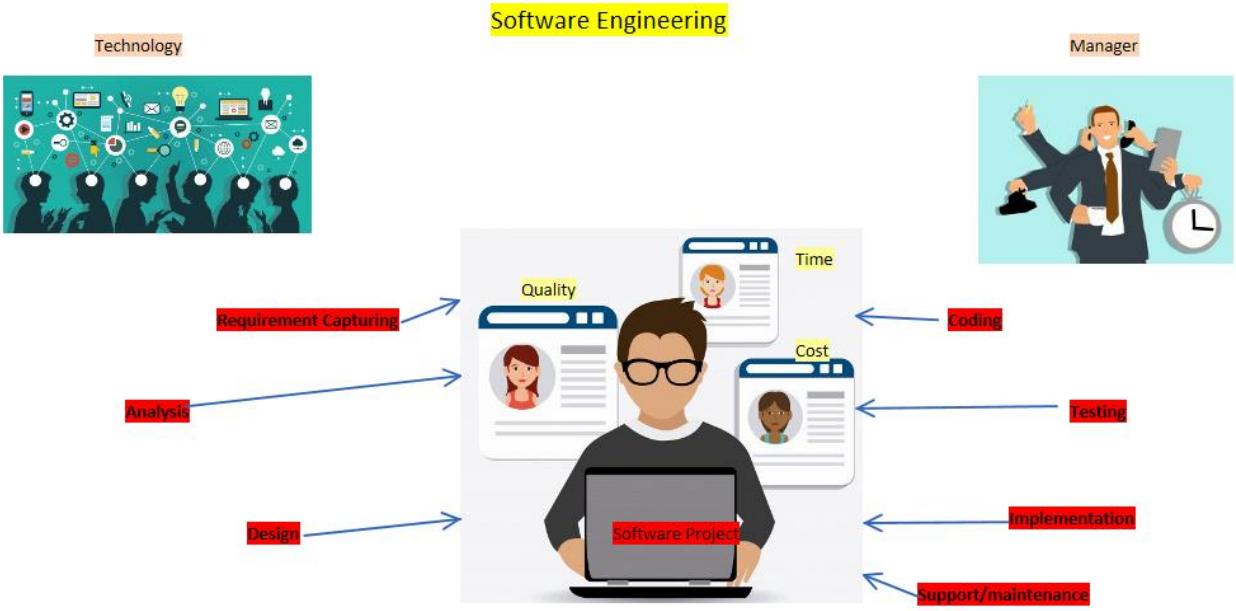
Software Engineering

- Software Engineering is technological & managerial both discipline concerned on a development & maintenance of a software project are products on time within cost estimation.
- **There are three important factors in software development is:**
    - Quality
    - Schedule/time
    - Budget/Cost
- Developing a quality software within budget and within cycle time.
- One of the important characteristics of software engineering is 'Reusability'.
- **Advantages of Reusability:**
    - Productivity will be increases.
    - Project development time is reduce.
    - Cost is saved.



Software process:

- A sequence of steps performed for a given purpose.
- A set of activities, methods that are people used to develop and maintain system.
- **If companies are not following process properly: Disadvantages: -**
    - Commitment consistently missed.
    - Late delivery
    - Last minute crashes
    - Quality problem
    - To much rework
    - Functions do not work correctly.
    - Customer complaint after delivery.
    - People frustrated (End-User)

- **Benefits of Process:**
    - Quality
    - Consistency
    - Traceability
    - Early defect removal
    - Reduce rework and rejections
    - Control of cost
    - On-Time

People:

- A people is a set practices performed to achieve a given purpose, it may include tools, methods and materials or a people.
- The quality of product is largely determined by the quality of process that is used develop and maintain it.

Process Model:

- A model is structure of collection of practices that describe characteristics of effective process.
- SEI – Software Engineering Institute at Carnegie Mellon University initiated by a US defense department to help to improve software development process.
- CMMI: Capability Maturity Model Integration – The CMM for software has been retired and CMM replaces it & it is developed by SEI. Its model of 5 – level of process 'maturity' that determine effectiveness in delivery of quality software.
- Organization are receive CMMI ratings by undergoing assessments by qualified auditors.
- CMMI for system engineering & software engineering staged representation.
- Maturity Levels:
    - Performed – (Initiation)
    - Managed – (Management)
    - Defined – (Technical)
    - Quantitatively Managed (Quantification)
    - Optimizing – (Process Improvement)

CMMI Levels:

Process areas by maturity level:

- **Performed – Overview:**
  Key Process areas (KPA's):
    - Introduction
    - Structure of the model
    - Understanding the model
    - Usage of model
- **Managed – Basic project management:**

  Key Process areas (KPA's):

    - Requirement management(RTM)
    - Project planning
    - Project monitoring and control (Status report)
    - Supplier agreement management
    - Measurement and analysis
    - Process and product quality Assurance (Audits)
    - Configuration management.(WinSCP)
- **Defined – Process standardization :**
  Key Process areas (KPA's):
    - Requirement development
    - Technical solution
    - Verification
    - Validation
    - Organizational training
    - Risk Management

- **Continuously managed :**

  KPA:

  - Organizational process performance
  - Quantitatively project management
- **Optimizing :** Continuous process improvement :

  KPA:

  - Organization innovation & deployment (OID)

Definition of a Key Performance Indicator (KPI) :

A way of measuring the effectiveness of an organization and its progress towards achieving its goals.