(P) Chapter-2
The software Process

⊘ How do we define software engineering?

□ Software engineering:

Software engineering: ① the application of a systematic, disciplin-d, quantifiable approach to the development, operation, and maintenance of software; that is, the application of enginuering to software.

(2) The study of approaches as in (1).

[IEE 93].

⊘ Describe software enginuering as layered approach.

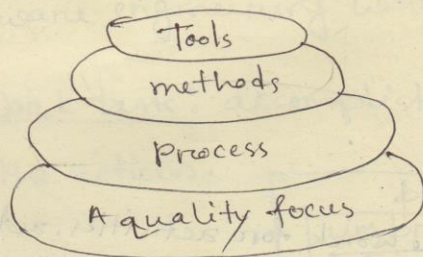→ Software enginuering as layered approch is described with following figure-

Fig: Software Enginuering layers.

* Quality focus:
The bedrocks that supports software engineering is a quality focus. It is this culture that ultimately leads to the development of increasingly more effective approaches to software engineering

☐ **Process:**

This is the foundation for software engineering. It holds the technology layers together and enables rational and timely development of software. It defines a framework that must be established for effective delivery of software engineering technology.

☐ **Methods:**

Methods provides the technical "howto's" for building software. It encompasses a broad array of tasks that include communication, requirement analysis, design modeling, program construction, testing and support.

☐ **Tools:**

Tools provide automated a or semi automated support for process and methods. Tools are integrated so that information created by one tool can be used by another.
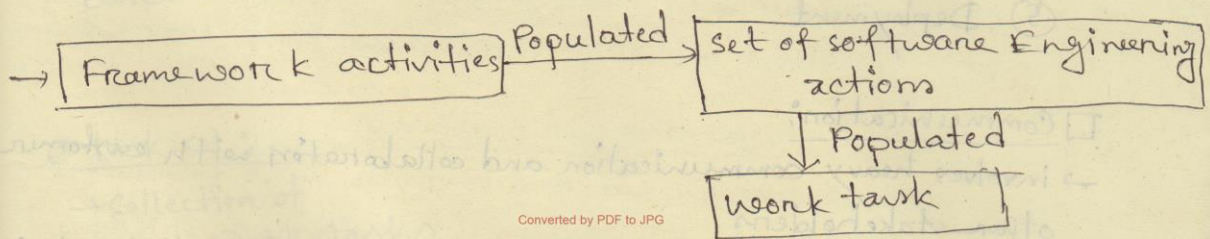
② Software Process:

Software process is a framework for activities, actions and tasks that are required to build high quality software.

- It defines the approaches that are taken as the software is engineered.
- Software process ≠ software engineering.
- Software engineering encompasses technologies that populate the process — technical methods and automated tools.

⊙ Process Frame Work :

→ Establishes the foundation for a complete software process by identifying a small number of framework activities that are applicable to all software projects regardless of their size or complexity.
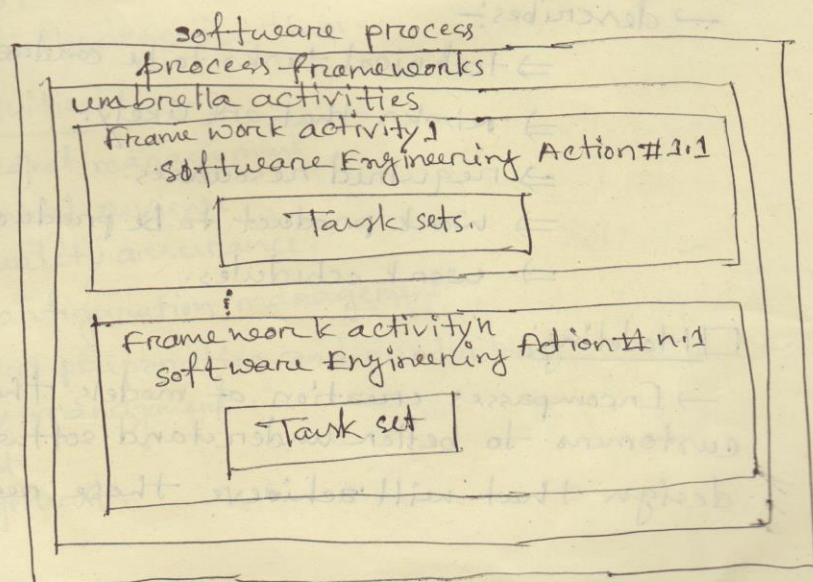
→ encompasses a set of umbrella activities that are applicable across entire software process.

→ | Framework activities | Populated → | Set of software Engineering actions |
                                              |
                                              ↓ Populated
                                        | work task |

→ actions: collection of related tasks that produces a major software engineering work product.

→ Work task: accomplishes some part of work implemented by the actions.

Fig: 2.2. generic process model.

```
software process
  process frameworks
    umbrella activities
      Frame work activity 1
        software Engineering Action#1.1
          Task sets.
      ⋮
      Frame work activity n
        software Engineering Action# n.1
          Task set
```

☑ Frame Work activities:

① Communication
② Planning
③ Modeling
  → Analysis of requirements
  → Design.

④ Construction
  → Code generation
  → Testing

⑤ Deployment.

☐ Communication:
→ involves heavy communication and collaboration with customer and other stakeholders.
→ encompasses requirements gathering and other related activities.

☐ Planning:
→ Plan for software engineering work that follows is established
→ describes:-
  ⇒ technical tasks to be conducted
  ⇒ risks that are likely.
  ⇒ required resources.
  ⇒ Work product to be produced.
  ⇒ work schedules.

☐ Modeling:
→ Encompasses creation of models that allow developers and customers to better understand software requirements and design that will achieve those requirements.

☐ Construction:
  → Combines
    ⇒ Code generation (manual/automated)
    ⇒ Testing (uncovers error in code)

☐ Deployement:
  → delivering software to customers.
  → customers evaluates the delivered product and provides feedback based on evaluation.

⊘ task set:
  → Collection of
    ⇒ Work tasks
    ⇒ work products.
    ⇒ Project milestones and deliverables
    ⇒ Quality assurance check point.

⊘ What are the typical umbrella activities found in process framework? briefly describe them.

  ☐ Umbrella Activities:
    → Software project management
    → Formal technical reviews
    → Software quality assurance.
8   → Software configuration management.
    → Work product preparation and production
    → Reusibility management.
    → Measurement
    → Risk management.

☐ Software Project Management:
→ assess progress against project plan.
→ take necessary actions to maintain schedules.

* Formal Technical Reviews:
→ assess software engineering work products to uncover and remove errors before propagating to the next action or activity

* Software Quality Assurance:
→ defines and conducts activities required to ensure software quality

* Software Configuration Management:
→ Manages the effect of change throughout the software process.

* Work product prepatation and production:
→ encompasses activities required to create work products.
→ work product ⇒ models, documents, logs, forms and lists.

* Reusibility Management:
→ defines criteria for work product reuse.
→ establishes mechanism to achieve reusable components.

* Measurement:
→ defines and collects process, project and product measure that assists the team in delivering software that meets customer needs.
→ can be used in conjuction with all other framework and umbrella activities.

* Risk Management:
→ assesses risks that may effect the outcome of the project or quality of product.