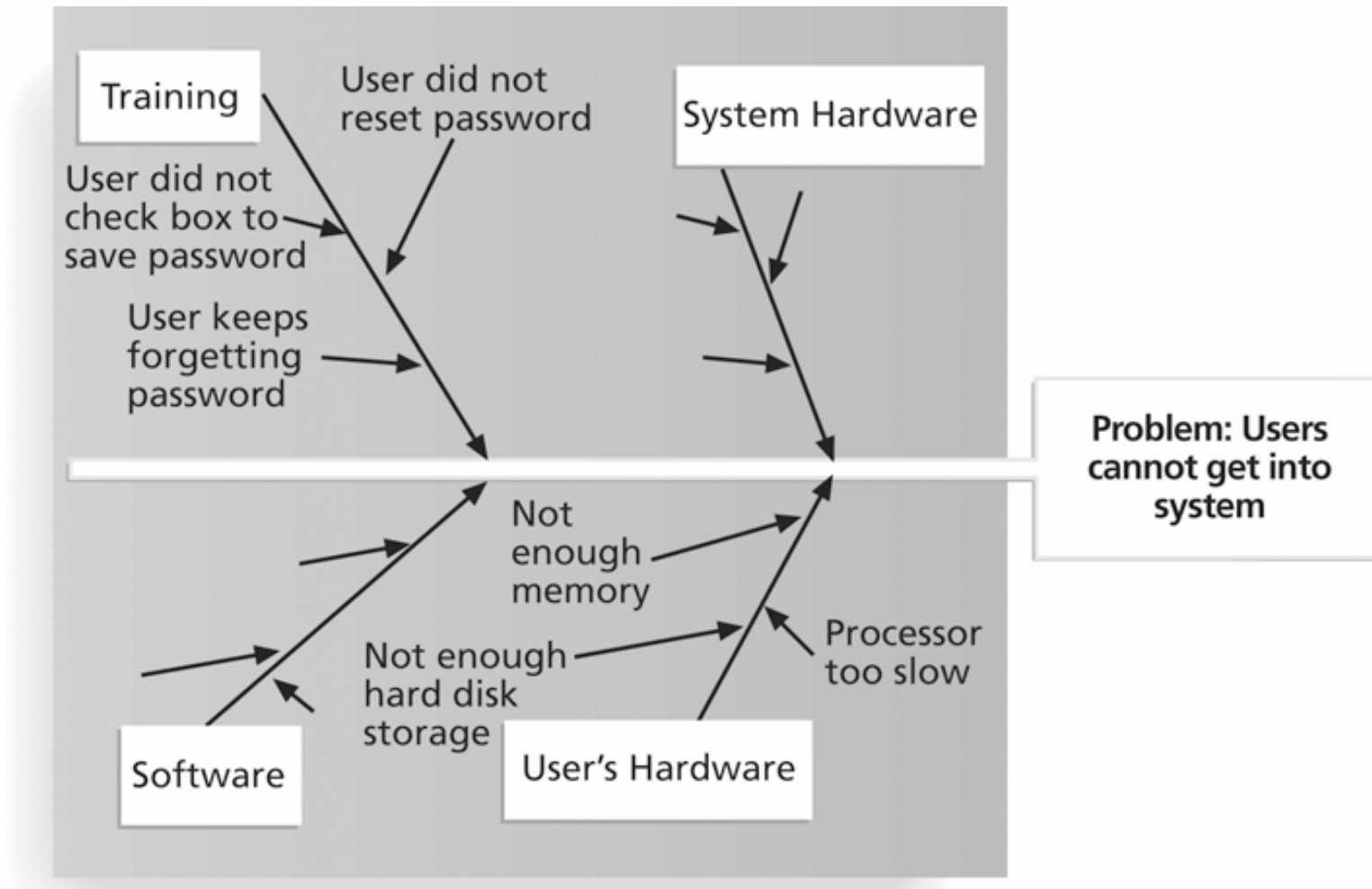


# Tools & Techniques for Quality Control

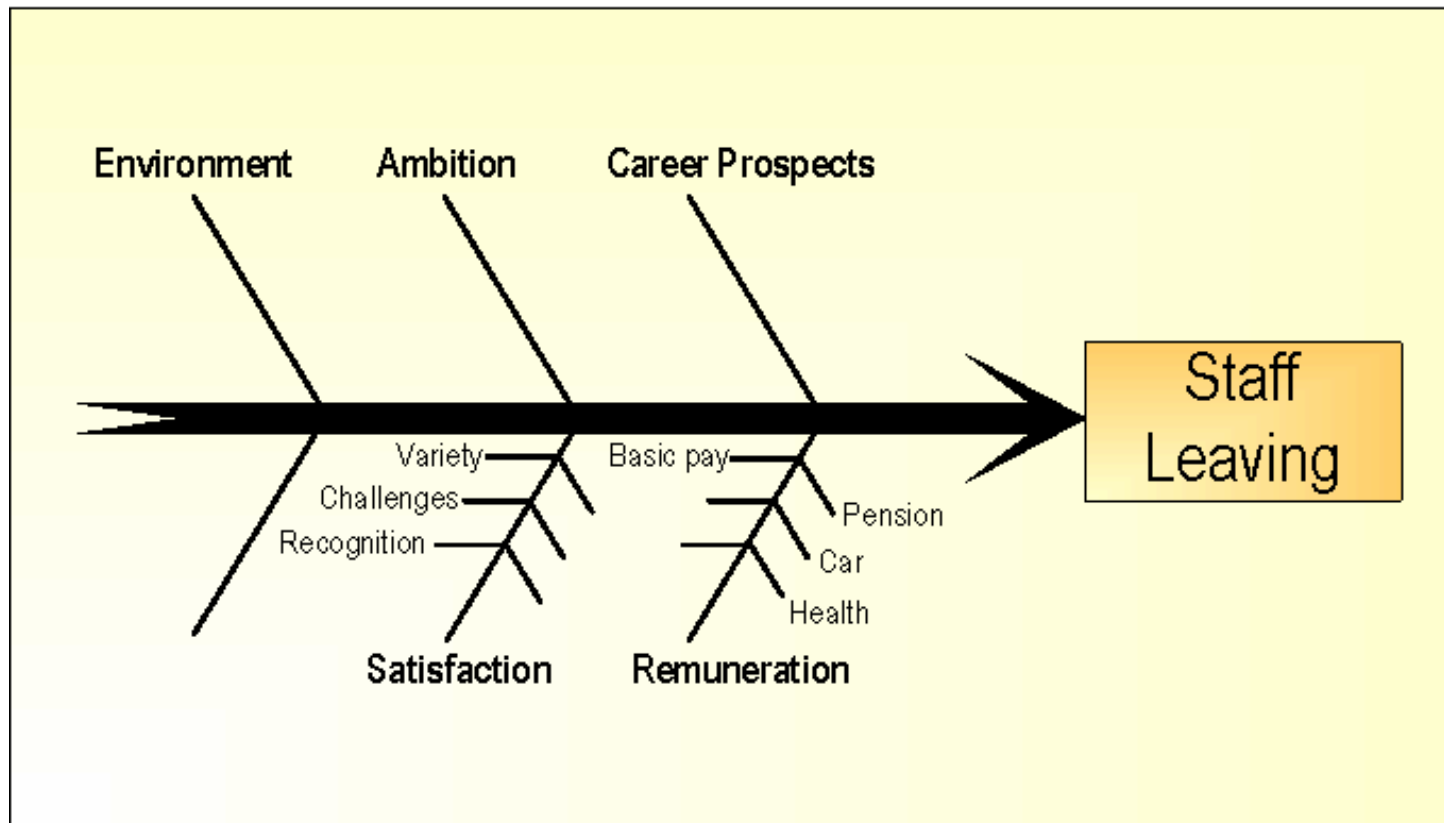
- **Cause-and-effect diagrams** trace complaints about quality problems back to the responsible production operations
  - They help you find the root cause of a problem
  - Also known as **fishbone** or **Ishikawa diagrams**
  - Can also use the **5 whys** technique where you repeat the question “Why” (five is a good rule of thumb) to peel away the layers of symptoms that can lead to the root cause
    1. Why the users can not get into the system
    2. Why they keep forgetting passwords
    3. Why didn’t they reset their passwords
    4. Why didn’t they check the box to save their password, etc.

# Sample Cause-and-Effect Diagram



# Sample Cause-and-Effect Diagram

- Possible causes of staff leaving before the end of a project
  - They may include environment, ambition, career prospects, satisfaction (variety, challenges, recognition), remuneration (basic pay, benefits - car, health, pension).



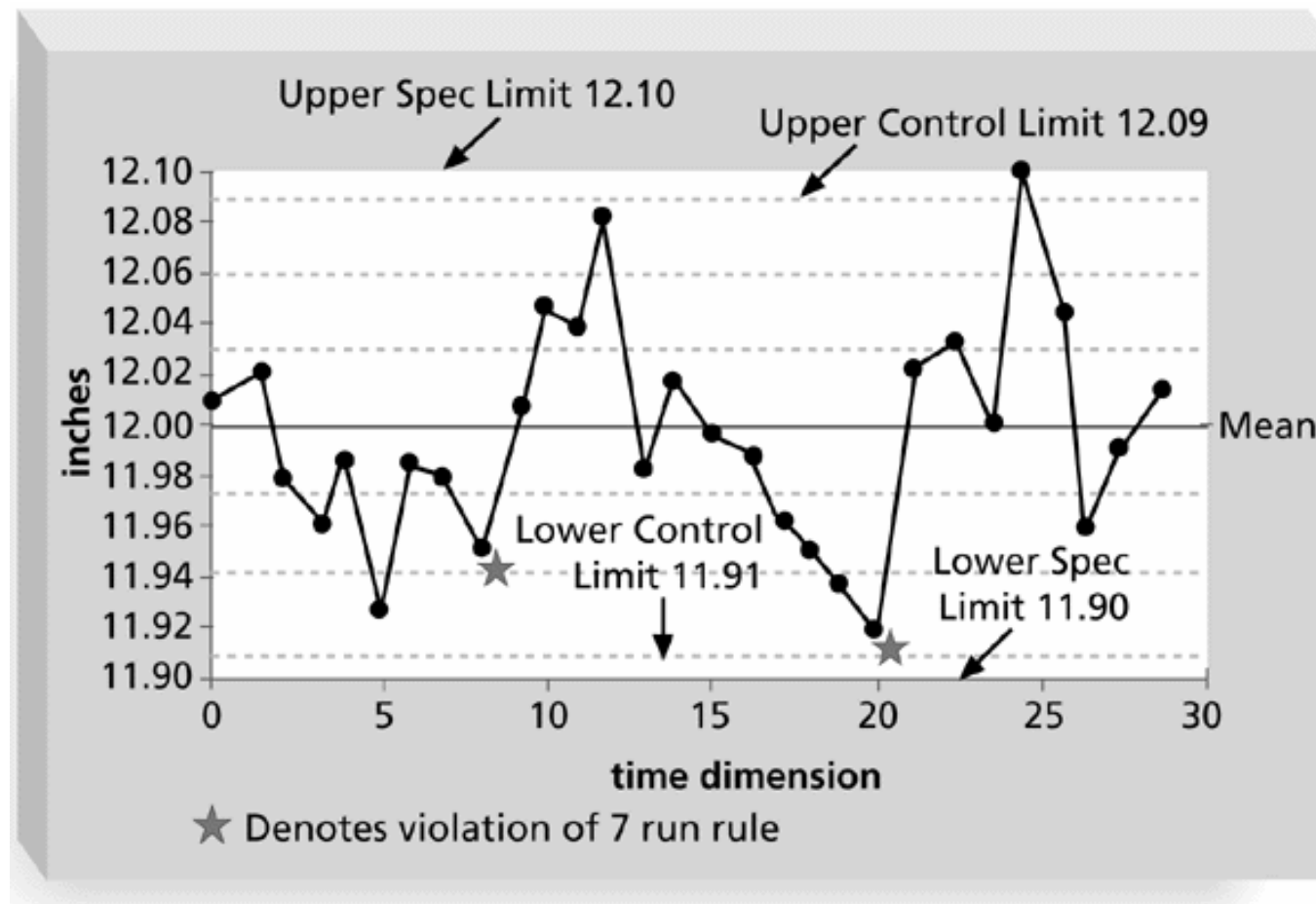
# Quality Control Charts

- A **control chart** is a graphic display of data that illustrates the results of a process over time
- The main use of control charts is to prevent defects, rather than to detect or reject them
- Quality control charts allow you to determine whether a process is in control or out of control
  - When a process is in control, any variations in the results of the process are created by random events; processes that are in control do not need to be adjusted
  - When a process is out of control, variations in the results of the process are caused by nonrandom events; you need to identify the causes of those nonrandom events and adjust the process to correct or eliminate them

# The Seven Run Rule

- You can use quality control charts and the seven run rule to look for patterns in data
- The **seven run rule** states that if seven data points in a row are all below the mean, above the mean, or are all increasing or decreasing, then the process needs to be examined for nonrandom problems
  - Example: The following slide is a control chart for the manufacture of 12” rulers
    - Upper and lower specifications are 12.10” and 11.9” - this is the range specified as acceptable by the customer for purchase
    - The controls limits of 11.91” and 12.09” mean that the manufacturing process is designed to produce rulers within that range

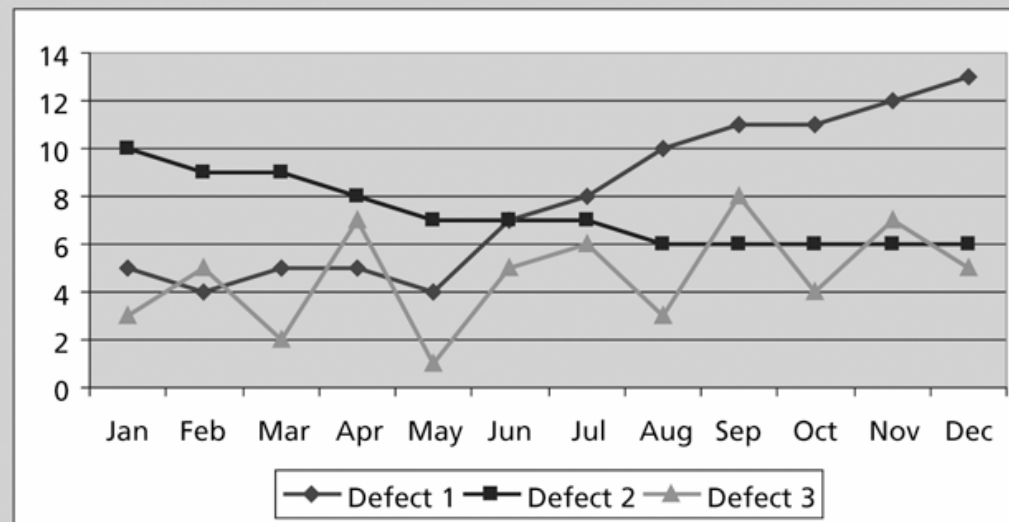
# Sample Quality Control Chart



*he rule violations indicate that a calibration device may need adjustment*

# Run Chart

- A run chart displays the history and pattern of variation of a process overtime
- It is a line chart that shows data points plotted in the order in which they occur
- Can be used to perform trend analysis to forecast future outcomes based on historical patterns e.g., of defects



Example: Rule of Seven - Control Charts

<https://www.brainbok.com/guide/pmp/study-notes/rule-of-seven-control-charts/>