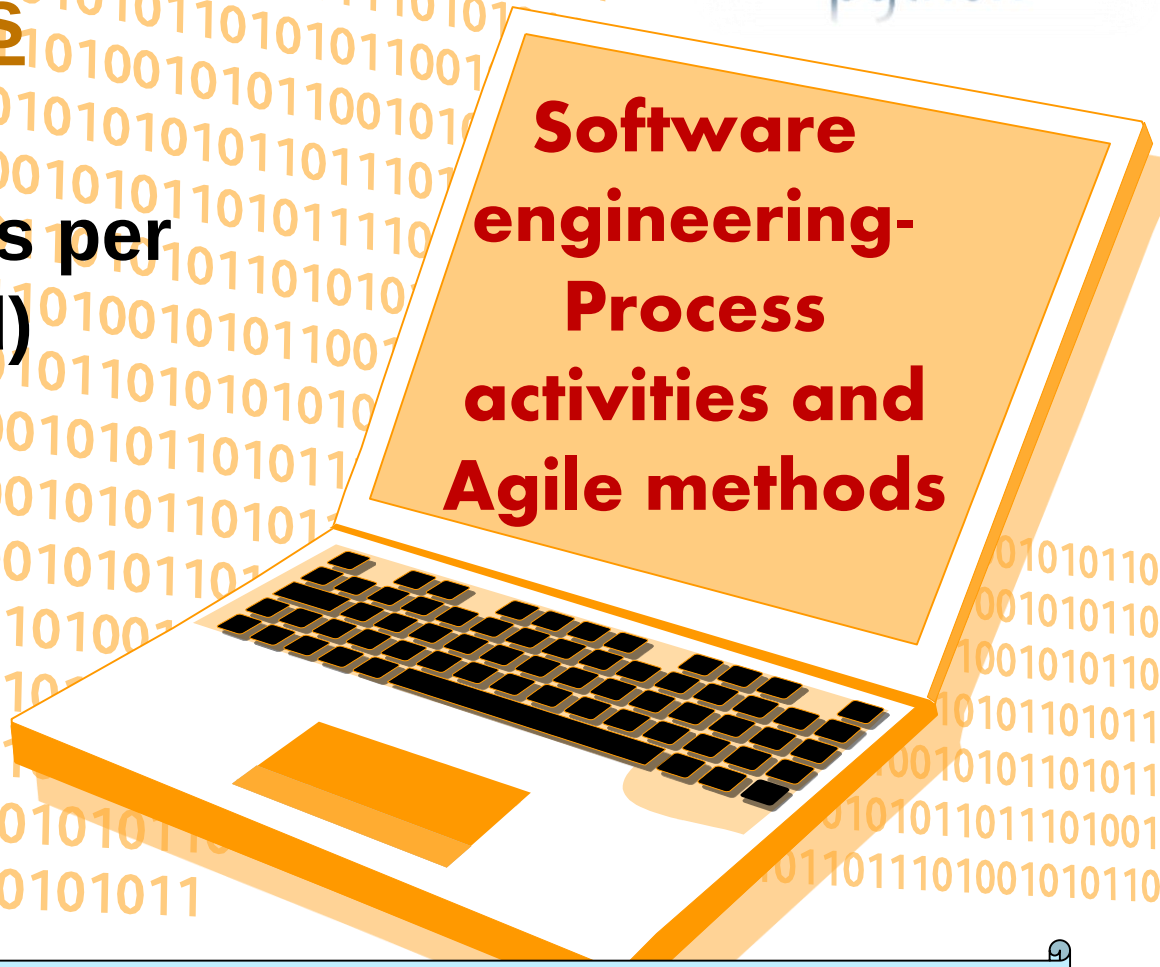
Chapter 8 :

Informatics Practices

Class XII (As per CBSE Board)



New Syllabus 2019-20

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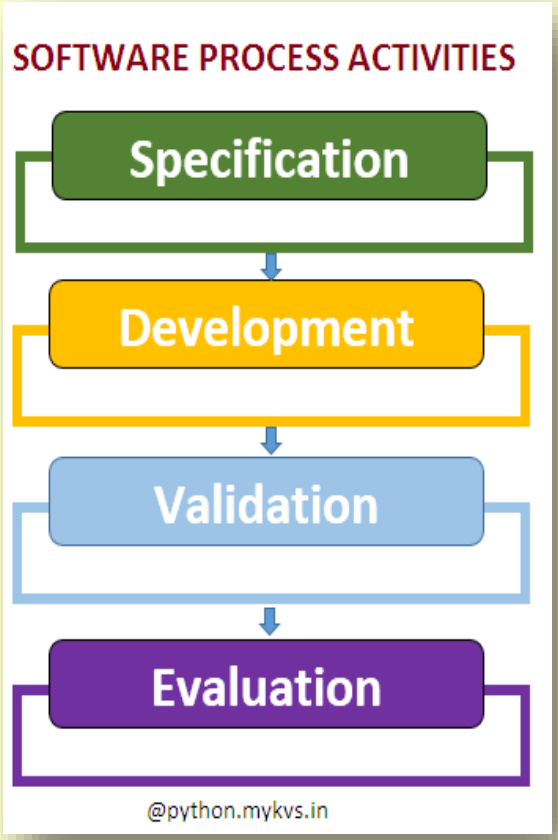
Software engineering

Process activities :

The software process activities are the sets of activities that finally ends up in the production of a software product. These software process activities may involve the development of software from a scratch. There are different software processes but all must include the major four activities. They are:

1. Software specification
2. Software design and implementation
3. Software validation
4. Software evolution

These four basic process activities are organized differently in different development processes. In the waterfall model, these activities are organized in sequence, whereas in evolutionary development these activities are interleaved. Utilization of these activities depends on the type of software, people and organizational structures involved.



Software engineering

Process activities :

Software specification

The Software specification or requirements engineering is the process of understanding the user requirements means finding what services are required and what constraints on these services are.

- **Ensures that the software will meet the user expectations**
- **It's a important stage of the software process ,errors at this stage will reflect later on the next stages, resultant higher costs of the project**

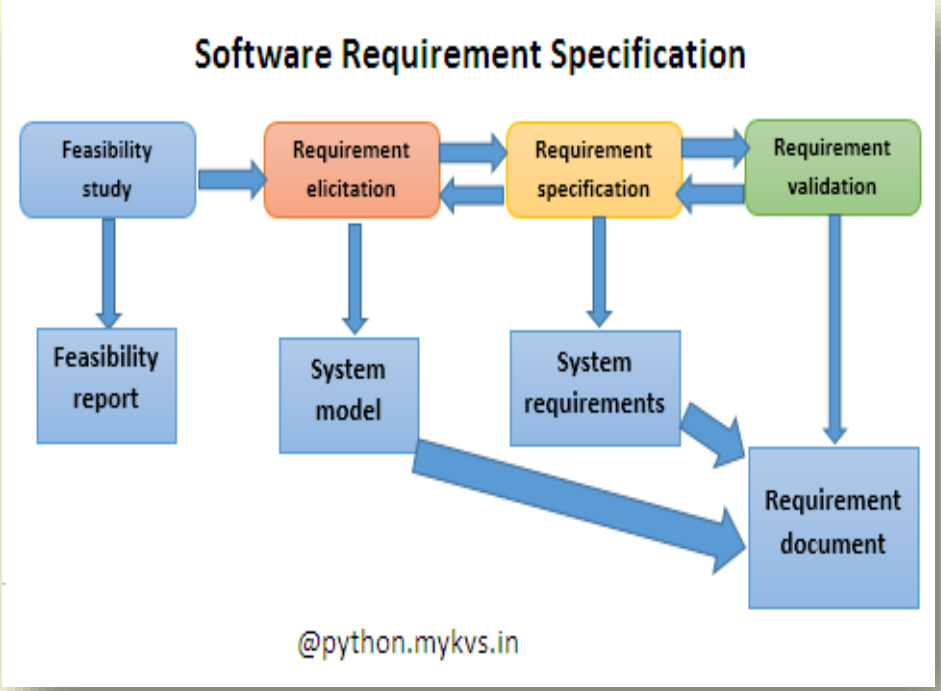
Software engineering

Process activities :

1. Software specification

There are four main sub-activities of software specification in Process Activities:

- **Feasibility study: Technical, operational, economical feasibility is checked that these are as per budget planned .**
- **Requirements elicitation and analysis: Deriving the system requirements through observation of existing systems, onsite observation, discussion with stakeholders, etc.**
- **Requirements specification: elicitation of requirements and writing down these in a document.**
- **Requirements validation: Checking the requirements for realism, consistency and completeness.**



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Process activities :

2. Software design and implementation

It is a description of the architecture of the proposed software. It can be considered as interfaces between system components and the algorithms used. The design process activities are the followings:

- **Architectural design:** It defines the overall structure of the system, its components and their relationships between these components.
- **Interface design:** It defines the interfaces between these components, which must be clear.
- **Component design:** Take each component and design it.
- **Database design:** The system data structures are designed and their representation in a database is defined.

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Process activities :

3. Software validation

Software verification (plan,requirements etc.,carried out by QA) or validation (actual product,carried out by testing team) (V&V model) means system conforms to its specification and that it meets the expectations of the customer.

Testing has three main stages:

- Development (or component) testing: Components are tested by the team developing system.
- System testing: Finding errors that result from interactions between components.
- Acceptance testing: The system is tested with data supplied by the system customer rather than using dummy(simulated) data.

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Process activities :

4. Software evolution

Software evolution means software maintenance, refer to the process of developing software initially, then repeatedly updating it for various reasons.

The main objectives of software evolution is ensuring the reliability and flexibility of the system. The costs of software maintenance are often several times the initial development costs of software.

Software engineering

Agile Methods :

The Agile Method is an approach to project management in software development. This method assists teams in responding to the unpredictability of software in development . It uses incremental, iterative work sequences that are commonly known as sprints.

AGILE methodology promotes continuous iteration of development/testing throughout the software development. Both development and testing activities are concurrent.

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Agile Methods :

The general principles of the Agile Method

- continually develop software to satisfy the client.
- Concentrate on delivering working software.
- Developers and user must work together throughout the software development.
- Constant attention to technical excellence.
- Self-organized teams usually create the best designs.
- At regular intervals, the team focus on how to become more effective, so as tune and adjust their behavior accordingly.

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Agile Methods –

➢ Pair Programming:

Pair Programming is a agile method ,where two programmers share a single workstation/computer. One programmer is the driver, whom has control over the mouse and keyboard to write the code, while the other serves as the navigator, who review the code that the other is writing the code.

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Agile Methods –

➢ Benefits of Pair Programming:

- Increased software Quality
- User Satisfaction
- Easy Integration of components
- Mentoring & Learning by programmers
- Flexibility in development

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Agile Methods –

➢ Scrum

It is an agile development method which concentrates on how to manage tasks within a team-based development environment. Scrum believes in empowering the development team and advocates working in small teams .

It consists of three roles

- **Scrum Master : Responsible for setting up the team, sprint meeting and removes obstacles to progress**
- **Product owner: Creates product backlog and responsible for the delivery of the functionality at each iteration**
- **Scrum Team: Organizes the work to complete the sprint or cycle**

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Agile Methods –

➢ Scrum

Process flow of Scrum Methodologies:

- Each iteration of a scrum is known as Sprint
- Product backlog is a document/list where all details are entered to get the end product.
- During each Sprint, top items of Product backlog are selected and developed.
- Team works on the specified sprint backlog
- Team checks the work on daily basis.
- Team delivers product functionality at the end of the sprint.

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Agile Methods –

- **Scrum**

The Sprint

The main part of Scrum is a Sprint, where a useable and potentially releasable product Increment is created. Sprints can be of one week to one month in length.

There are three events each Sprint:

Sprint Planning – Team decides what to work in current period

Daily Scrum – The Development Team meets for 5 to 15 minutes daily to inspect progress toward Goal.

Sprint Review – The Team review about task competed as the per Backlog

Sprint Retrospective – The Team discusses on right and wrong development, and how to improve