



Process Analysis Tools and Techniques

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Tools and Techniques

- Synthesis Tools
 - Brainstorming
 - 5 Whys
 - Run Chart
 - Control Chart
- Process Analysis Tools
 - Logical Process Map
 - Physical Process map
 - Time Value Map
- General Analysis Tools
 - Groups and Relationships
 - Affinity Diagram
 - Cause-Effect Diagram
 - Reality Tree
 - Matrix Diagram
 - Trends and Importance
 - Histogram
 - Pareto Chart
 - Scatter Diagram
- And many others



Brainstorming

- An easy method to generate ideas in a group setting. It helps groups bring out the hidden ideas
- Use it to list possible problem areas, causes or solutions
- Brainstorming methods:
 - **Structured:** Every person in the group must contribute an idea
 - **Unstructured:** Members simply give ideas that come to mind.



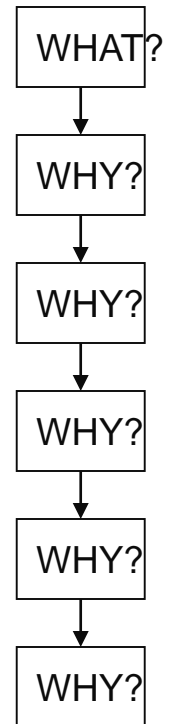
Brainstorming

- Never criticize ideas. Everyone is potentially has a great idea or a path to one. No idea is bad.
- Generate as many ideas as possible, as quickly as possible.
- Encourage a “free-wheeling” atmosphere. Do not hold back your own idea or anyone else’s.
- “Piggyback” on other people’s ideas. Look for connections, analogies, modifications, variations on the theme or other links
- Avoid talking about the good and bad points of ideas until after the transforming is complete. The only discussions allowed are questions related to clarifying ideas, not debating them.



5 Whys

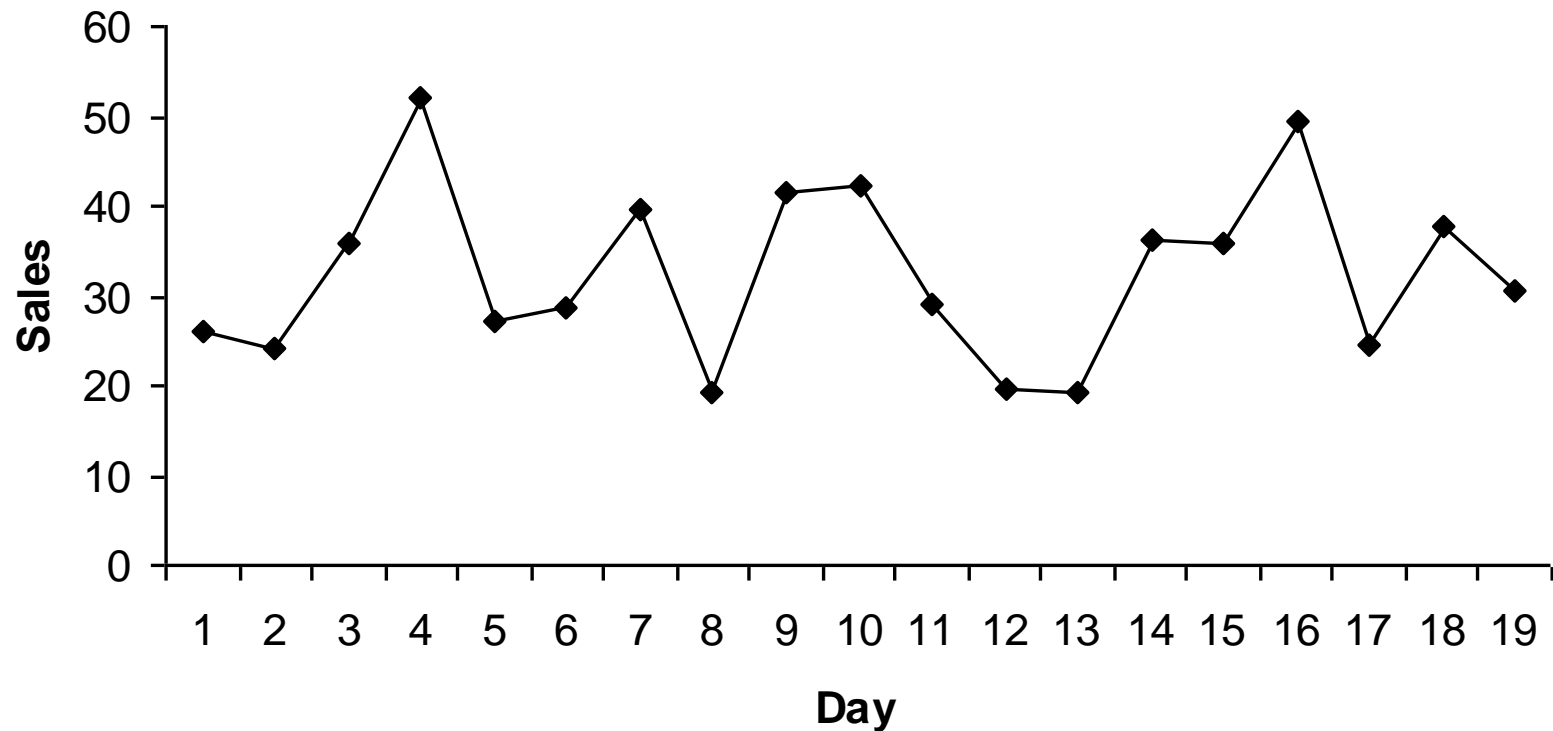
- Ask why five times to get to the root cause of problems
- Example:
 - “We spend too much time mopping the floor.”
 - “Why?” “Because there is always oil on the floor.”
 - “Why?” “Because the machine is constantly leaking oil.”
 - “Why?” “Because the seat is broken.”
 - “Why?” “Because it was not fixed last time.”
 - “Why?” “Because we did not put it on the maintenance list.”





Run Chart

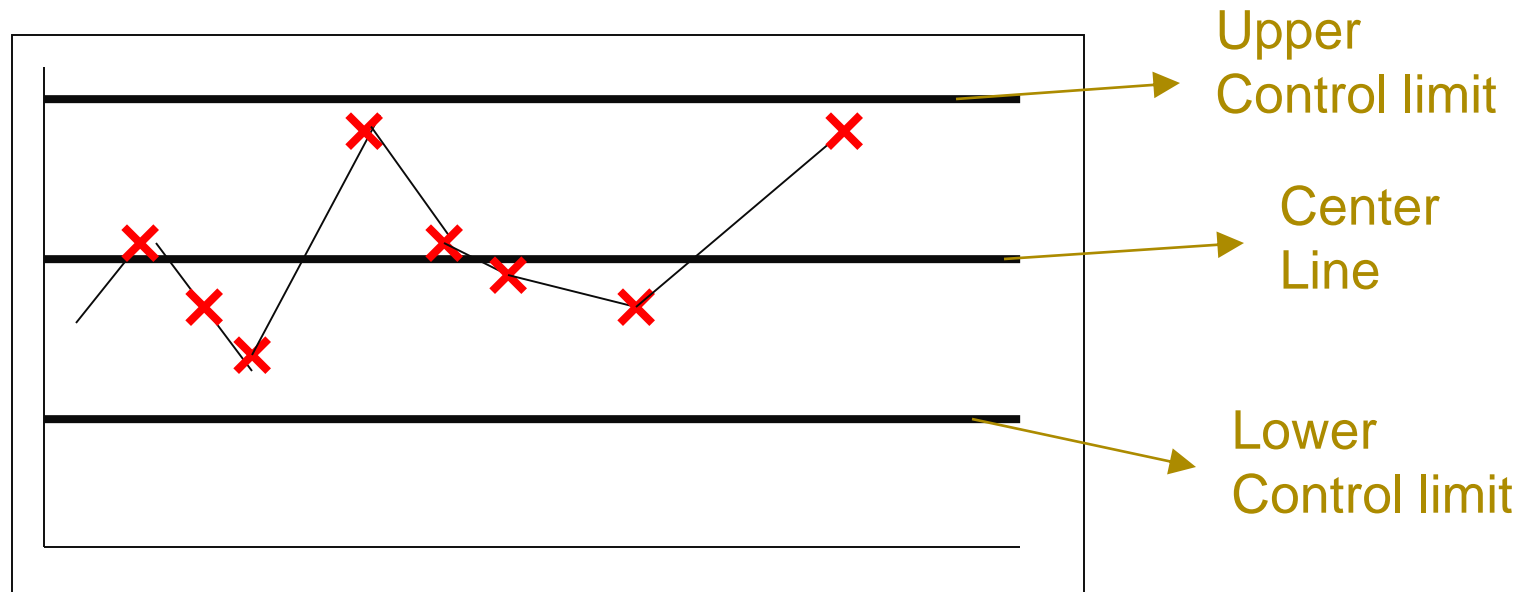
- A run chart is a graph that is used to see how something changes over time.





Control Chart

- A control chart is a graph that is used to monitor an ongoing process and defects trends over time against limits

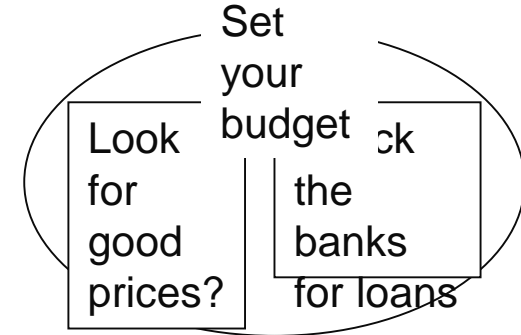




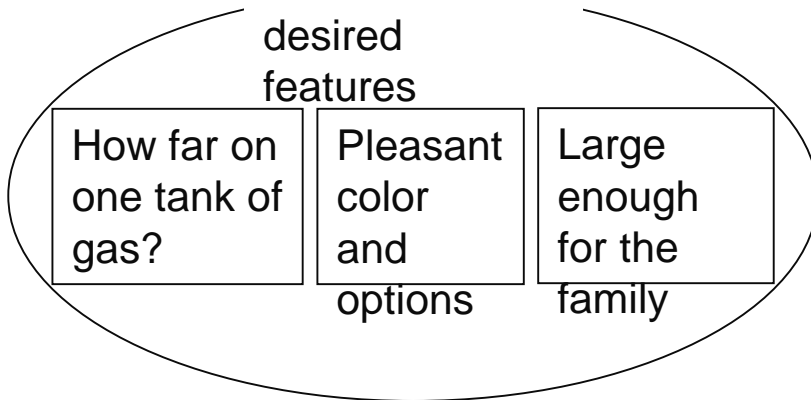
Affinity Diagram

- Organizing and summarizing natural groupings of ideas can help to understand the nature of the problem and create new solutions

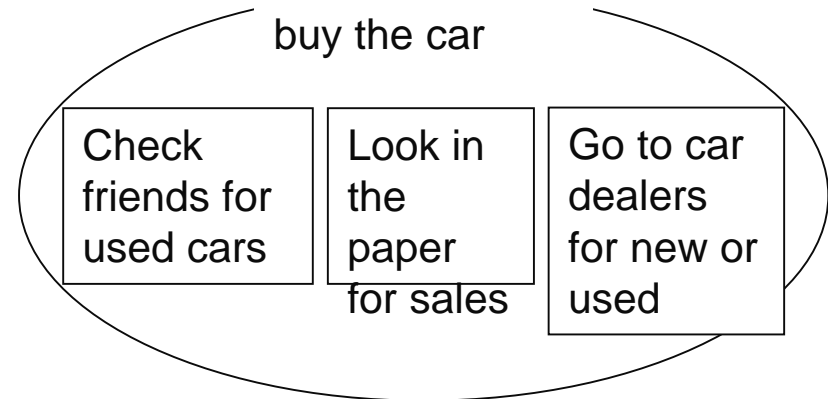
What are the issues involved in buying a new car?



Determine the desired features



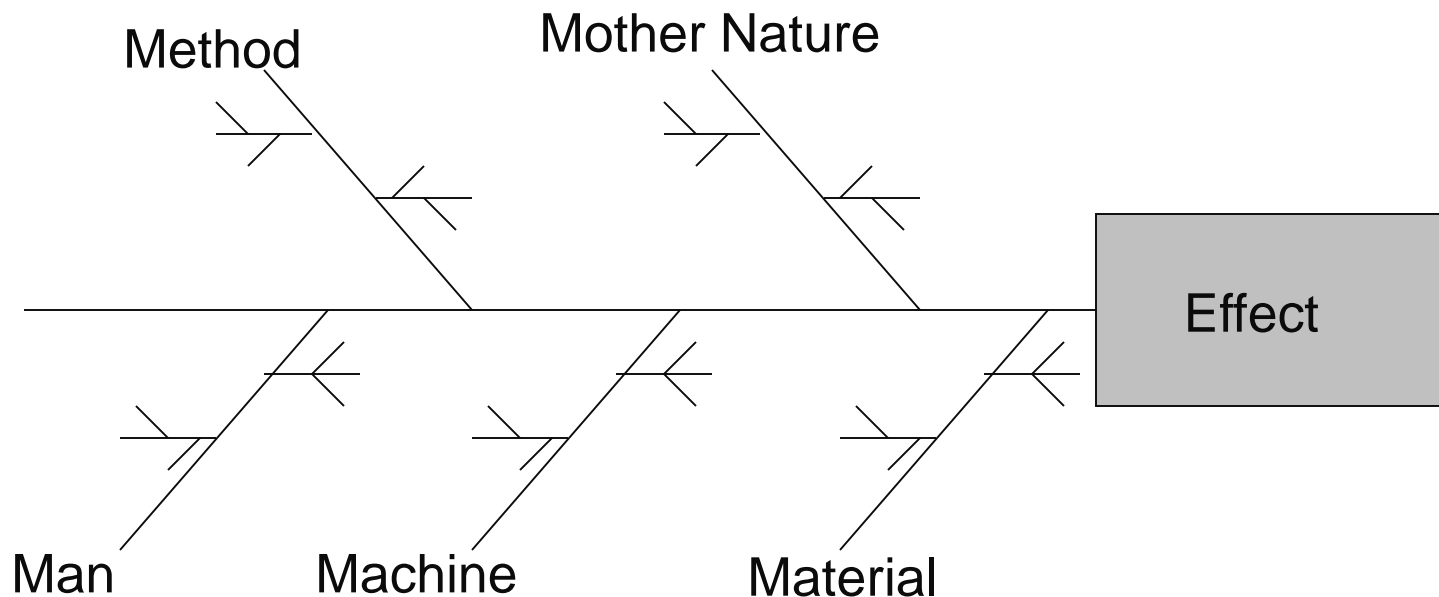
Decide how to buy the car





Cause and Effect Diagram

Ask why, what, where, who, when and how to find more causes and organize them.



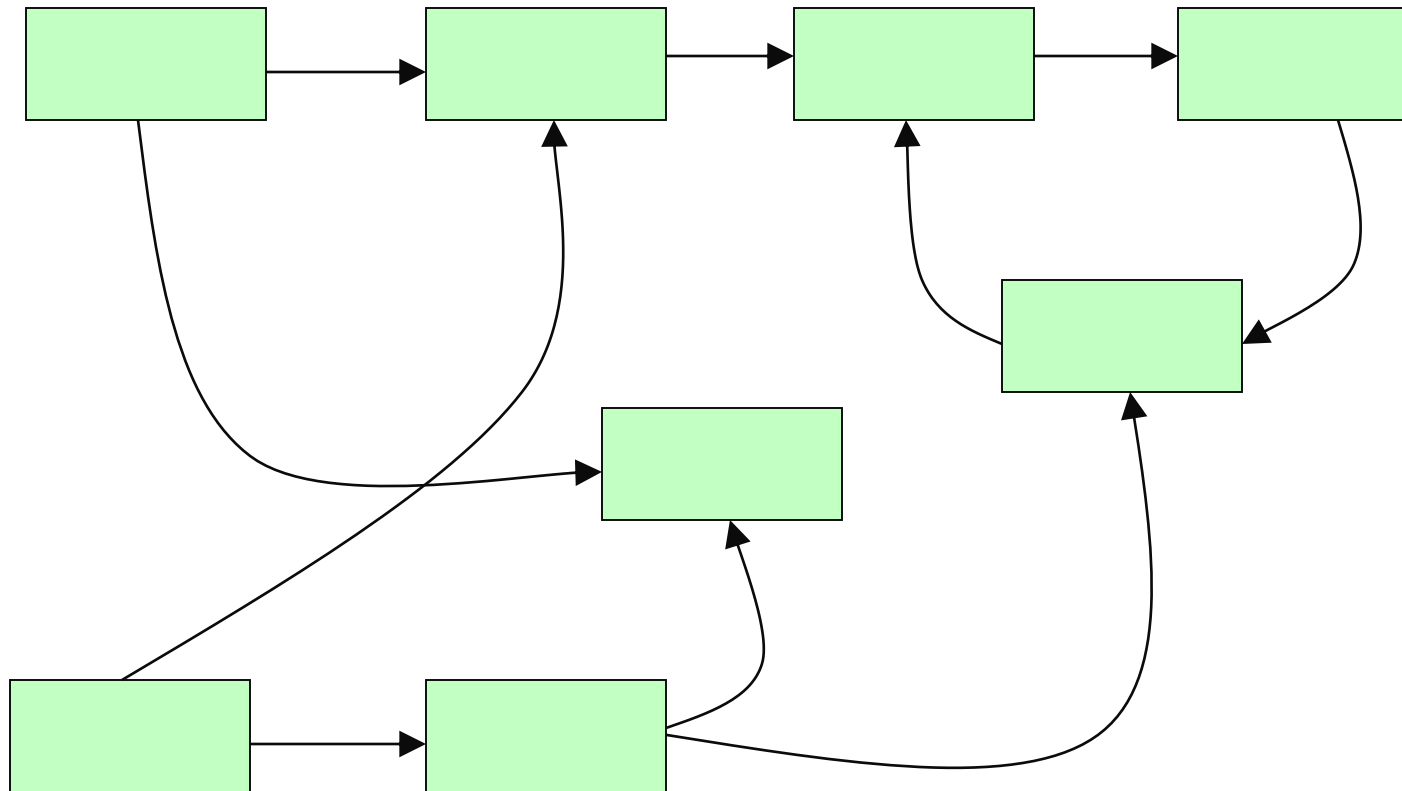


Reality Tree

- Not all causal relationships are simple. The Reality Tree is a method for diagramming complex systems.
- Steps
 - List the undesirable effects (UDEs) you see
 - Determine the sequence of cause relationships
 - Check for “sufficiency” and add “injections”
 - Connect clusters and rearrange for clarity
 - Get to the root cause using “Five Whys”
 - Analyze: look for loops, “and”, connections
 - Identify observations, quick hits, leverage points



Reality Tree





Matrix Diagram/ Check Sheet

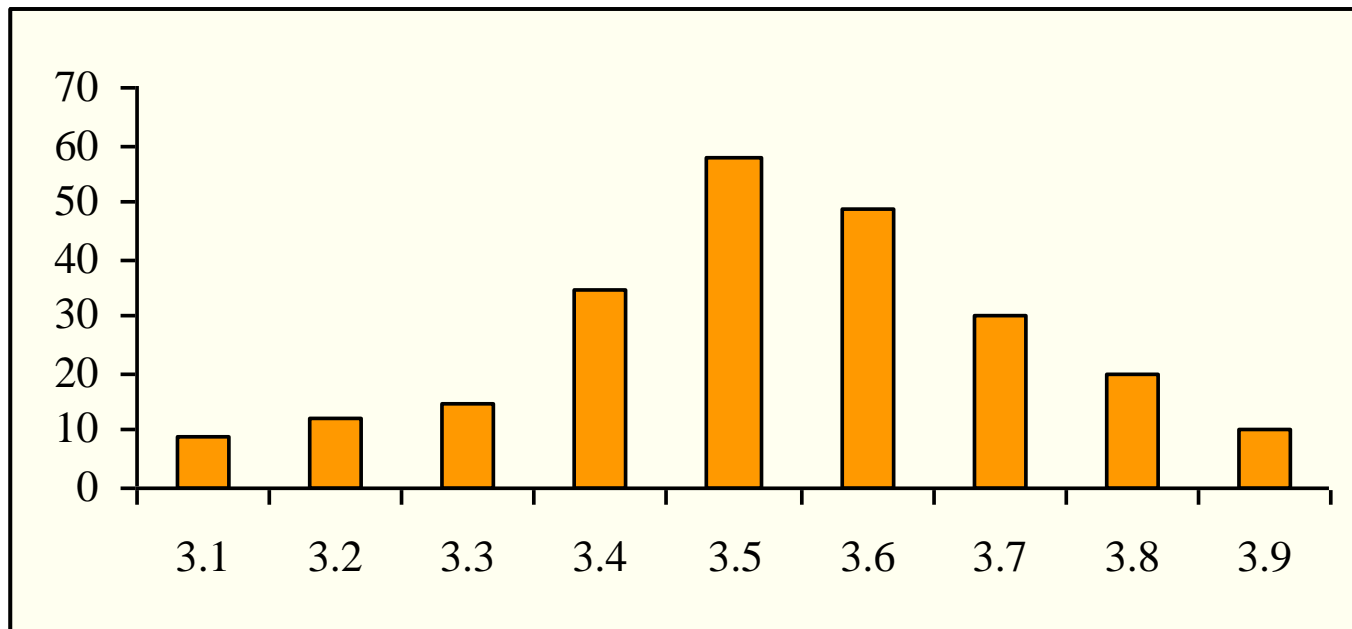
- A way to collect or organize data. Make it as complex as needed – there is no standard form

	Mon	Tue	Wed	Thu	Fri	Total
Shift 1	<i>I</i>	<i>II</i>	<i>III</i>	<i>I</i>	<i>II</i>	9
Shift 2	<i>II</i>		<i>I</i>	<i>I</i>	<i>II</i>	6
Shift 3		<i>I</i>	<i>II</i>	<i>III</i>		6
Total	3	3	6	5	4	



Histogram

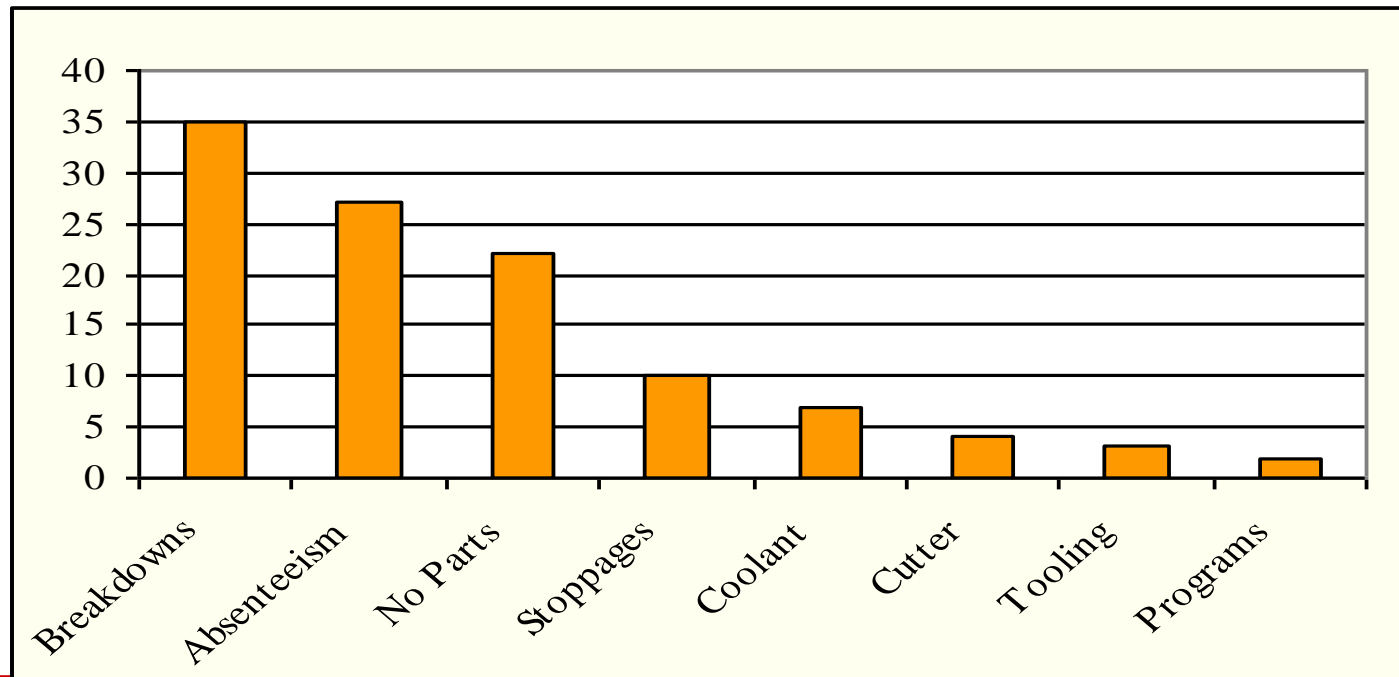
- A histogram is the graph of the distribution of data. It shows the amount of variation in a process and its characteristics.





Pareto Chart

- Shows the relative frequency of size of things relative to each other on a descending bar graph

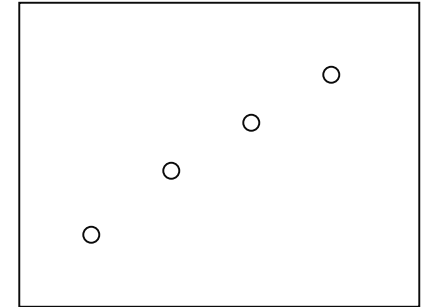




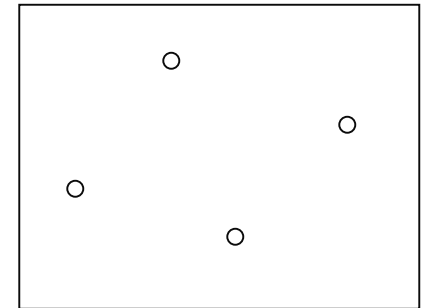
Scatter Diagram

- A graph used to see if a linkage exists between two variables and how strong it may be
- Scatter diagrams show relationships but do not prove that one variable causes another
- Statistical tests can reveal the exact degrees of correlation between variables

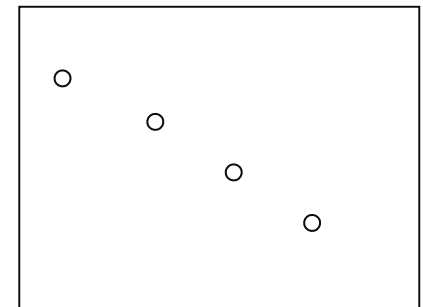
Positive correlation



No correlation



Negative correlation





Value Stream Map

