Manajemen kualitas proyek (Project Quality Management)

- Manajemen kualitas proyek merupakan knowledge area yang sulit untuk didefinisikan.
- The International Organization for Standardization (ISO) defines **quality** as “the degree to which a set of inherent characteristics fulfills requirements” (ISO9000:2000) → kualitas sebagai penilaian terhadap karakteristik dari sebuah kesatuan yang berhubungan dengan kemampuanya untuk memenuhi spesifikasi kebutuhan stakeholder dan pengguna.

Para ahli lainnya mendefinisikan :

- kualitas berdasarkan keselarasan terhadap kebutuhan dan kesesuaian untuk digunakan. (**Conformance to requirements**: the project's processes and products meet written specifications)
- kesesuaian untuk digunakan berarti produk dapat digunakan sebagiamana mestinya. (**Fitness for use**: a product can be used as it was intended)

- Tujuan utama dari manajemen kualitas proyek adalah memastikan bahwa proyek akan memuaskan spesifikasi kebutuhan perangkat lunak atau sistem.
- Dan untuk mendapatkan kualitas yang diinginkan oleh Stakeholder, tim proyek harus memahami kebutuhan stakeholder baik yang diungkapkan secara lisan maupun tertulis.

- Terdapat tiga aktivitas utama dari manajemen kualitas proyek:
  - Perencanaan kualitas (**Quality Planning**), mengidentifikasikan standard kualitas yang sesuai dengan desain proyek dan bagaimana memberikan rekomedansi agar perangkat lunak memuaskan stake holder .
  - Jaminan kualitas (**Quality Assurance**), evaluasi periodic terhadap keseluruhan performa proyek untuk memastikan proyek akan memuaskan standard kualitas yang relevan.
  - Pengendalian kualitas (**Quality Control**), memonitor hasil proyek tertentu untuk memastikan hasil tersebut sesuai dengan standard kualitas relevan serta mengidentifikasikan cara untuk meningkatkan kualitas keseluruhan.

Quality Planning

- Perencanaan kualitas (**Quality Planning**), mengidentifikasikan standard kualitas yang sesuai dengan desain proyek dan bagaimana memberikan rekomedansi agar perangkat lunak memuaskan stake holder .
- Cara untuk melakukan quality plannging adalah dengan :
  - Mendesain suatu experiment yang berfungsi untuk mengidentifikasi variable apa yang paling berpengaruh dari project tersebut.
  - Dalam hal perangkat lunak yang paling berpengaruh dalam hal kualitas adalah mampu untuk memenuhi kebutuhan dari pemakai, pengembang dan pemelihara perangkat lunak.

Quality Planning

- Implies the ability to anticipate situations and prepare actions to bring about the desired outcome

- Important to prevent defects by:
  - Selecting proper materials
  - Training and indoctrinating people in quality
  - Planning a process that ensures the appropriate outcome

Quality Planning

- Important scope aspects of IT projects that affect quality include:
  - **Functionality** is the degree to which a system performs its intended function
    - **Features** are the system's special characteristics that appeal to users. It is important to specify which are required and which are optional
  - **System outputs** are the screens and reports the system generates. Need to define clearly what they look like
  - **Performance** addresses how well a product or service performs the customer's intended use.
    - Need to know volumes of data and transactions, number of simultaneous users, required response time, etc.
  - **Reliability** is the ability of a product or service to perform as expected under normal conditions (customers must define expected level of service)
    - **Maintainability** addresses the ease of performing maintenance on a product

Quality Assurance

- Jaminan kualitas (**Quality Assurance**), evaluasi periodic terhadap keseluruhan performa proyek untuk memastikan proyek akan memuaskan standard kualitas yang relevan.

- Teknik yang digunakan :
  - **Benchmarking** generates ideas for quality improvements by comparing specific project practices or product characteristics to those of other projects or products within or outside the performing organization
  - A **quality audit** is a structured review of specific quality management activities that help identify lessons learned that could improve performance on current or future projects

Quality Control

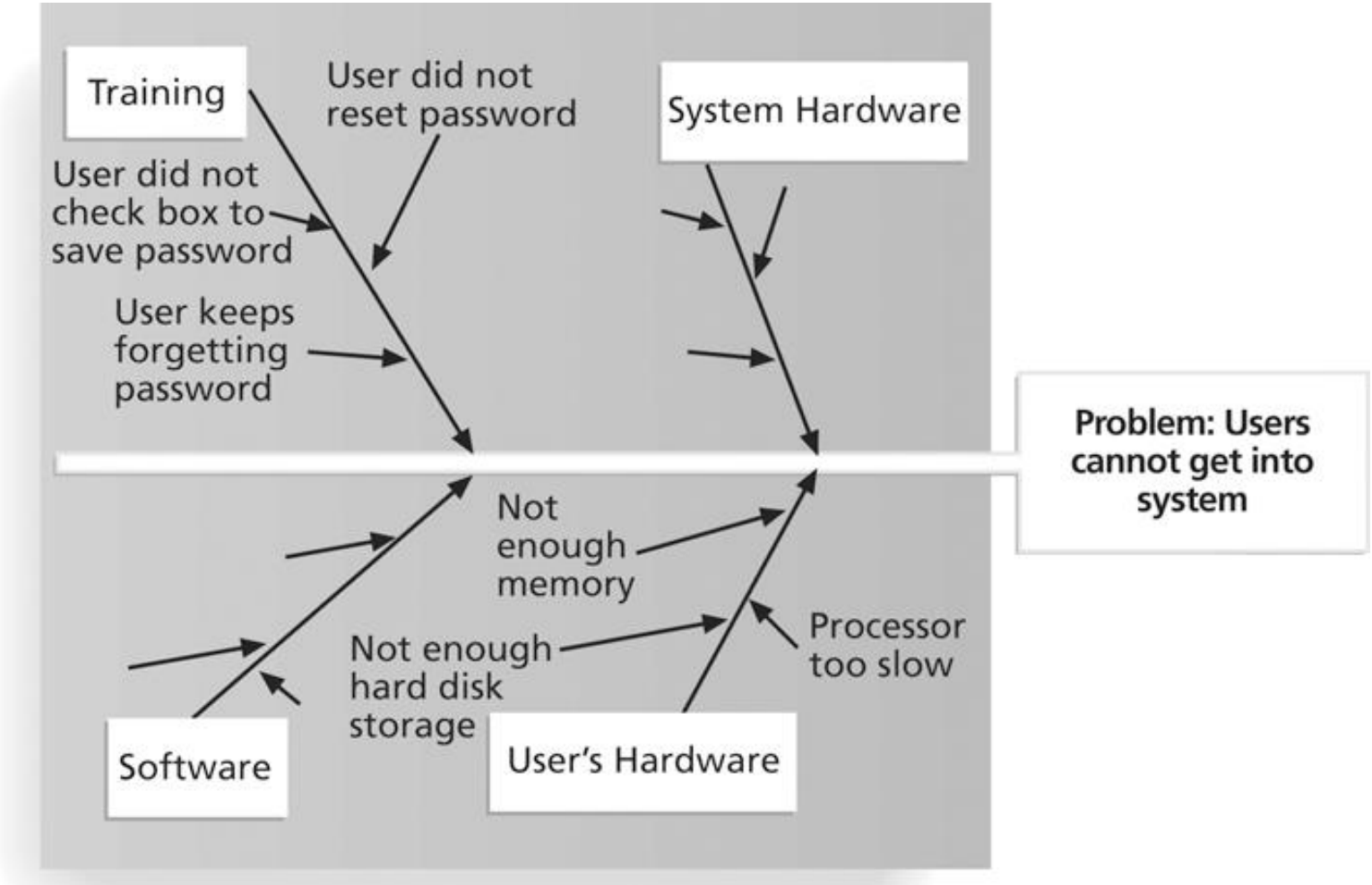
- Pengendalian kualitas (**Quality Control**), memonitor hasil proyek tertentu untuk memastikan hasil tersebut sesuai dengan standard kualitas relevan serta mengidentifikasikan cara untuk meningkatkan kualitas keseluruhan.

Tools & Techniques for Quality Control

Cause-and-effect diagrams trace complaints about quality problems back to the responsible production operations

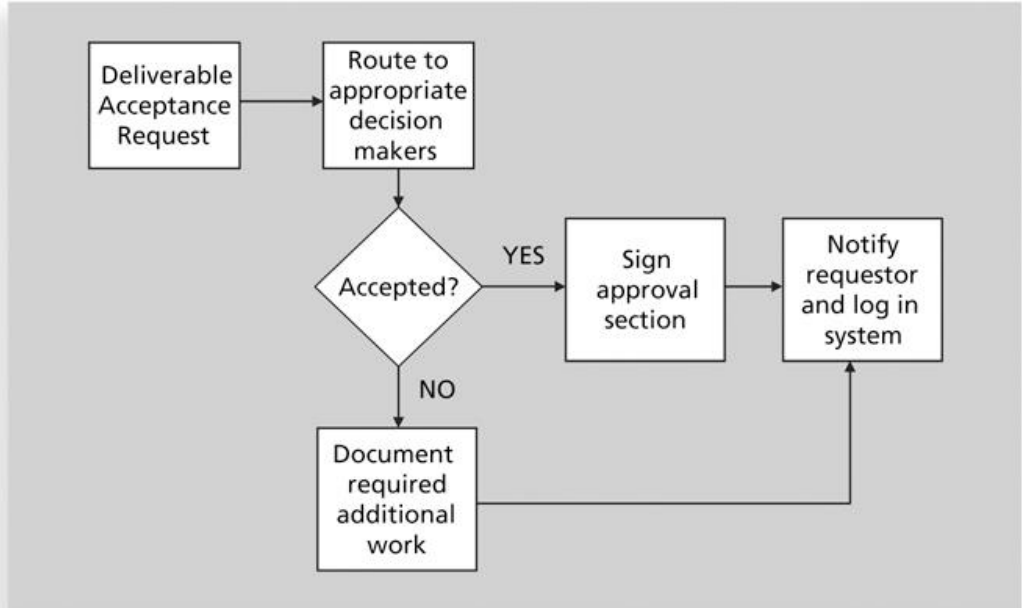
- They help you find the root cause of a problem
- Also known as **fishbone** or **Ishikawa diagrams**
- Can also use the **5 whys** technique where you repeat the question “Why” (five is a good rule of thumb) to peel away the layers of symptoms that can lead to the root cause
  1. Why the users can 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



Flowcharts

- Flowcharts are graphic displays of the logic and flow of processes that help you analyze how problems occur and how processes can be improved
- They show activities, decision points, and the order of how information is processed



Out put

- ***Acceptance decisions-*** are the products/services acceptable or should they be rejected and rework is then necessary
- ***Rework*** – action taken to bring rejected items into compliance with products specs. Can be very expensive
- ***Process adjustments*** – correct or prevent further quality problems based on quality control measurements (purchase faster server if response time is too slow)

Expectations and Cultural Differences in Quality

- Project managers must understand and manage stakeholder expectations
- Expectations also vary by:
  - Organization's culture – even within the organization
  - Geographic regions

Contoh : software quality factors dari Hewlett-Packard

- Functionality : diukur denganmengevaluasi fasilitas dan kemampuan dari program
- Usability : diukur dari faktor manusia yang memakai sistem (estetika, konsistensi dan dokumentasi)
- Reliability : dievaluasi dengan mengukur frekuensi kegagalan (error), akurasi output, MTBF(mean time between failure) dan kemampuan mengatasi error

Contoh : software quality factors dari Hewlett-Packard (2)

- Performance : diukur dari kecepatan proses, respon, pemakaian sumber daya dan efisiensi
- Supportability : gabungan dari extensibility, adaptability dan serviceability (ketiganya lebih dikenal dengan istilah maintainability) beserta testability, compatibility, configurability, kemudahan instalasi dan identifikasi problem

Contoh : software quality factors dari Hewlett-Packard (3)

- Product Operation Correctness: Software must exactly perform as specified
- Robustness: Software must function even in abnormal circumstances Extendability: Software must be adaptable to changes in specifications
- Reusability: Software must be used (in whole or in part) in new applications Compatibility: Software must ease with which sofware can be combined with others

Testing

- Many IT professionals think of testing as a stage that comes near the end of IT product development
- Testing should be done during almost every phase of the IT product development life cycle

Types of Tests

- **Unit testing** tests each individual component (often a program) to ensure it is as defect-free as possible
- **Integration testing** occurs between unit and system testing to test functionally grouped components
- **System testing** tests the entire system as one entity
- **User acceptance testing** is an independent test performed by end users prior to accepting the delivered system

Who's Responsible for the Quality of Projects?

- Project managers are ultimately responsible for quality management on their projects
- Several organizations and references can help project managers and their teams understand quality
  - International Organization for Standardization (www.iso.org)
    - When products, systems, machinery and devices work well and safely, it is often because they meet standards. The organization responsible for many thousands of the standards which benefit the world is **ISO** (derived from the Greek *isos*, meaning "equal")
  - IEEE – Standards Association (www.ieee.org)
    - A leading, developer of industry standards in a broad-range of industries (Power and Energy, Information Technology, Telecommunications, Transportation, Medical and Healthcare, nanotechnology, cybersecurity, information assurance, and green technology) . Globally recognized