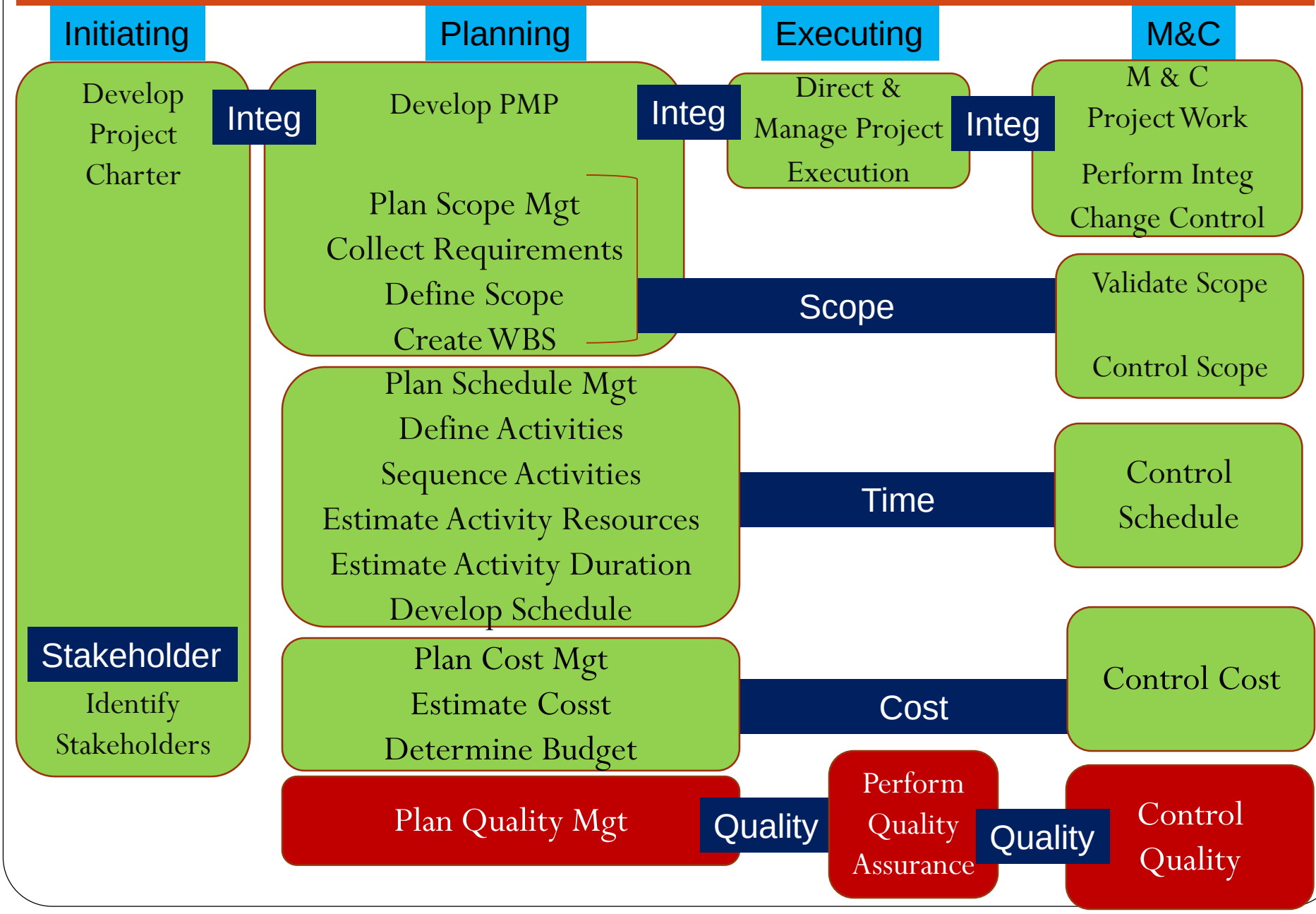
Lecture XIII

“Change is inevitable - except from vending machines”

Recap : Lecture XII

- Schedule Management
  - Resource Optimization Techniques
- Cost Management
  - EVM

Where R V ?


Initiating
Planning
Executing
M&C
Develop Project Charter
Integ
Develop PMP
Integ
Direct & Manage Project Execution
Integ
M & C Project Work
Perform Integ Change Control
Plan Scope Mgt
Collect Requirements
Define Scope
Create WBS
Scope
Validate Scope
Control Scope
Plan Schedule Mgt
Define Activities
Sequence Activities
Estimate Activity Resources
Estimate Activity Duration
Develop Schedule
Time
Control Schedule
Stakeholder
Identify Stakeholders
Plan Cost Mgt
Estimate Cosst
Determine Budget
Cost
Control Cost
Plan Quality Mgt
Quality
Perform Quality Assurance
Quality
Control Quality

KNOWLEDGE AREA
PROJECT QUALITY MANAGEMENT

The standard of something as measured against other things of a similar kind; the degree of excellence of something

Quality Management : Processes

Knowledge Area	Planning	Executing	Monitoring & Controlling
Quality	8.1 Plan Quality Management	8.2 Perform Quality Assurance	8.3 Control Quality

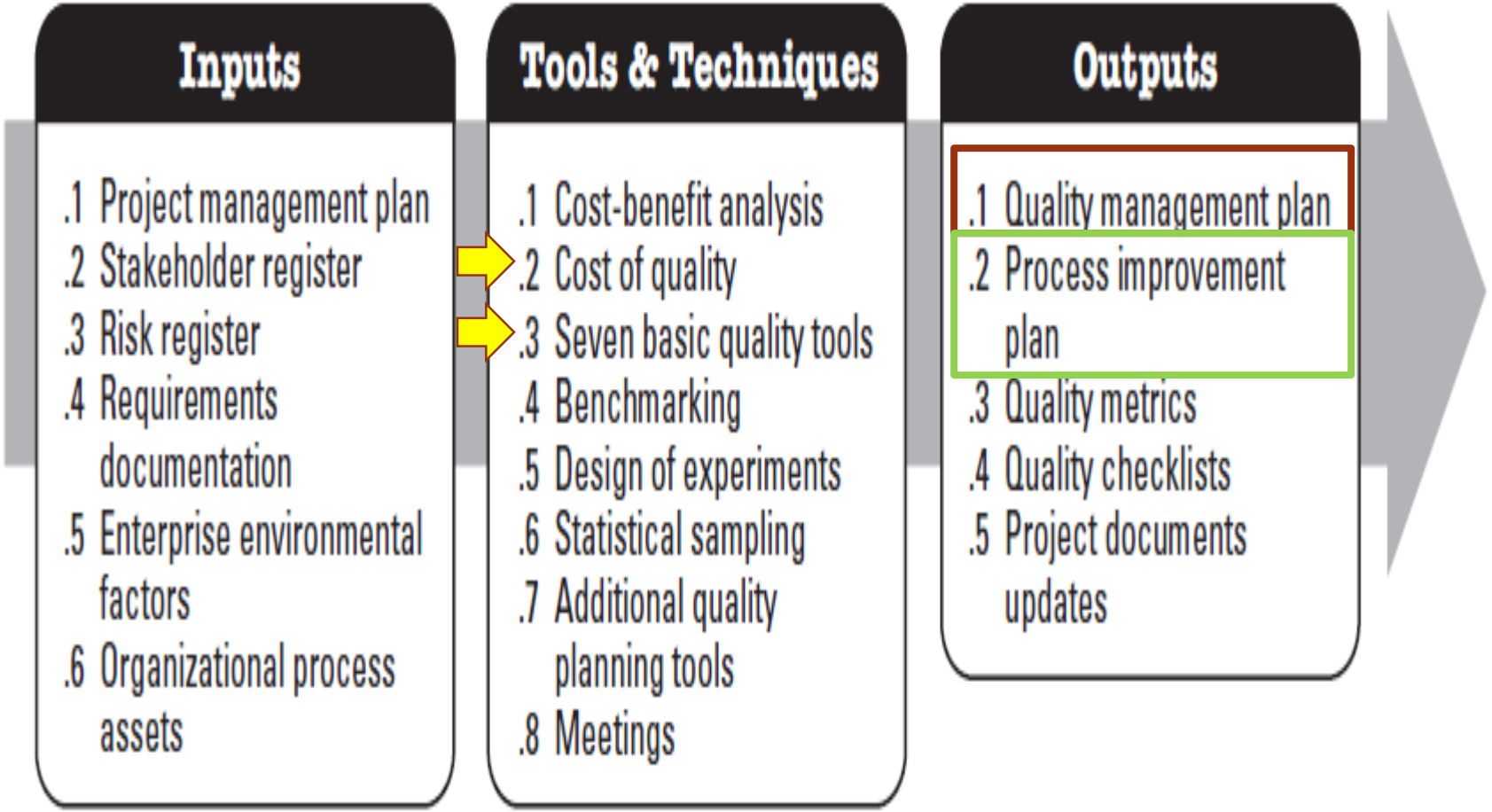
What is Project Quality Management

- Project Quality Management includes the processes and activities of the performing organization that determine quality policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken

Plan Quality Management

- The process of identifying quality requirements and/or standards for the project and its deliverables and documenting how the project will demonstrate compliance with quality
- Result of this process is the formation of Quality Management Plan

Plan Quality Management



Cost of Quality

- Cost of Quality includes all the cost incurred by investment in:-
  - Preventing non-conformance to requirements
  - Rework i.e failing to meet requirements (Failure Costs)
- Failure costs are often categorized into internal (found by the project) and external (found by the customer)

Cost of Quality

Cost of quality includes all costs incurred over the life of the product to ensure conformance and to cater non conformances

Cost of Conformance

Prevention Costs
(Build a quality product)

- Training
- Document processes
- Equipment
- Time to do it right

Appraisal Costs
(Assess the quality)

- Testing
- Destructive testing loss
- Inspections

Money spent during the project **to avoid failures**

Cost of Nonconformance

Internal Failure Costs
(Failures found by the project)

- Rework
- Scrap

External Failure Costs
(Failures found by the customer)

- Liabilities
- Warranty work
- Lost business

Money spent during and after the project **because of failures**

Failure costs are also called cost of poor quality

Seven Basic Quality Tools

Cause & Effect Diagram

Fish Bone diagram

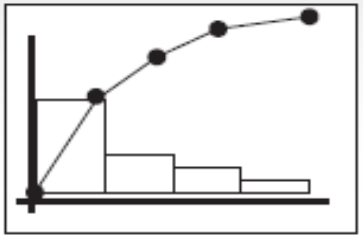
Process Maps

Flowcharts

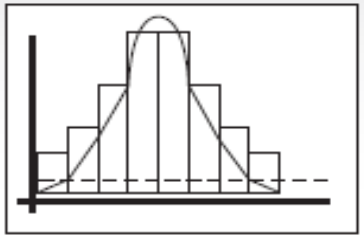
Checksheets

Category	Strokes	Frequency
Attribute 1		
Attribute 2		
Attribute ..		
Attribute n		

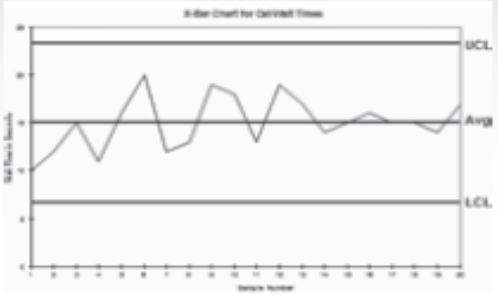
Pareto Diagrams



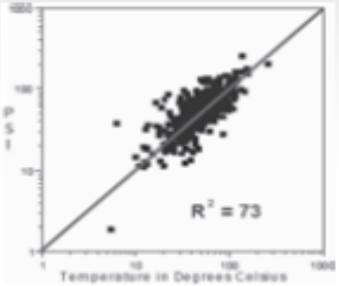
Histograms



Control Charts



Scatter Diagrams



Control Charts

The ***control chart*** is a **statistical quality control** tool used in the monitoring variation in the characteristics of a process, product or service

Control Charts

The control chart focuses on the **time dimension** and the **nature of the variability** in the process / system

Control Charts

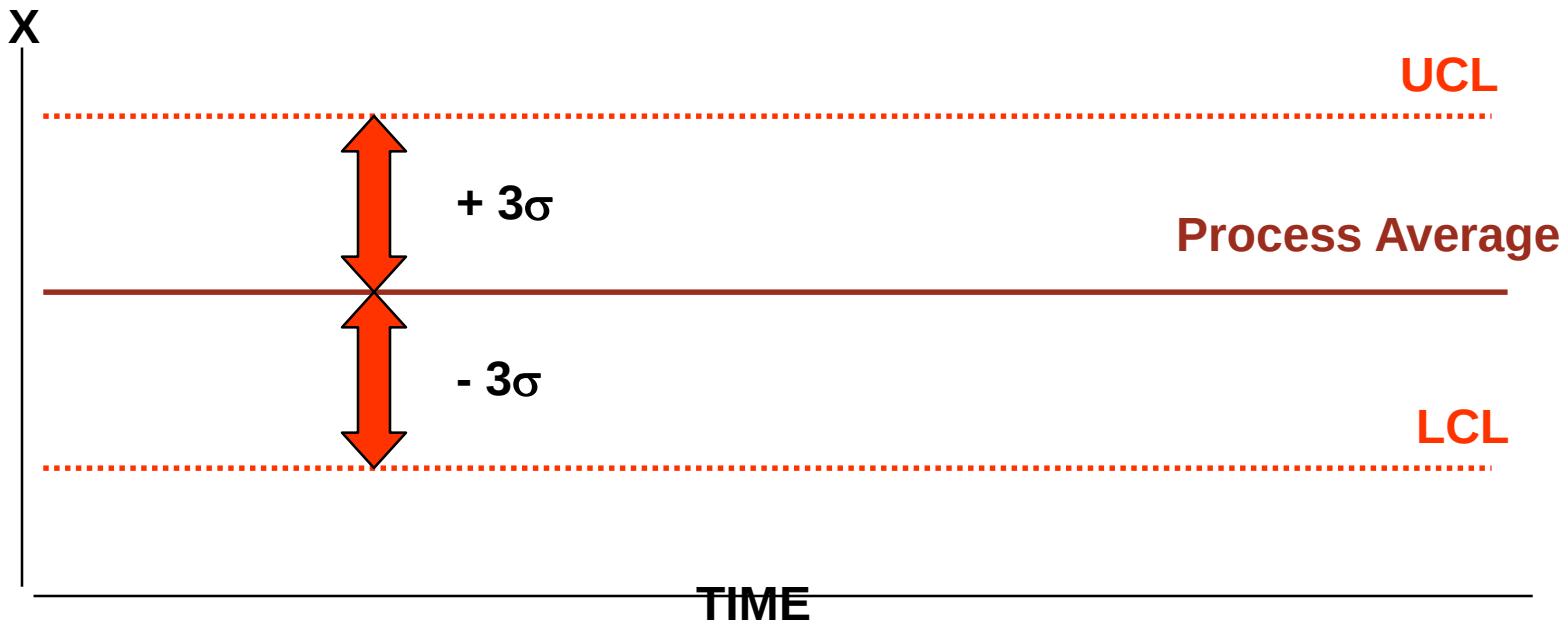
The control chart may be used to study past performance and/or to evaluate present conditions

Control Charts

Data collected from a control chart may form the basis for process improvement

Control Charts

- UCL = Process Average + 3 Standard Deviations
- LCL = Process Average - 3 Standard Deviations



Control Charts

Work out the Standard Deviation.
Step 1. Work out the mean.

Step 2. Then for each number: subtract the Mean and square the result.

Step 3. Then work out the mean of those squared differences

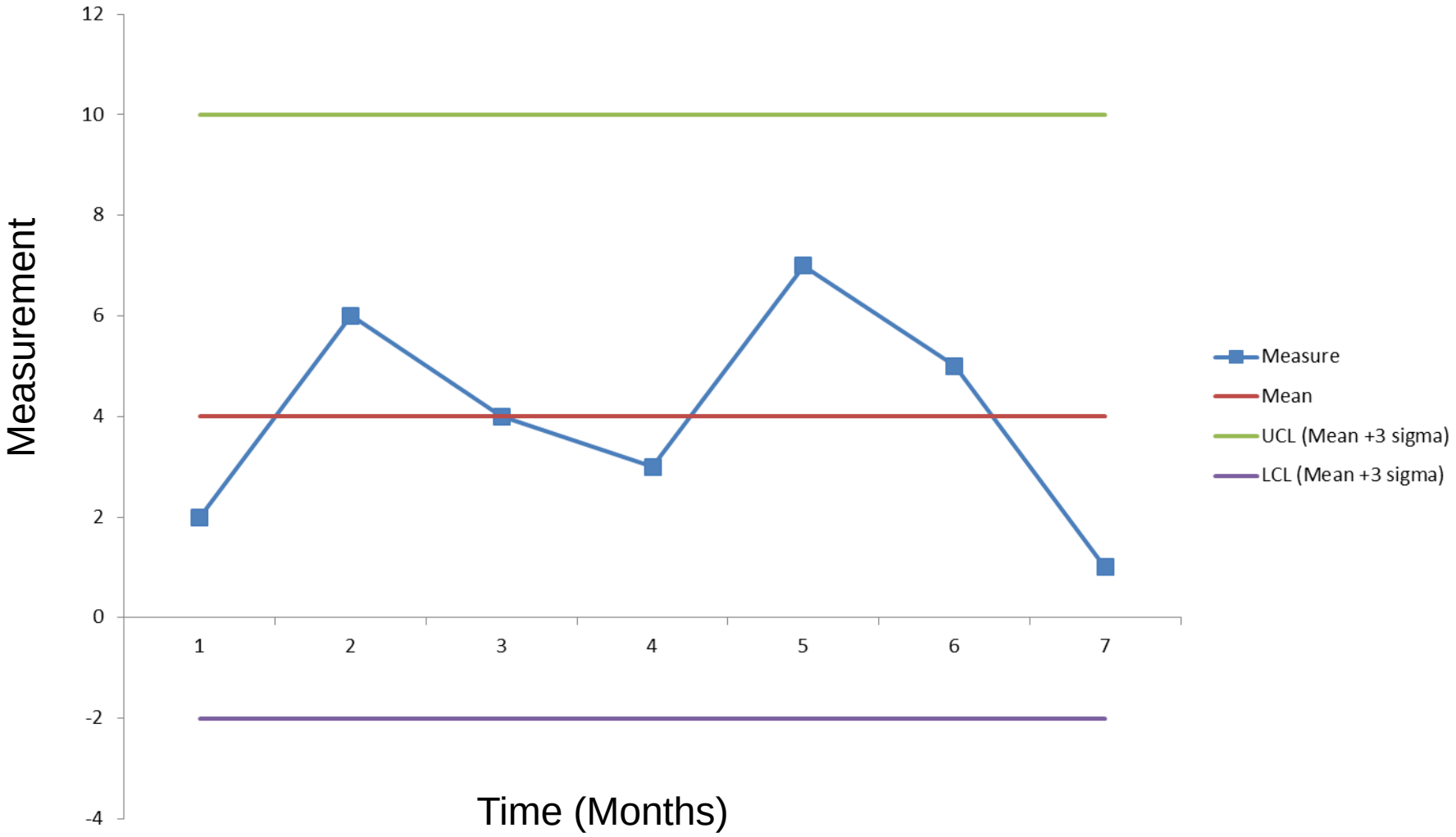
Step 4. Take the square root of that

Step 5 : This square root is sigma (standard deviation).
Multiply it with 3 to calculate 3 sigma

Control Charts

Time (Months)	Value after Measurement	Value-Mean	Square	Mean(2)	UCL [Mean(2) +3 sigma]	LCL [Mean(2) - 3 sigma]
Jan	2	-2	4	4	10	-2
Feb	6	2	4	4	10	-2
Mar	4	0	0	4	10	-2
Apr	3	-1	1	4	10	-2
May	7	3	9	4	10	-2
June	5	1	1	4	10	-2
July	1	-3	9	4	10	-2
Total	28	Total	28			
Mean(1) (Total/7)	4	Mean(2)	4			
		Standard Deviation (sigma) (Under root of mean)	2			
		3 Sigma	6			

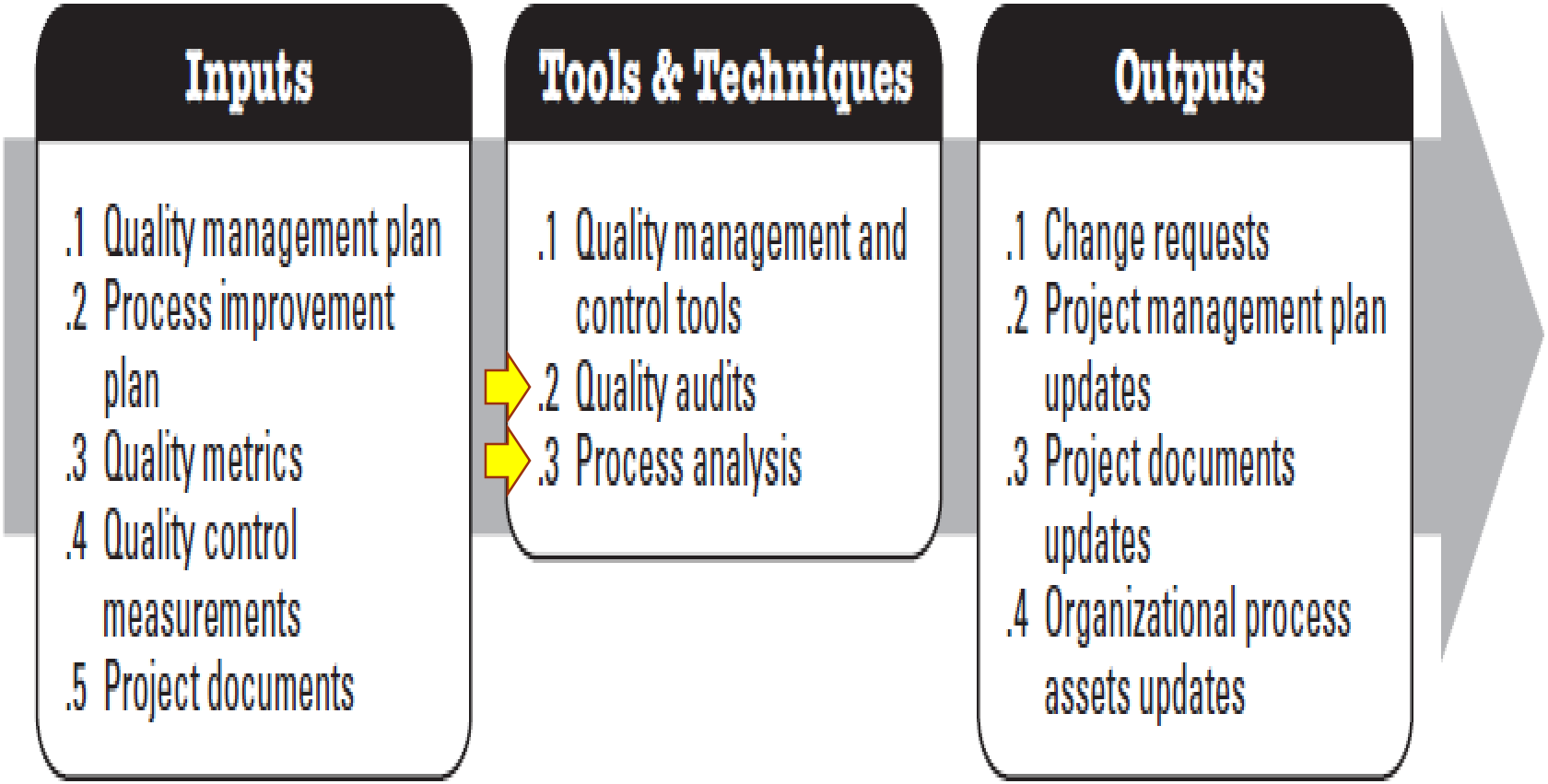
Control Charts



Perform Quality Assurance

- Perform Quality Assurance is a way of preventing mistakes or defects while manufacturing products
- QA is applied to processes in pre-production to verify that what will be made, meets specifications & requirements
- Process oriented & focusses on defect prevention
- Two principles included in QA are:
  - "Fit for purpose", the product should be suitable for the intended purpose
  - "Right first time", mistakes should be eliminated

Perform Quality Assurance



Quality Audits

- A quality audit is a structured, independent process to determine if project activities comply with organizational and project policies, processes & procedures
- Identify all good and best practices being implemented
- Identify all nonconformity, gaps & shortcomings
- Highlight contributions of each audit in the lessons learned repository of the organization

Process Analysis

- Process analysis follows the steps outlined in the process improvement plan to identify needed improvements
- This analysis also examines problems experienced, constraints experienced, and non-value-added activities identified during process operation
- Process analysis includes root cause analysis

Quality Assurance vs Quality Control

- Quality Assurance is process oriented and focuses on defect prevention; while quality control is product oriented and focuses on defect identification
- QA is a set of activities for ensuring quality in the processes by which products are developed
- QC is a set of activities for ensuring quality in products
  - These activities focus on identifying defects in the actual products produced

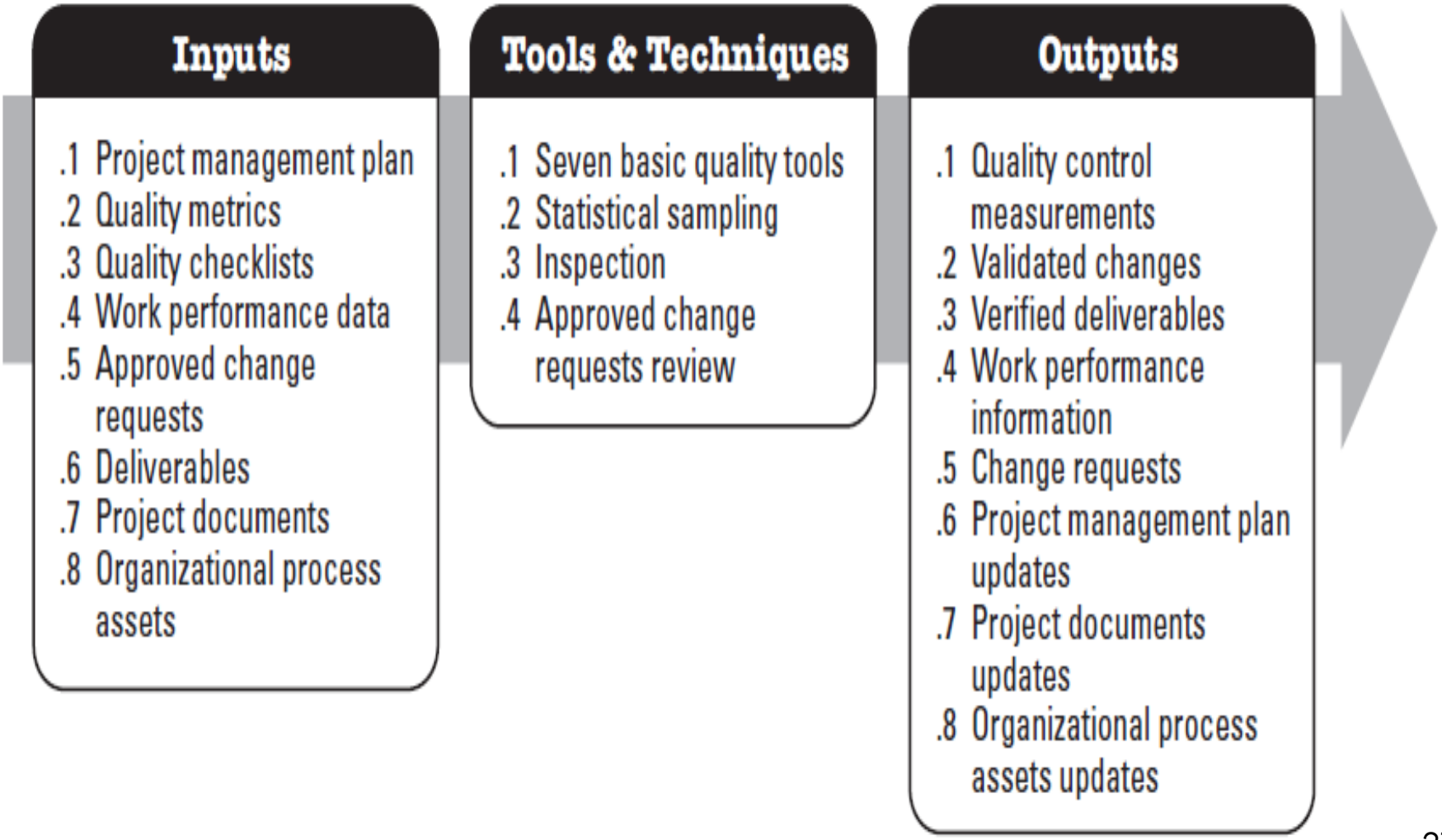
QC vs QA

QC	QA
Product	Process
Reactive	Proactive
Find defects	Prevent defects
QC	**QA**
Walkthrough	Quality Audit
Testing	Defining Process
Inspection	Selection of tools
Checkpoint review	Training

Control Quality

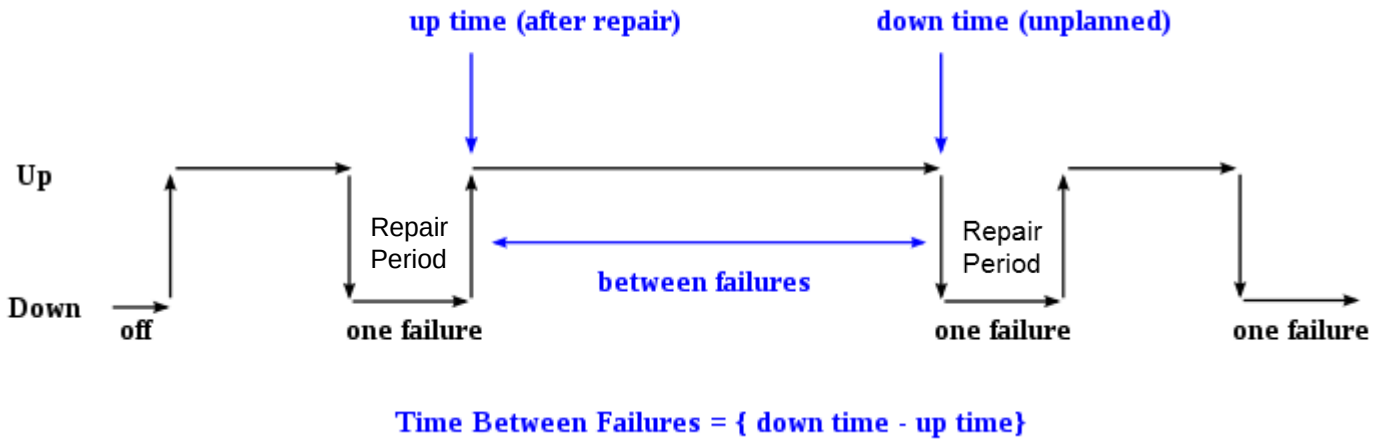
The process of monitoring & recording the results of executing the quality activities to assess performance and to recommend necessary changes

Control Quality



Control Quality : Inputs

- Quality Metric
  - Describes a project or product attribute & how it will be measured
  - MTBF, MTTR



- Quality Checklist
  - Structured lists that help to verify that the work of the project & its deliverables fulfill a set of requirements

Control Quality : Tools & Techniques

- Statistical Sampling
  - Choosing part of a population of interest for inspection
  - Sample frequency & size of the samples is determined

during the Plan Quality Management Process

Control Quality