

The background features a large, semi-transparent watermark of the Georgia Institute of Technology logo. The logo is circular, with the words "GEORGIA INSTITUTE OF TECHNOLOGY" around the perimeter. In the center, there is a shield with a torch and a gear, and the motto "PROGRESS AND SERVICE" below it.

***Management and Planning Tools***

***ME – 2110***

***Creative Decisions and Design***

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## ***8 Management & Planning Tools***

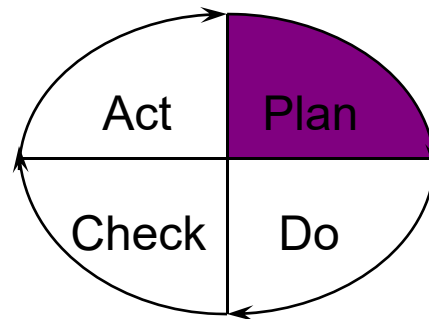
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- ❖ Gantt Chart (1)
- ❖ Affinity Diagram (2)
- ❖ Interrelationship Digraph (3)
- ❖ Tree Diagram (4)
- ❖ Prioritization Matrix (5)
- ❖ Matrix Diagram (6)
- ❖ Process Decision Program Chart (PDPC) (7)
- ❖ Activity Network Diagram (8)

## Continuous Quality Improvement (CQI)

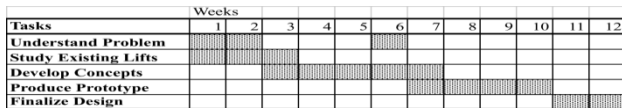
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- ❖ Management goal = CQI
- ❖ The 8 MP tools are part of the “plan” segment of CQI.
  - Tools encourage the participation and input from more people.
- ❖ Tools organize the non-quantitative information from “a chaotic situation [into] an implementable action plan” (p. 7, MJP).

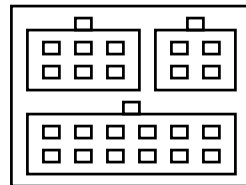


Demming Cycle

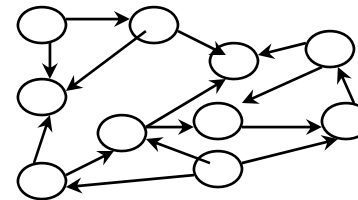
# 8 Management & Planning Tools



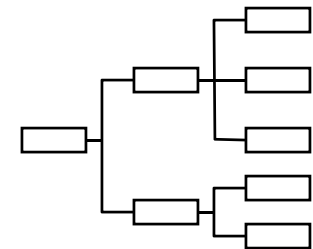
Gantt Chart (1)



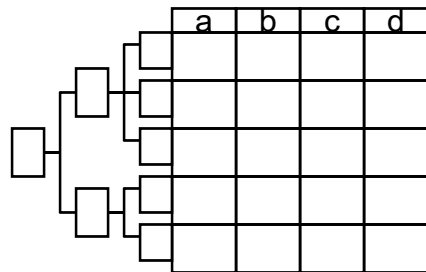
Affinity Diagram (2)



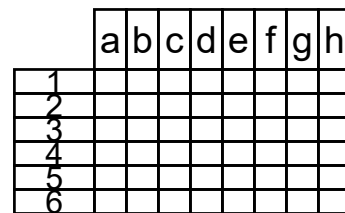
Interrelationship Digraph (3)



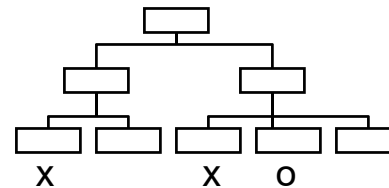
Tree Diagram (4)



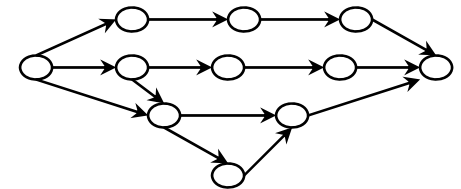
Prioritization Matrices (5)



Matrix Diagram (6)

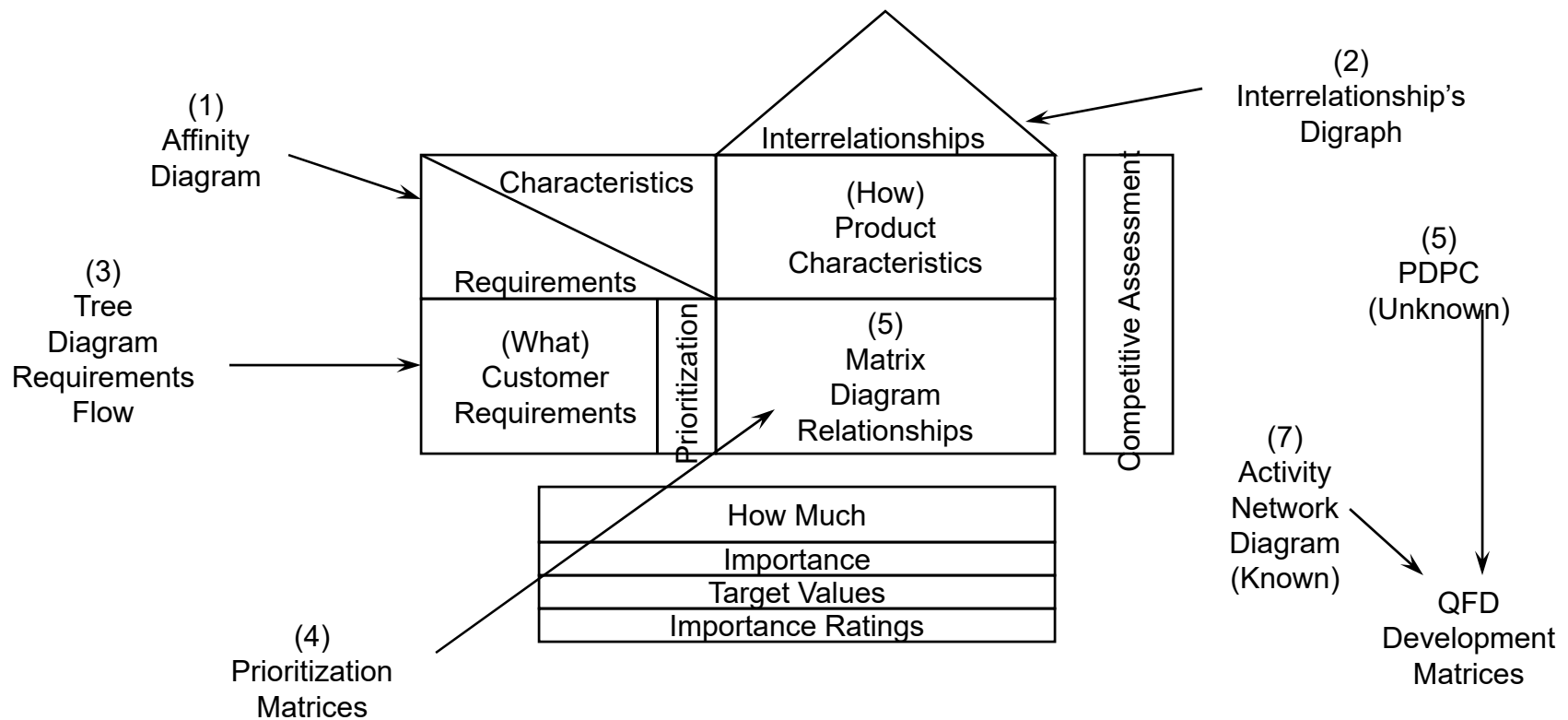


Process Decision Program Chart (7)



Activity Network Diagram (8)

# Relationship of 8 MP Tools to QFD



# Gantt Chart

Timeline of  
Required Tasks:  
Design an Aerial Lift



Tasks	Weeks											
	1	2	3	4	5	6	7	8	9	10	11	12
<b>Understand Problem</b>	█	█				█						
<b>Study Existing Lifts</b>	█	█	█									
<b>Develop Concepts</b>			█	█	█	█	█					
<b>Produce Prototype</b>							█	█	█	█		
<b>Finalize Design</b>											█	█

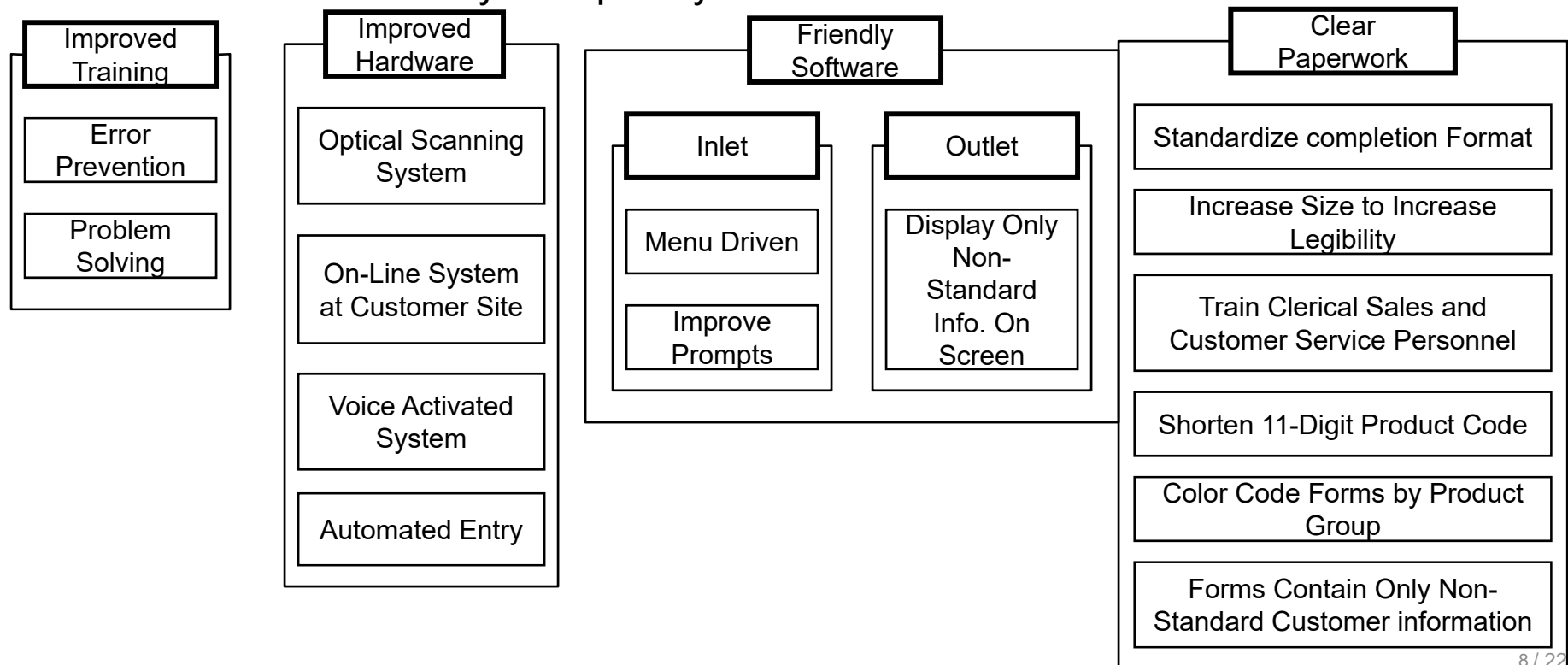
## *Affinity Diagram*

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- ❖ Purpose:
  - Creative process (generate ideas)
  - Gathers language data
- ❖ Start with:
  - What is issue under discussion?
- ❖ Then:
  - Brainstorm ideas
- ❖ Then:
  - Gather ideas under affinity headings

# Affinity Diagram Example

## ❖ Reduce Data Entry Complexity





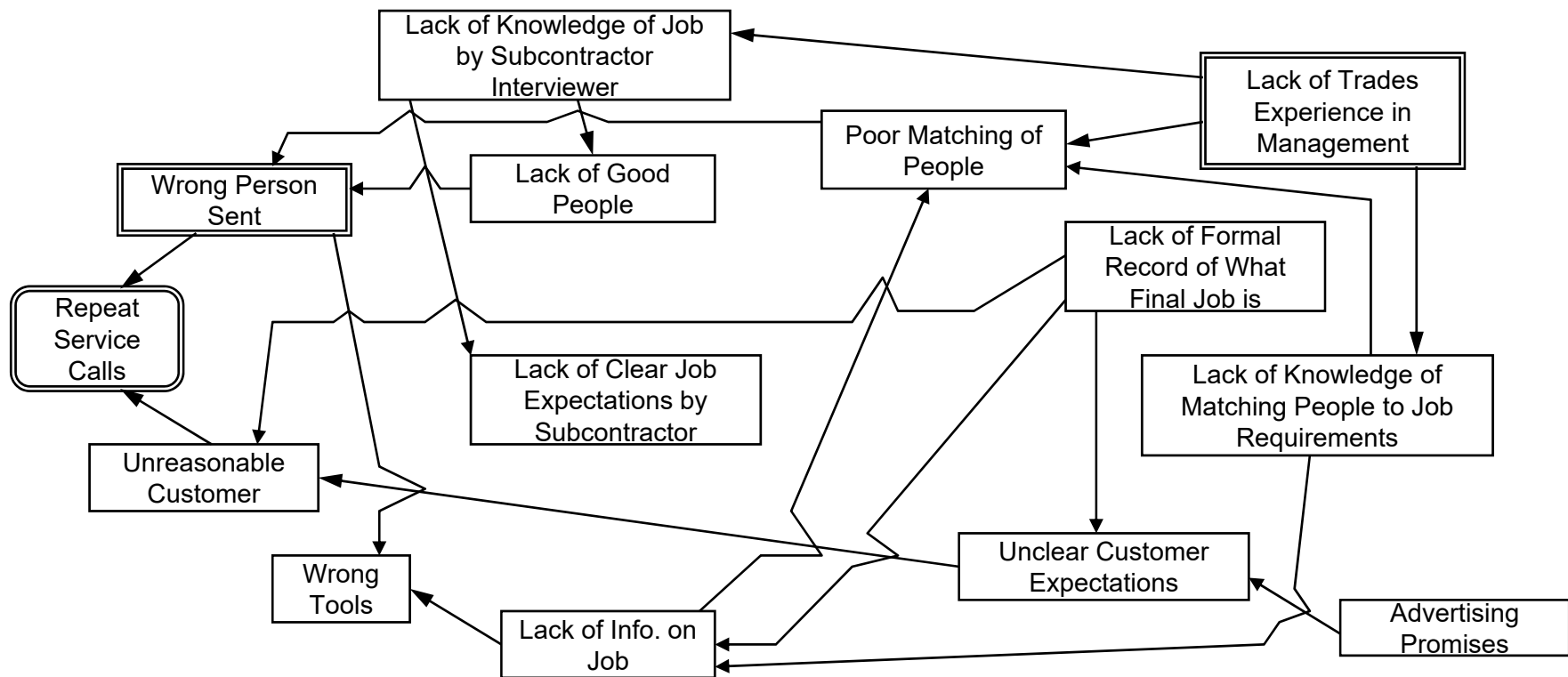
## *Interrelationship Digraph*

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- ❖ Purpose:
  - To show causality between items
  - To identify drivers and bottlenecks
  - Can be used to fill in roof of house of quality
- ❖ First:
  - Place items to be discussed
- ❖ Then:
  - Draw arrows between items
  - From  $\rightarrow$  to indicates causality
- ❖ Arrows
  - Most out arrows  $\rightarrow$  primary: driver
  - Most in arrows  $\leftarrow$  secondary: bottleneck

# Interrelationship Digraph Example

❖ Issues involved in repeated service calls



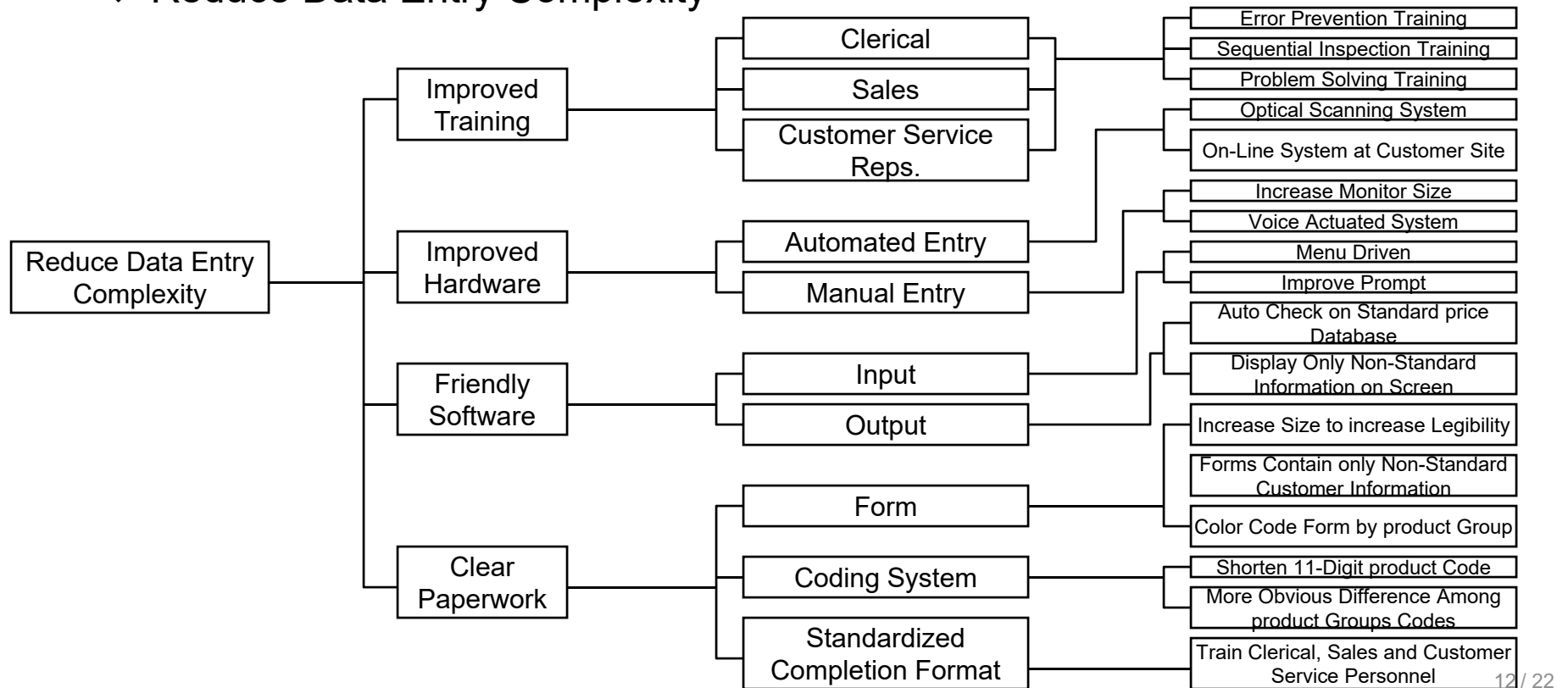
## *Tree Diagram*

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- ❖ Purpose:
  - Paths and tasks to accomplish primary goal and its related sub-goals
- ❖ First:
  - List main what (goal)
- ❖ Then:
  - List “Hows” (means)
  - These become goals (“Whats”) for next level
- ❖ Continue until you get to assignable tasks

# Tree Diagram Example

## ❖ Reduce Data Entry Complexity



## *Prioritization Matrix*

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- ❖ Purpose:
  - To prioritize items by:
    - Prioritization against themselves
    - Prioritization against criteria
- ❖ This allows you to focus resources

# Prioritization Matrix (Against Self)

		A	B	C	D	E			%
	A						$\Sigma R_1 /$ $\Sigma C$		
	B						$\Sigma R_2 /$ $\Sigma C$		
	C						$\Sigma R_3 /$ $\Sigma C$		
	D						$\Sigma R_4 /$ $\Sigma C$		
	E						$\Sigma R_5 /$ $\Sigma C$		
		$\Sigma C_1$	$\Sigma C_2$	$\Sigma C_3$	$\Sigma C_4$	$\Sigma C_5$	$\Sigma C$		

Total

(+) = 5; (-) = 1/5

## Prioritization Matrix (Coffee Example)

		A	B	C	D	E			%	
Taste	A	X	-	+	+	+	$\frac{\sum R_1}{\sum C}$	0.2923	29.23	
Smell	B	+	X	+	+	+	$\frac{\sum R_2}{\sum C}$	0.3846	38.46	
Poisonous	C	-	-	X	+	-	$\frac{\sum R_3}{\sum C}$	0.1077	10.77	
Color	D	-	-	-	X	-	$\frac{\sum R_4}{\sum C}$	0.0154	1.54	
Temperature	E	-	-	+	+	X	$\frac{\sum R_5}{\sum C}$	0.2000	20.00	
		5.6	0.8	15.2	20	10.4	52			
		$\sum C_1$	$\sum C_2$	$\sum C_3$	$\sum C_4$	$\sum C_5$	$\sum C$			
									Total	100.00

Reading Across the Rows



(+) = 5; (-) = 1/5

## Prioritization Matrix (Against Criteria)

		1 (Hi)	2 (Low)	3 (Hi)	4 (Hi)		Value
	A						
	B						
	C						
	D						

Criteria:

1 =

2 =

3 =

4 =



## Prioritization Matrix (Coffee Example)

		1 (High)	2 (High)	3 (High)	4 (Target)	5 (Target)	Value
Taste	A	□	□	O	Δ	Δ	23
Smell	B	□	□	O	Δ	Δ	23
Poisonous	C	O	Δ	□	Δ	Δ	15
Color	D	O	O	Δ	□	Δ	17
Temperature	E	□	O	Δ	Δ	□	23.

### Criteria:

1 = Taste Jury Rating

3 = LD 50

5 = Burn Level

2 = Smell Jury Rating

4 = Color Spectrum

□ = Strong (9)

O = Medium (3)

Δ = Weak (1)

## *Matrix Diagram*

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- ❖ Purpose:
  - To show relations between two sets
  - To show strength of relations
  
- ❖ Basic types
  - QFD
  - Job responsibilities

# House of Quality

DIRECTION OF IMPROVE		Fng. Characts.							CUSTOMER RATING						
		IMPORTANCE	Serving Temp.	Taste Jry	Smell Jry	Coffeine Level	Color Standard	Filler/ Weigh	Analysis	0	1	2	3	4	5
Cup of Coffee	Hot	9	⊕	⊕	⊕										
	Smell	9	⊕	⊕	⊕										
	Taste	9	⊕	⊕		Δ		⊕							
	Color	2					⊕								
	Stimulating	10	Δ			⊕									
	Grounds	3		⊕				⊕							
	Not Poisorous	10							⊕						
ORGANIZATIONAL DIFFIC		TARGETS	130 of	95%	95%	X mg/l	167 STD	4 mg/l	4.0g						
ENGINEERING COMPETITIVE ASSESSMENT	5														
	4														
	3														
	2														
	1														
0															
ABSOLUTE IMPORTANCE			181	132	54	44	18	108	40						
RELATIVE IMPORTANCE			0.27	0.19	0.08	0.15	0.03	0.16	0.13						
			1	2	6	4	7	3	5						
ROOF		MATRIX	WEIGHTS		ARROWS										
Strong Pos ⊕		Strong ⊕	9		Maximize ↑										
Positive ○		Medium ○	3		Minimize ↓										
Negative ×		Weak Δ	1		Nominal ○										
Strong Neg ⊗															

# Matrix Diagram

## Job Responsibilities

	Person A	Person B	Person C
Job 1			
Job 2			
Job 3			
Job 4			
Job 5			
Job 6			

- = Primary Responsibility, O = Secondary Responsibility
- △ = Needs To Know

## Matrix Diagram (Interview Example)

### Job Responsibilities

	Boss	Organizer	Staff person
Travel	△	□	□
Pick Date	○	□	△
Schedule	△	□	○
Benefits Discussion	□	○	△
Dinner	○	△	□
Follow-Up	□	○	

□ = Primary Responsibility, ○ = Secondary Responsibility  
 △ = Needs To Know

## *Summary*

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- ❖ Management and planning tools allow you to:
  - Plan more formally
  - Organize information
  - Deal with qualitative information
  - Show relations between items and issues

*Use Them!!!*