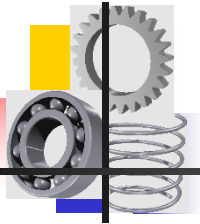
- Customer survey (have to formulate the questions very carefully)
- If redesign, observe customers using existing products
- Combine both or one of the approaches with designer knowledge/experience to determine “the customers’ voice”



## Step 3: Determine Relative Importance of the Requirements: Who vs. What

- Need to evaluate the importance of each of the customer's requirements.
  - Generate weighing factor for each requirement by rank ordering or other methods



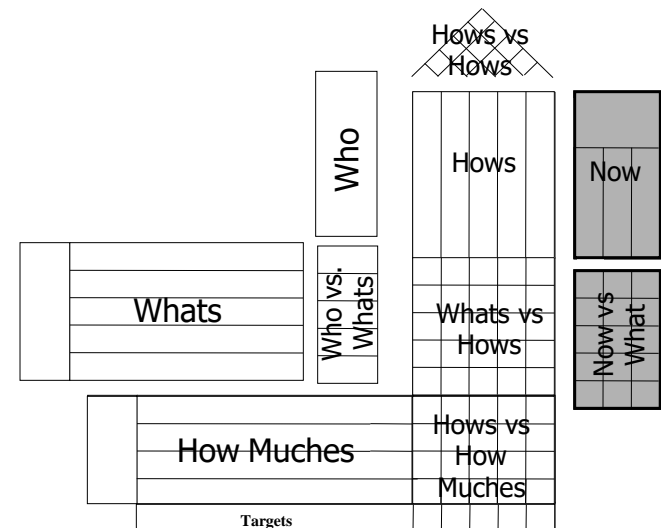


## Step 4: Identify and Evaluate the Competition: How satisfied is the customer now?

- The goal is to determine how the customer perceives the competition's ability to meet each of the requirements
  - it creates an awareness of what already exists
  - it reveals opportunities to improve on what already exists

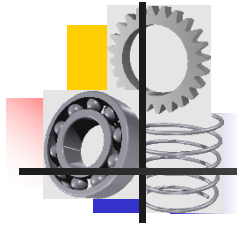
The design:

1. does not meet the requirement at all
2. meets the requirement slightly
3. meets the requirement somewhat
4. meets the requirement mostly
5. fulfills the requirement completely





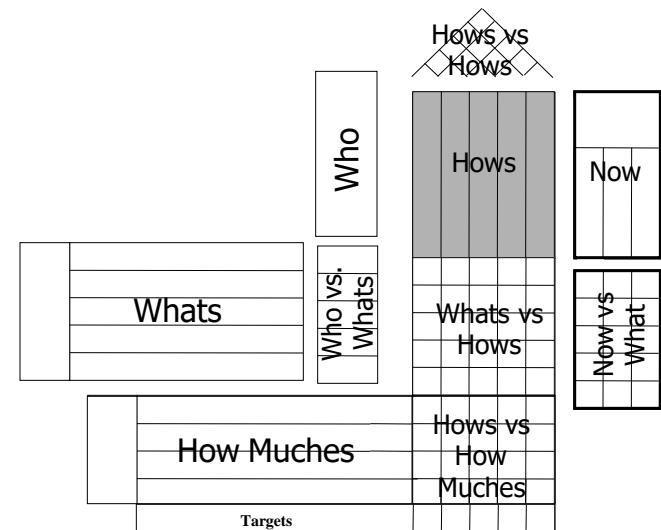
# Step 5: Generate Engineering Specifications: How will the customers' requirements be met?



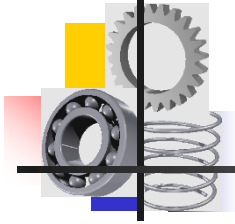
- The goal is to develop a set of engineering specifications from the customers' requirements.

Restatement of the design problem and customer requirements in terms of parameters that can be measured.

Each customer requirement should have at least one engineering parameter.

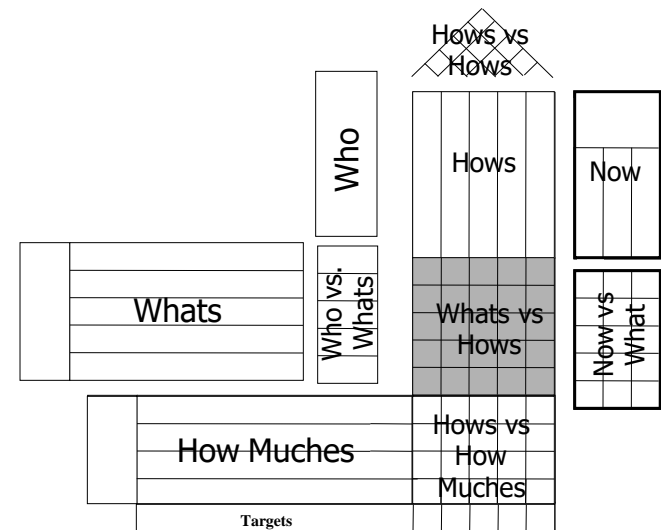


# Step 6: Relate Customers' requirements to Engineering Specifications: Hows measure Whats?

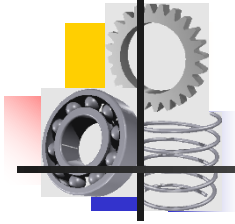


- This is the center portion of the house. Each cell represents how an engineering parameter relates to a customers' requirements.

9 = Strong Relationship  
 3 = Medium Relationship  
 1 = Weak Relationship  
 Blank = No Relationship at all

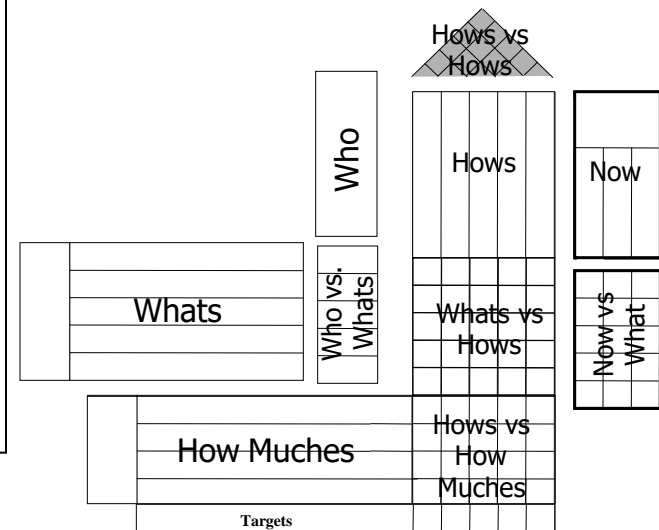


# Step 7: Identify Relationships Between Engineering Requirements: How are the Hows Dependent on each other?

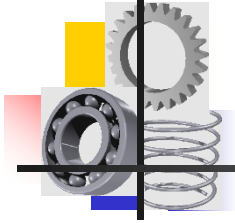


- Engineering specifications maybe dependent on each other.

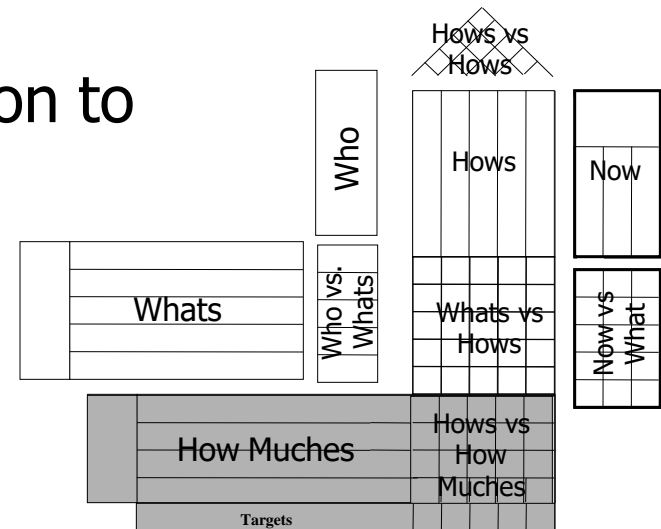
9 = Strong Relationship  
 3 = Medium Relationship  
 1 = Weak Relationship  
 -1 = Weak Negative Relationship  
 -3 = Medium Negative Relationship  
 -9 = Strong Negative Relationship  
 Blank = No Relationship at all



# Step 8: Set Engineering Targets: How much is good enough?

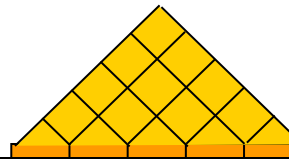


- Determine target value for each engineering requirement.
  - Evaluate competition products to engineering requirements
  - Look at set customer targets
  - Use the above two information to set targets



# Relationships Among Engineering Characteristics

# Customer Evaluation



Identifying performance measure conflicts

Record Performance measures for each customer demanded quality

Record customer performance for your product and similar product and competitors

Importance for each demand

Technical benchmarking

Engineering Performance

Objectives  
Measures

Technical Difficulty associated with achieving Targets/improvements and importance of technical characteristics

Engineering Performance  
Qualities

Determining Important Characteristics

Targets							
Technical Difficulty							
Importance							

Qualities  
Targets

# Components of House of Quality

