Introduction
to
Software Engineering (SE)

What is Software?

- *Software is: (1) instructions (computer programs) that when executed provide desired features, function, and performance; (2) data structures that enable the programs to adequately manipulate information and (3) documentation that describes the operation and use of the programs.*
- ***Software is developed or engineered, it is not manufactured in the classical sense.***

Category of Software

- system software
- application software
- engineering/scientific software
- embedded software
- product-line software
- WebApps (Web applications)
- AI software

Legacy Software

Why must it change?

- software must be adapted to meet the needs of new computing environments or technology.
- software must be enhanced to implement new business requirements.
- software must be extended to make it interoperable with other more modern systems or databases.
- software must be re-architected to make it viable within a network environment.

Definition – Software Engineering

- The IEEE definition: The application of a **systematic, disciplined, quantifiable** approach to the **development, operation, and maintenance of software**, that is the application of engineering to software.

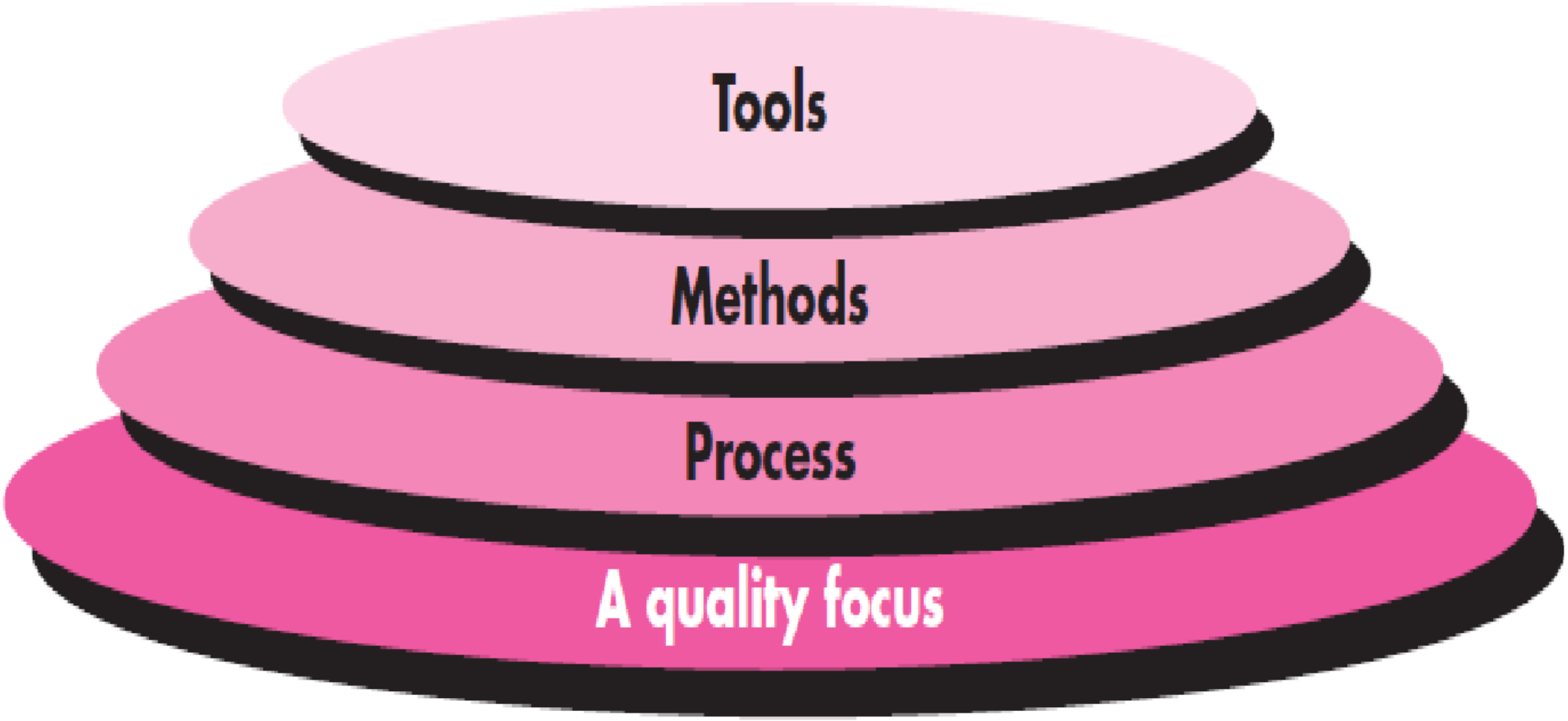
- *Software engineering is the use of **sound engineering principles** in order to obtain **economical** software that is **reliable and works efficiently** **on** **real machines**.*

Need of SE

- Challenge for Software Engineers is to produce high quality software with finite amount of resources & within a predicted schedule

- Software engineering is important because it enables us to build complex systems in a timely manner and with high quality

Software Engineering Layers



Process & Software Process

- A **process** is a series of actions or steps taken in order to achieve a particular end.

- A **software process** (also knows as **software** methodology) is a set of related activities that leads to the production of the **software**. These activities may involve the **development** of the **software** from the scratch, or, modifying an existing system.

What is Practices?

- the actual application or use of an idea, belief, or method, as opposed to theories relating to it.

Or

- the customary, habitual, or expected procedure or way of doing of something.

The STQ Approach

- STQ stand for Scope, Timeliness and Quality
- Scope: Work/ task to be done to have the complete solution
- Timeliness: With a certain time line and budget
- Quality : End result as per agreed expectation

Requirement

- Software has become deeply embedded in virtually every aspect of our lives,
- Increase in the number of stakeholders so many voices must be heard.
- Each of them has a slightly different idea or view
- ***It follows that a concerted effort should be made to understand the problem before a software solution is developed.***

Design

- requirements demanded by individuals, businesses, and governments are becoming increasingly complex with each passing year
- The complexity of these new computer-based systems and products demands careful attention to the interactions of all system elements.
- ***It follows that design becomes a pivotal activity***

Quality : Component

- **Functionality.** The capability to provide functions which meet stated and implied needs when the software is used
- **Reliability.** The capability to maintain a specified level of performance
- **Usability.** The capability to be understood, learned, and used
- **Efficiency.** The capability to provide appropriate performance relative to the amount of resources used
- **Maintainability.** The capability to be modified for purposes of making corrections, improvements, or adaptation
- **Portability.** The capability to be adapted for different specified environments without applying actions or means other than those provided for this purpose in the product

Maintainability

- As the perceived value of a specific application grows, the likelihood is that its user base and longevity will also grow
- demands for adaptation and enhancement will also grow.
- ***It follows that software should be maintainable***

Activity 1

- Write down the process to prepare tea.

Software Process

- When you build a product or system, it’s important to go through a series of predictable steps—a road map that helps you create a timely, high-quality result.
- The road map that you follow is called a ‘*software process.*’

End of Class

Let’s Talk

One more Suggestion

- Now you have become a master student …. So be Mature …

- How many times you heard this statement ???

- Now you have become a mas student …. So be Mature …

All Agree ???

Instead

- Become Courageous
- Become Sensitive
- And most important … Always be a kid @ heart