WHERE ARE WE NOW ?

☑ **Module 1: Explore Data using Python 6 Hrs**
Understanding Characteristics of the dataset – Size, Shape, value counts – Data Types and change data types

☑ **Module 2: Measures of Central Tendency 5 Hrs**
Arithmetic Mean, Median, Mode – Relationship between mean, median and mode – Computation of the measures for grouped and ungrouped data

☑ **Module 3: Measures of dispersion 6 Hrs**
Range, mean deviation and standard deviation – coefficient of variation and its use – Quartiles and Inter quartile range – Quintiles, Deciles and Percentiles — Skewness and Kurtosis and their uses

☑ **Module 4: Understanding Correlation 3 Hrs**
Understanding correlation – calculating correlation using Pandas – Interpreting a correlation matrix

Module 5: Statistical Quality Control 3 Hrs
Nature of Control Limits – Purpose of Control Charts – Control Charts for Variables – Control Charts for Attributes

Module 6: Conducting EDA using Python 6 Hrs
Data Analysis using Python – Handling missing data – Computing metrics – Analysis & Interpretation of the data and connected visualization

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PYTHON FOR DATA SCIENCE — MODULE 5

Nature of Control Limits
Purpose of Control Charts
Control Charts for Variables
Control Charts for Attributes

SQC

Statistical Quality Control

PYTHON FOR DATA SCIENCE – MODULE 5
WHAT IS SQC?

- Statistical Quality Control the predecessor of Total Quality Management still continues to exert its influence in the quality management of corporations

- SQC is about employing inspection methodologies derived from statistical sampling theory to ensure conformance to requirements (Nicholas, 1998)

- Statistical Quality Control (SQC) is a methodology used to **monitor** and **control** the quality of products or services

- Statistical Quality Control aims to **identify** and **eliminate** defects or variations in production processes, improving product or service quality and reducing waste

- SQC can help identify patterns and trends that can be used to make data-driven decisions that improve overall quality and productivity

- SQC is widely used across many industries, including manufacturing, healthcare, and service industries

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VARIABILITY

- Processes have some degree of inherent variability

- Process variability can be classified:
  - *that caused by common sources (also referred to as chance causes)*
  - *that caused by special sources (also known as assignable causes)*

- The common faults are those caused by problems with the processing system itself

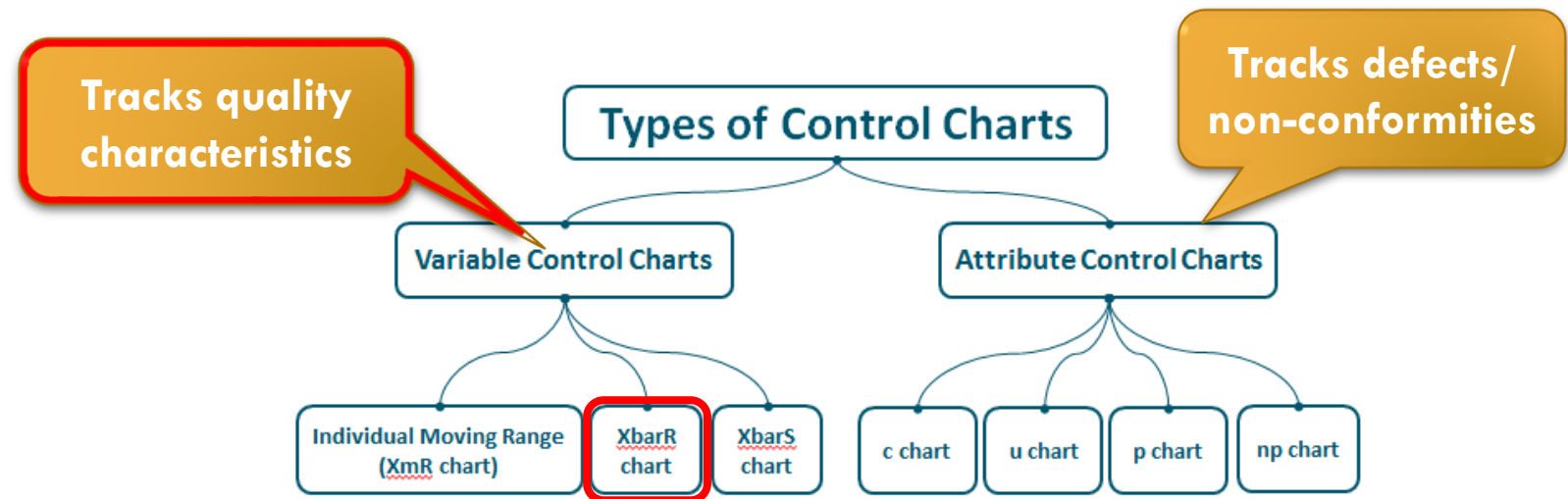- The special factors are usually unpredictable and are disturbances to 'routine' operation

Common faults	Special faults
Poor supervision	Tool wear
Poor operator training	Incorrect set-up, for example, speeds and feeds
Poor workstation design	Machine-setting drift
Incorrect manufacturing methods	Dirty machine
Poor equipment	Contaminated material

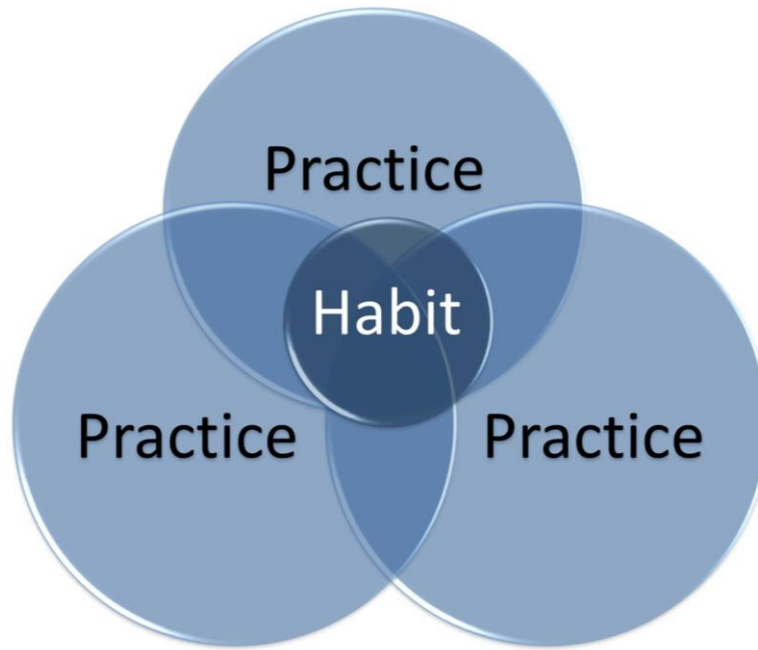Paul Abraham

PYTHON FOR DATA SCIENCE – MODULE 5
SQC TOOLS AND TECHNIQUES

- Process flowcharts
- Check sheets
- Pareto diagrams
- Histograms
- Cause-and-Effect diagrams
- Scatter diagrams
- **Control charts**

➤ In statistics, Control charts are tools to determine whether a process is in a controlled statistical state. They are also known as Shewhart charts or process-behavior charts.

➤ The data is plotted in a timely order

➤ It is bound to have a central line of average, an upper line of upper control limit and a lower line of lower control limit.

Tracks quality characteristics

Tracks defects/ non-conformities

Types of Control Charts

Variable Control Charts

Attribute Control Charts

Individual Moving Range (XmR chart)

XbarR chart

XbarS chart

c chart

u chart

p chart

np chart

Paul Abraham

the MORE YOU PRACTICE THE BETTER YOU GET

Practice

Habit

Practice   Practice

SUCCESS Is the SUM Of SMALL efforts, Repeated DAY IN AND DAY OUT