SOFTWARE ENGINEERING

Introduction

Software Engineering

- Engineering is the application of scientific and practical knowledge in order to invent ,design, improve and maintain systems and processes.

- Software is a program or set of programs containing instructions which provide desired functionality .

- ***Software Engineering*** *is a systematic approach to the design, development, operation, and maintenance of a software system.*

- **Dual Role of Software:**
- **As a product -**It delivers the computing potential across network of Hardware.
- As a product, software: Delivers computing potential embodied by computer Hardware or by a network of computers
- Produces, manages, acquires, modifies, display, or transmits information that can be as simple as a single bit or as complex as a multimedia presentation

- **As a vehicle for delivering a product -**

  It provides system functionality (e.g., payroll system)

  It controls other software (e.g., an operating system)

  It helps build other software (e.g., software tools)

- As a vehicle, software:Acts as the basis for the control of the computer for provides system functionality (e.g., operating systems)Controls the communication of information (e.g., networkingsoftware) andThe creation and control of other programs (software tools andenvironments).

Objectives of Software Engineering:

- **Maintainability –**
  It should be feasible for the software to evolve to meet changing requirements.
- **Correctness –**
  A software product is correct, if the different requirements as specified in the SRS document have been correctly implemented.
- **Reusability –**
  A software product has good reusability, if the different modules of the product can easily be reused to develop new products.
- **Testability –**
  Here software facilitates both the establishment of test criteria and the evaluation of the software with respect to those criteria.
- **Reliability –**
  It is an attribute of software quality. The extent to which a program can be expected to perform its desired function, over an arbitrary time period.
- **Portability –**
  In this case, software can be transferred from one computer system or environment to another.
- **Adaptability –**
  In this case, software allows differing system constraints and user needs to be satisfied by making changes to the software.

Program vs Software Product:

- Program is a set of instruction related each other where as Software Product is a collection of program designed for specific task.

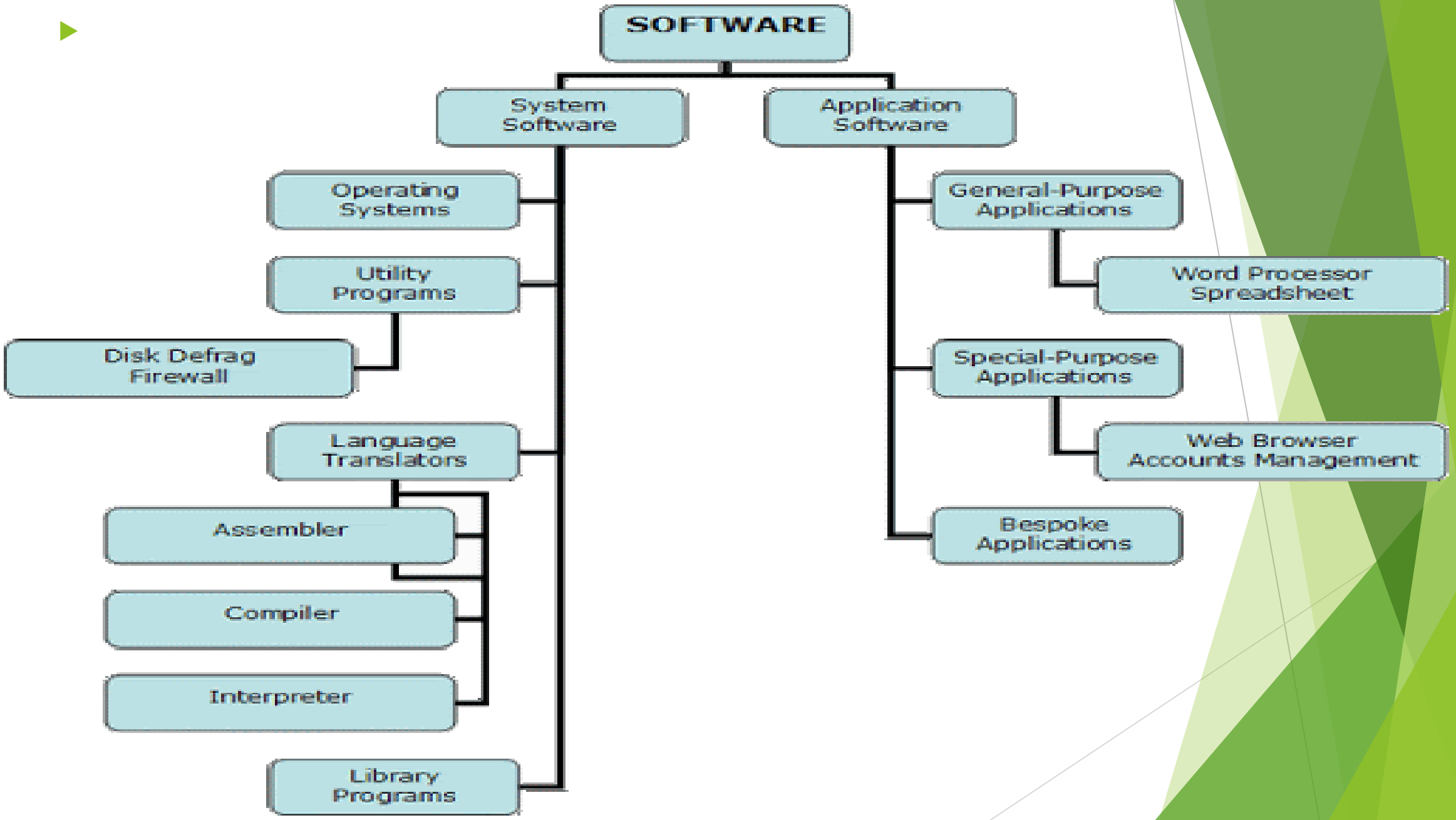
- Programs are usually small in size where as Software Products are usually large in size.

- Programs are developed by individuals that means single user where as Software Product are developed by large no of users.

- In program, there is no documentation or lack in proper documentation.
  In Software Product, Proper documentation and well documented and user manual prepared.

- Development of program is Unplanned, not Systematic etc but Development of Software Product is well Systematic, organised, planned approach.

- Programs provide Limited functionality and less features where as Software Products provides more functionality as they are big in size (lines of codes) more options and features.


SOFTWARE
System Software
Application Software
Operating Systems
Utility Programs
Disk Defrag
Firewall
Language Translators
Assembler
Compiler
Interpreter
Library Programs
General-Purpose Applications
Word Processor
Spreadsheet
Special-Purpose Applications
Web Browser
Accounts Management
Bespoke Applications

- Classification of Software

On the basis of application

- System Software – OS
- Application software-MS office,
- Networking and Web Applications Software –
- Embedded Software –
- Reservation Software –
- Business Software –
- Entertainment Software
- Artificial Intelligence Software –
- Scientific Software

- **Software Engineering Process**

- The process encompasses the entire range of activities, from initial customer inception to software production and maintenance.
- It is also known as the Software Development Life Cycle (SDLC).
- To produce a software product the set of activities is used. This set is called a software process.

- s/w process activities

- 4 steps

- Software specification : customers and designers define the software to be produced
- Software development : software designed and developed
- Software validation : the software is checked to ensure that it is what the customer requires.
- Software evolution : the software is modified to adapt it to changing customer and market requirements

Different type→different processes

- Generic process model

- **1. Communication:**
  The software development starts with the communication between customer and developer.

  2. Planning:
  It consists of complete estimation, scheduling for project development and tracking.

  3. Modeling: Modeling consists of complete requirement analysis and the design of the project like algorithm, flowchart etc.

4. Construction: Construction consists of code generation and the testing part.

Coding part implements the design details using an appropriate programming language.

Testing is to check whether the flow of coding is correct or not.

Testing also check that the program provides desired output.

5. Deployment: Deployment step consists of delivering the product to the customer and take feedback from them.

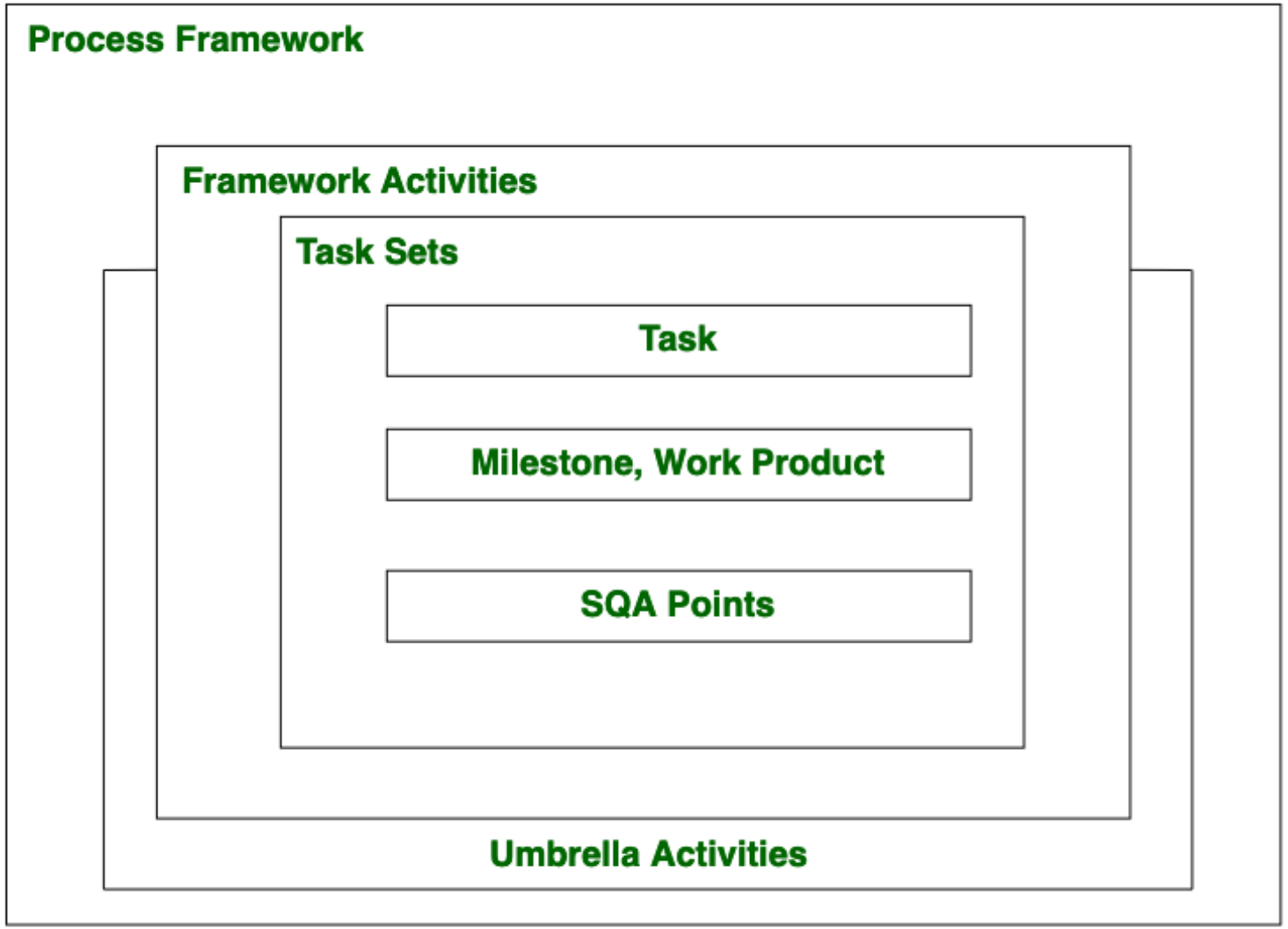
- Task set
- A task set is a collection of

  software engineering work tasks,

  milestones, and

  deliverables

  that must be accomplished to complete a particular project to achieve high software quality



Software Process Framework