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Software Process Model 2024

Introduction

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Software Process Modeling –IT1060

- Introduced in 2017 By Prof. Pradeepa Samarasinghe

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Lecture Panel –SPM Team

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Lecture Panel –SPM Team

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Ms.Nimasha Chinthaka -Lecturer-SPM Team

Latest Software Development Trends

Latest Software Development Trends

- Low-code & No-code Solutions in the Software Development Process
- Embracing Cloud Computing
- The Massive Growth of IoT Devices
- Artificial Intelligence Everywhere
- New Programming Languages Show Up & Gain Momentum
- More Use of Big Data in Software Engineering
- Agile Methodologies for DevOps and Security Teams
- Augmented Reality & Virtual Reality Take Software Development Beyond the Screen
- Put User Experience First

Session outcomes

- Introduction to Module
- SPM- Introduction

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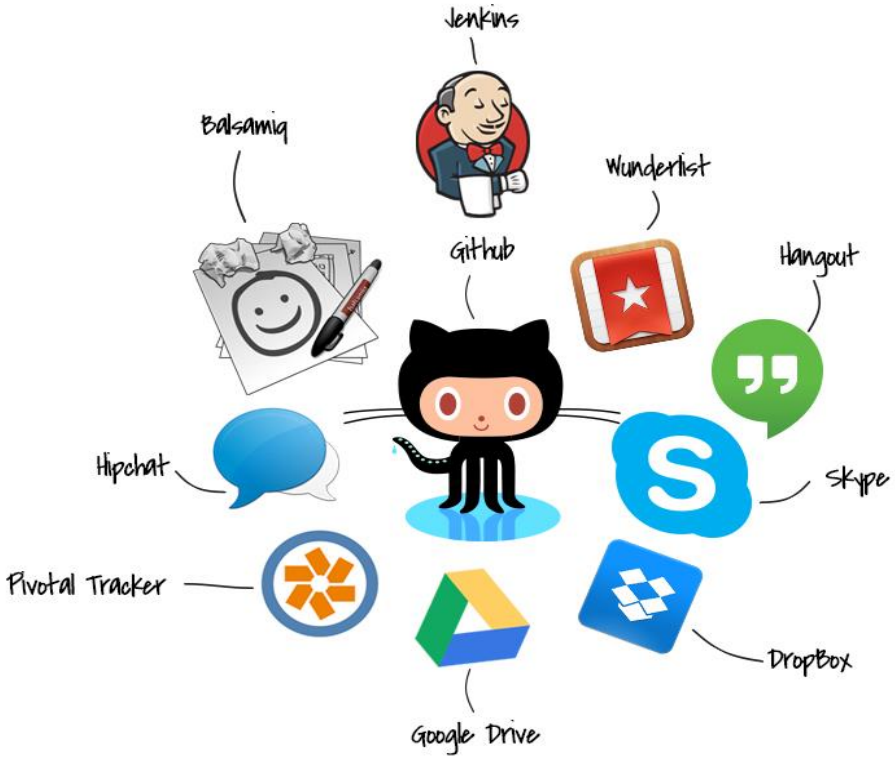
Academic Integrity Policy

- Are you aware that following are not accepted in SLIIT???
  - Plagiarism - using work and ideas of other individuals intentionally or unintentionally
  - Collusion - preparing individual assignments together and submitting similar work for assessment.
  - Cheating - obtaining or giving assistance during the course of an examination or assessment without approval
  - Falsification – providing fabricated information or making use of such materials
- Committing above offenses come with serious consequences !
- See General support section of Course web for full information.

Enrollment Key :IT1060

MODULE INTRODUCTION



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Module contents

- Course web - IT1060
  - IT1060 [2023/FEB] General
  - Module outline
  - Notices
  - Marks
- Weekly updates
  - Lecture
  - Lab
  - Tutorial
  - Additional Reading/Recordings

Learning outcomes

Differentiate the characteristics and effects of different types of software engineering processes.
Describe the requirement engineering process and components of a formal requirements document for a software project.
Apply the knowledge of UML to model and represent system requirements.
Describe software design strategies and the importance of design models.
Apply the knowledge of software implementation and testing to write test cases.
Apply Agile development methodology.

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Assessment Criteria

Mid Term Examination	30%	LO1-LO4
Assignment I	10%	LO3-LO5
Assignment II	10%	LO4-LO5
Final Examination	50%	LO1-LO9

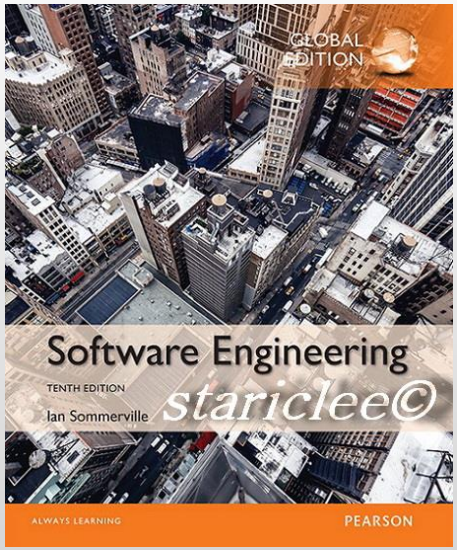
To pass this module, students need to obtain a pass mark in both "Continuous Assessments" and "End of the Semester Examination" components which would result in an overall mark that would qualify for a "C" grade or above.

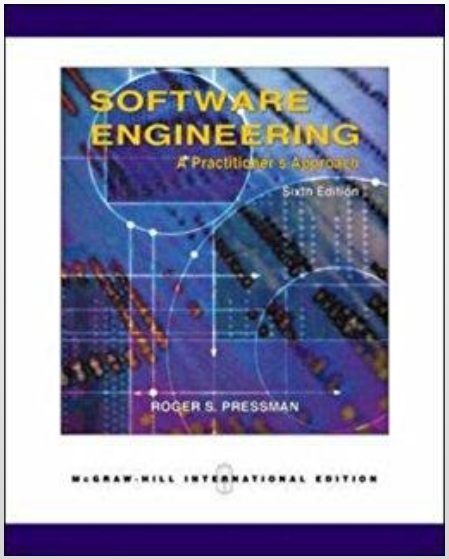
Assignments

- **Five members** in one group
- Randomly chosen case study
- Two submissions
  - Before Mid term – Week 7
    - Based on requirements engineering and use case diagrams
  - After Mid term – Week 13
    - Based on Activity Diagram

Recommend Texts

- ***Ian Sommerville, "Software Engineering", Pearson Education Limited, 10th edition, 2016***
- ***R. Pressman, "Software Engineering: a practitioner's approach", McGraw-Hill Education; 8th edition, 2014***
- ***K.S. Rubin, Essential Scrum: A Practical Guide to the Most Popular Agile Process, Addison-Wesley, 2012***
- *SWEBOK, Guide to the Software Engineering Body of Knowledge, 2014*





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Lab Schedule

Time	Lectures	Tutorial	Lab -Schedule
Week 01	Introduction to Software Engineering	No	No
Week 02	SDLC	No	Lab01
Week 03	SDLC	No	Lab01
Week 04	Requirements Engineering	Tutorial 01-SDLC	Lab02
Week 05	Use Case Diagram	Tutorial 02 -RE	Lab02
Week 06	Use Case Diagram	Tutorial 03-UCD PI	Lab03
Week 07	Activity Diagram	Tutorial 03-UCD PII	Lab03
Week 08	Mid-Examination	No	No
Week 09	Software Design	No	Lab04
Week 10	Implementation and Testing	Tutorial 04- Design	Lab04
Week 11	Implementation and Testing	Tutorial 05-testing	Lab05
Week 12	Modern Software Development and Meth	No	Lab05
Week 13			

SPM- INTRODUCTION

Session Outcomes

1. What is a Software
2. What is Software Engineering
3. Software Process
4. Software Process Activities
5. Software process model
6. Software Development Life Cycle
7. Software Engineering Ethics

What is Software?

Software is **not only** the computer programs, but also associated documentation and configuration files, needed to make the programs operate correctly.

Popular Software

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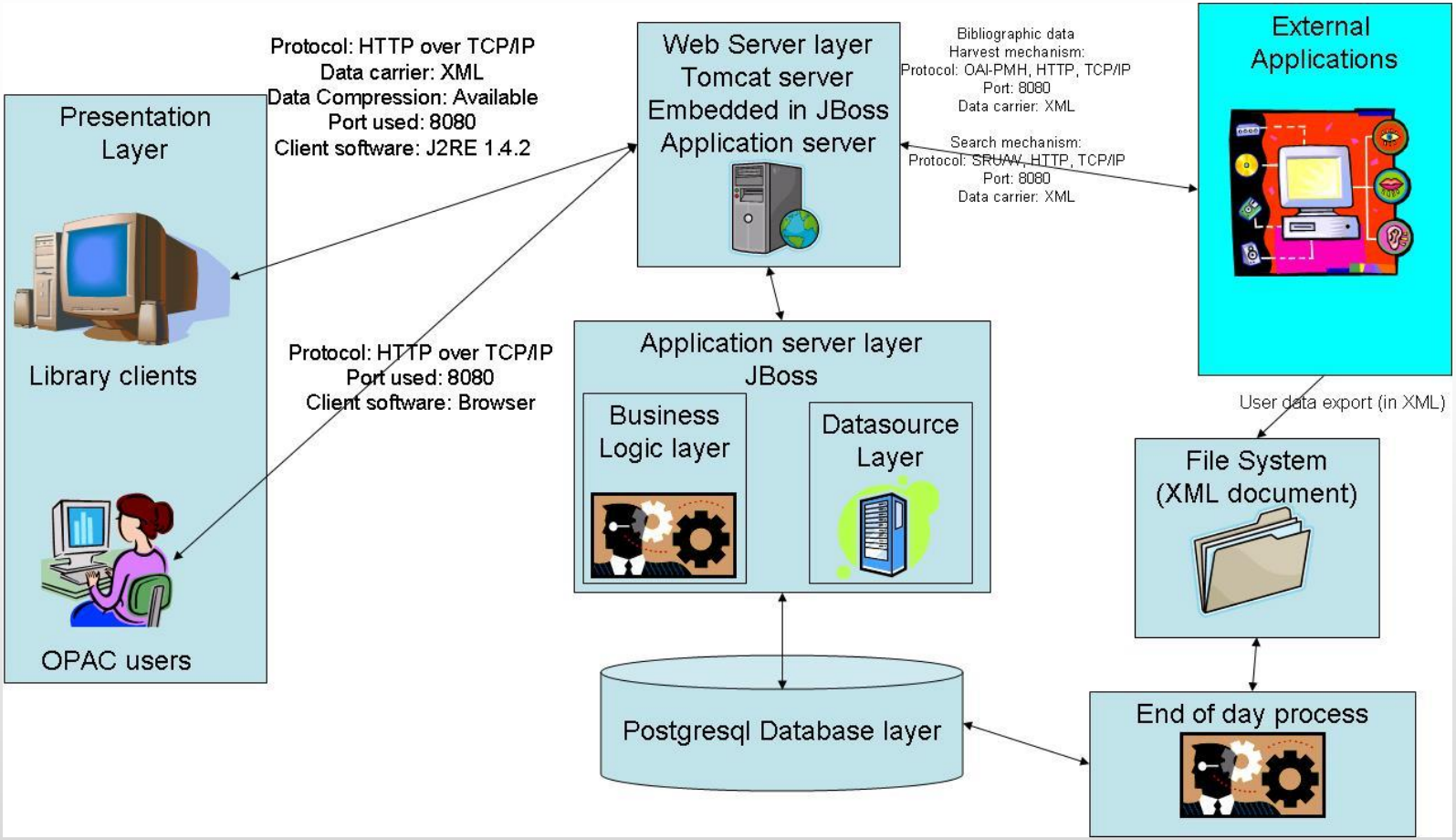
1st Year 1st Semester IP

```
/* adding two numbers*/
#include <stdio.h>

int main(void)
{
        int no1, no2;
        int sum;

        no1 = 25;   //  assign value to no1 variable
        no2 = 12;   //  assign value to no2 variable

        sum = no1 + no2;  // add numbers

        printf( " Sum is %d\n",  sum);    // print sum
        return 0;
 } // end of main function
```

```
/* adding two numbers*/
#include <stdio.h>

int main(void)
{
        int no1, no2;
        int sum;

        printf("Enter first number:  ");   /* prompt */
        scanf("%d", &no1);  /* read the value */

        printf("Enter second number:  ");    /* prompt*/
        scanf("%d", &no2);  /* read the value */

        sum =  no1  + no2;    /* assign total to sum */

        printf( " Sum is %d\n",  sum);    /* print sum */

        return 0;
 } // end of main function
```

- Are these Software ?
- What are things that you need to do to develop Software?

Library Software



http://www.verussolutions.biz/technology.php

Programs Vs. Software Products

Program

- Small
- Single developer
- Small in size
- Limited Functionality
- Single user (author)
- Simple user interface
- Sparse documentation
- No user manual
- Ad hoc development

Software Product

- Large
- Team of developers
- Multiple users (customer)
- Complex user interfaces
- Detailed documentation
- User manual
- Systematic development

MS Teams


Microsoft Teams help & learning
How can we help you?
Get started
Teams & channels
Notifications & settings
Chat
Meetings & calls
Files
Apps & services
Video conferencing with Teams
From custom backgrounds to more video feeds per meeting, Teams video meetings help you and your team feel connected.
LEARN MORE

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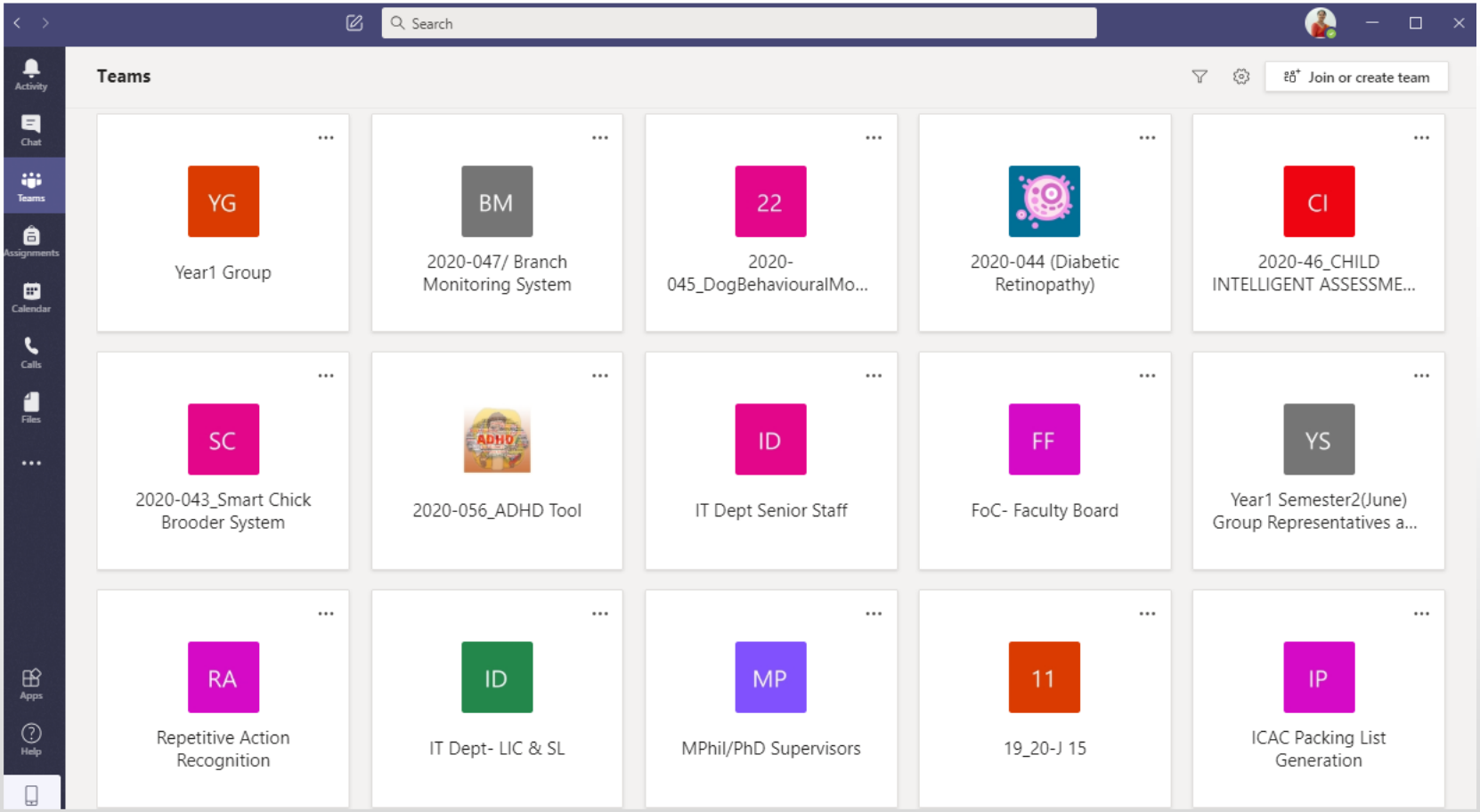
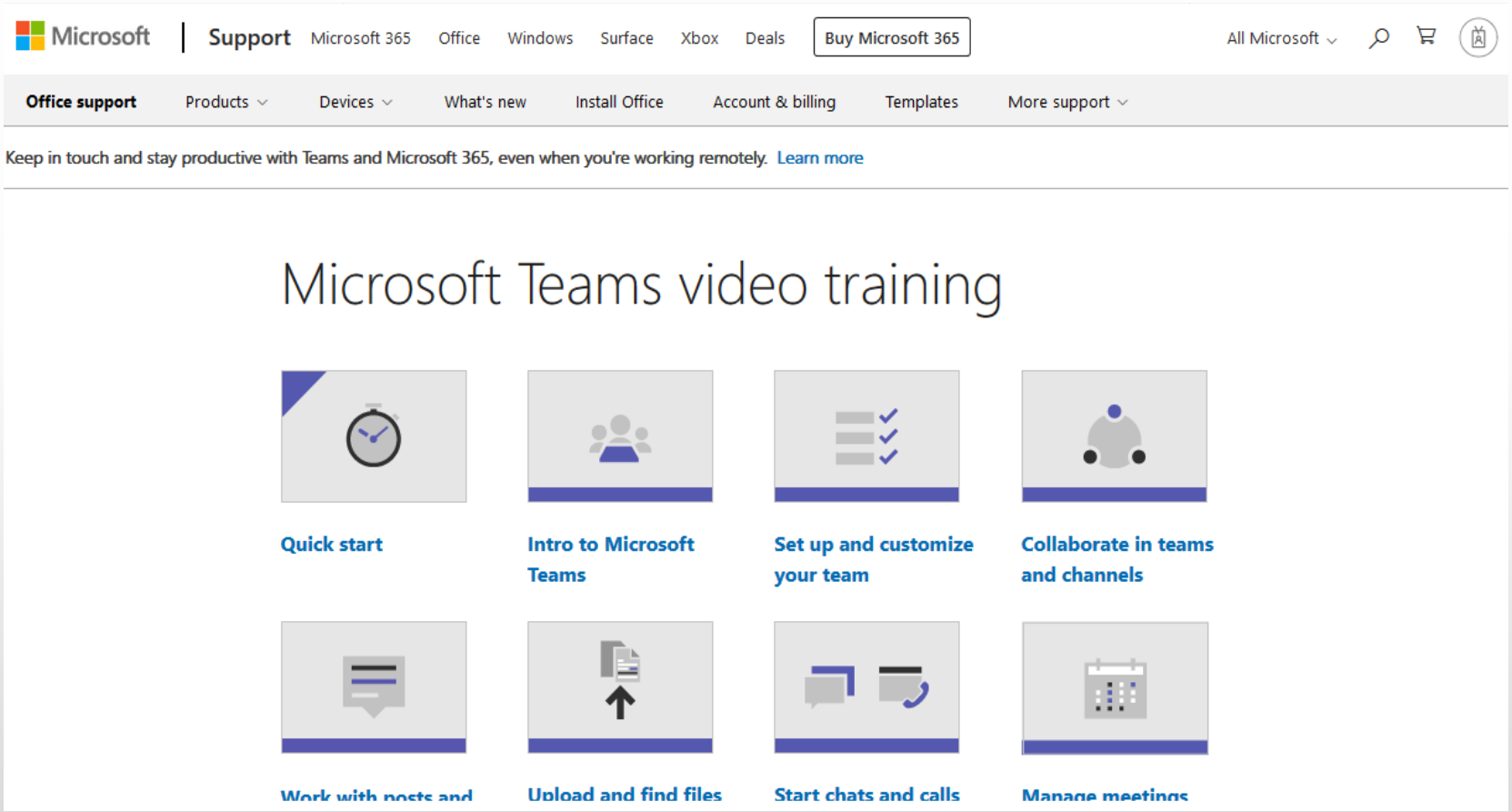
MS Teams



Teams Documentation



Software products can be

- Generic
  - These are stand alone systems that are produced by a development organization and sold on the open market to any customer who is able to buy them.
- Customized
  - These are systems that are developed for a particular customer requirements

How do we develop a real software?

- There will be a real user (Customer) who would need to use the software.
  1. Feasibly study (whether it is technical feasible and financially worthwhile)
  2. You have to find out what the customer wants (Requirements Gathering)
  3. Analyze the problem
  4. Develop a solution (Design)
  5. Code the solution
  6. Test and Debug
  7. Maintenance

Suggest Something Innovative?

- Suggest your dream software
  - Do not think about technical barriers
  - You can think beyond of the reality

“New Ideas will lead you to highest point of the Software Engineering”

Suggest Something Innovative in Pandemic Situation ?

Suggest Any Software Which helps in Pandemic Situation

- Day to day Life
- Communication
- Shopping
- Any other Idea ?

Software Engineering

- IEEE Definition of Software Engineering:

The application of a *systematic*, *disciplined*, *quantifiable* approach to the development, operation, and maintenance of software;

that is, the application of engineering to software.

IEEE Standard 610.12-1990, 1993.

Software Engineering Cont.

- Engineering discipline

  make things work by applying theories, methods and tools where these are appropriate and also try to discover solutions to problems even when there's no proper theories/methods.

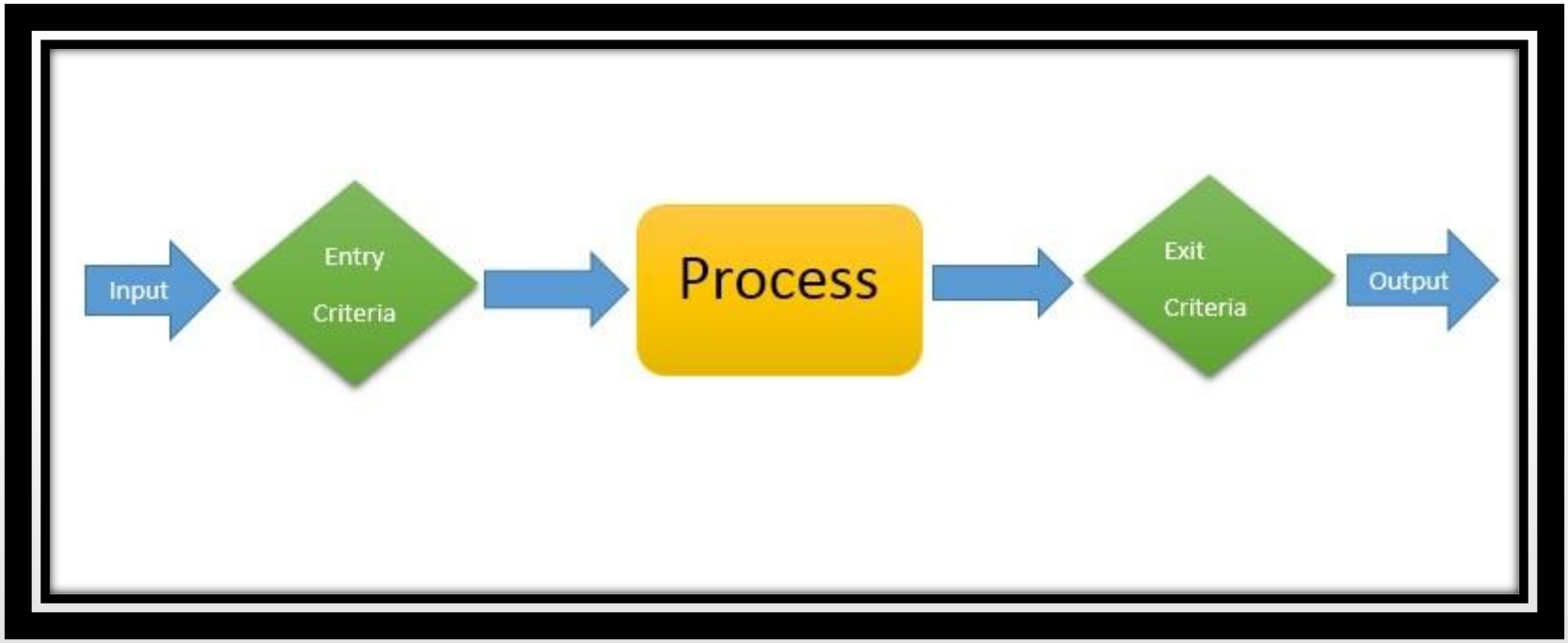
- All aspects of software production

  Not only technical processes of software development, but also project management and development of tools, methods and theories to support S/W production.

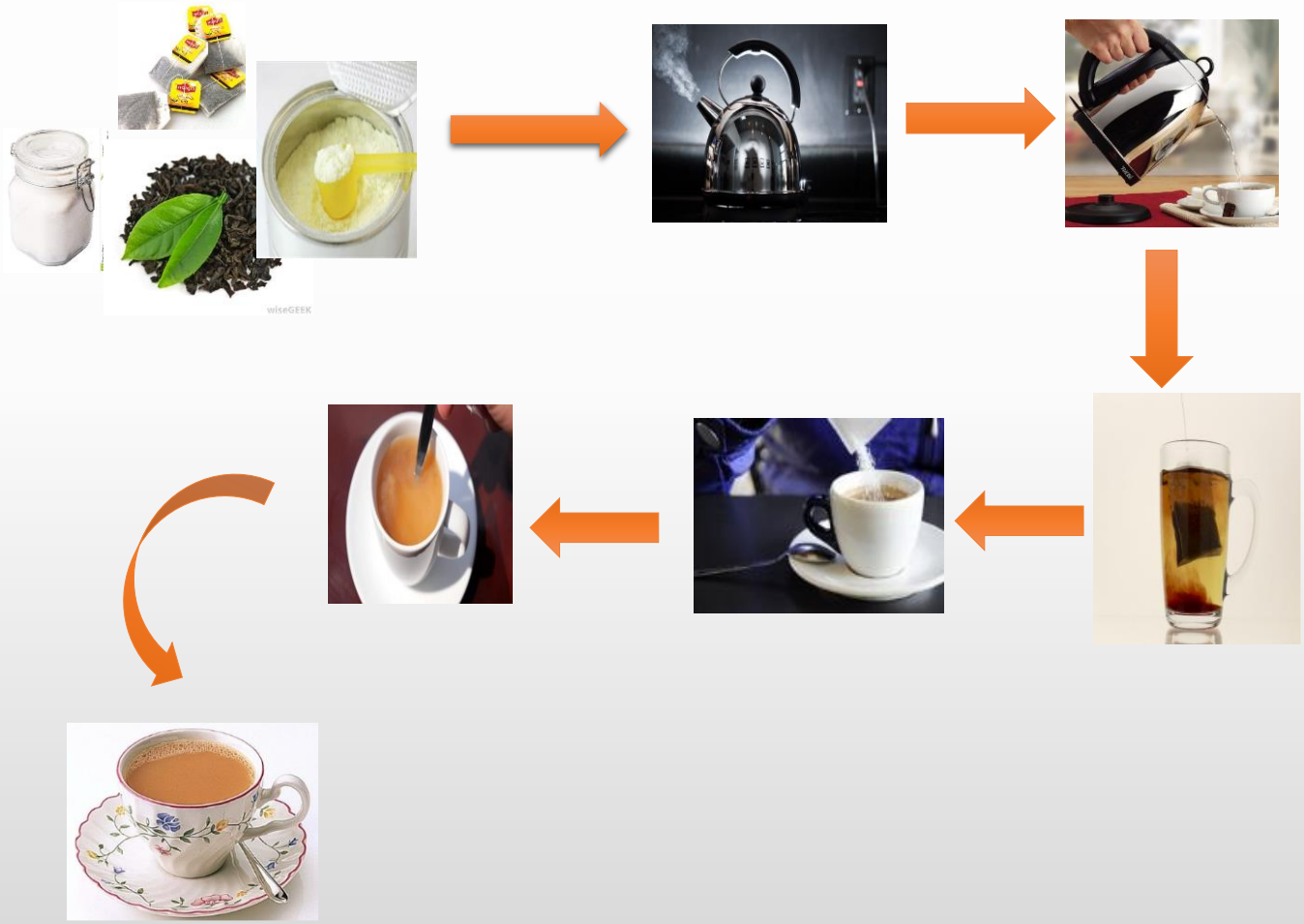
Key Challenges

- Deliver Quality software to the customer at the agreed time
- The product is intangible
- Software processes are available and organization/product specific
- Keep overall costs within budget

Process



Making A Cup of Tea



Making A Cup of Tea

- Ingredients : Tea Leaves, Sugar, Milk Powder, Boiled Water
- Process

  Boil the water
  Pour boiled water into cup
  Put a tea bag inside a cup
  Leave it few minutes
  Put Sugar and Milk (if necessary)
  Stir few seconds
  Arrange it nicely

- Output: Tea

Software Process

- A software process is a set of interrelated activities and tasks that transform input work products into output work products. (SWEBOK V3 – Chapter 8)

Software Process Activities

- Software Specification
- Software Development
- Software Validation
- Software Evolution

Software Process Activities

- Software Specification
  - The functionality of the software and constraints
- Software Development
  - The software is designed and programmed.
- Software Validation
  - The software must be validated
- Software Evolution
  - The software must evolve

Software Processes

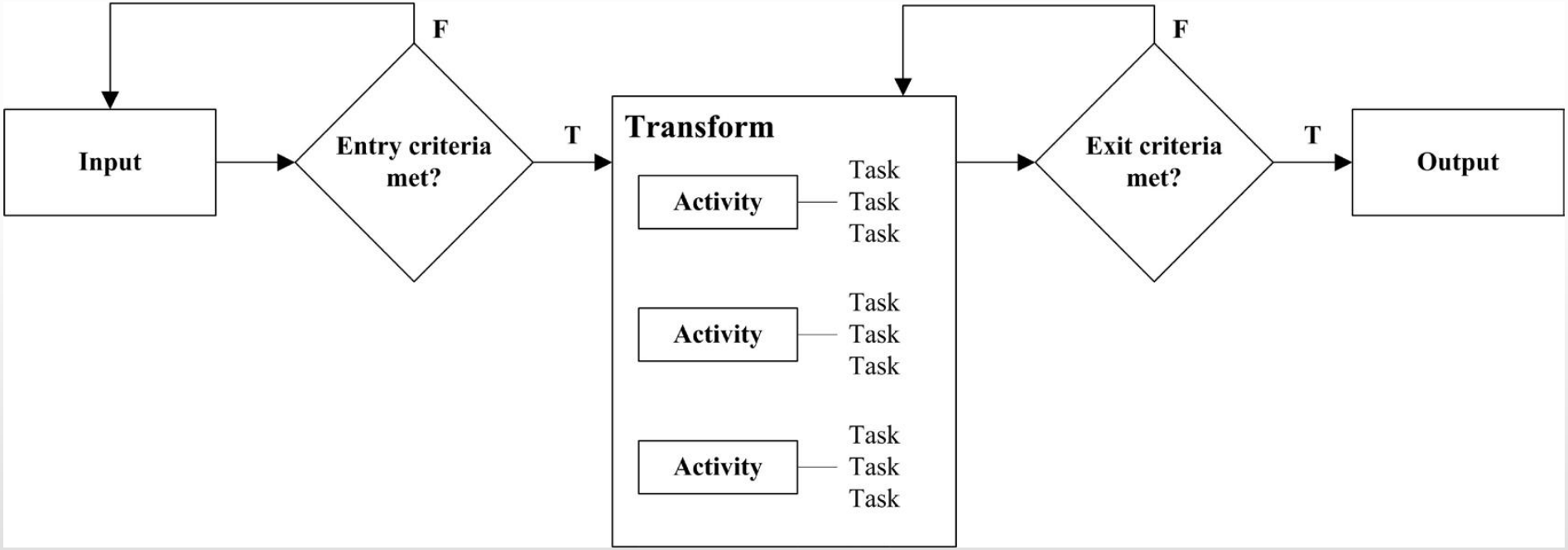
"There is no universal process that is right for all kinds of software"

Ex:

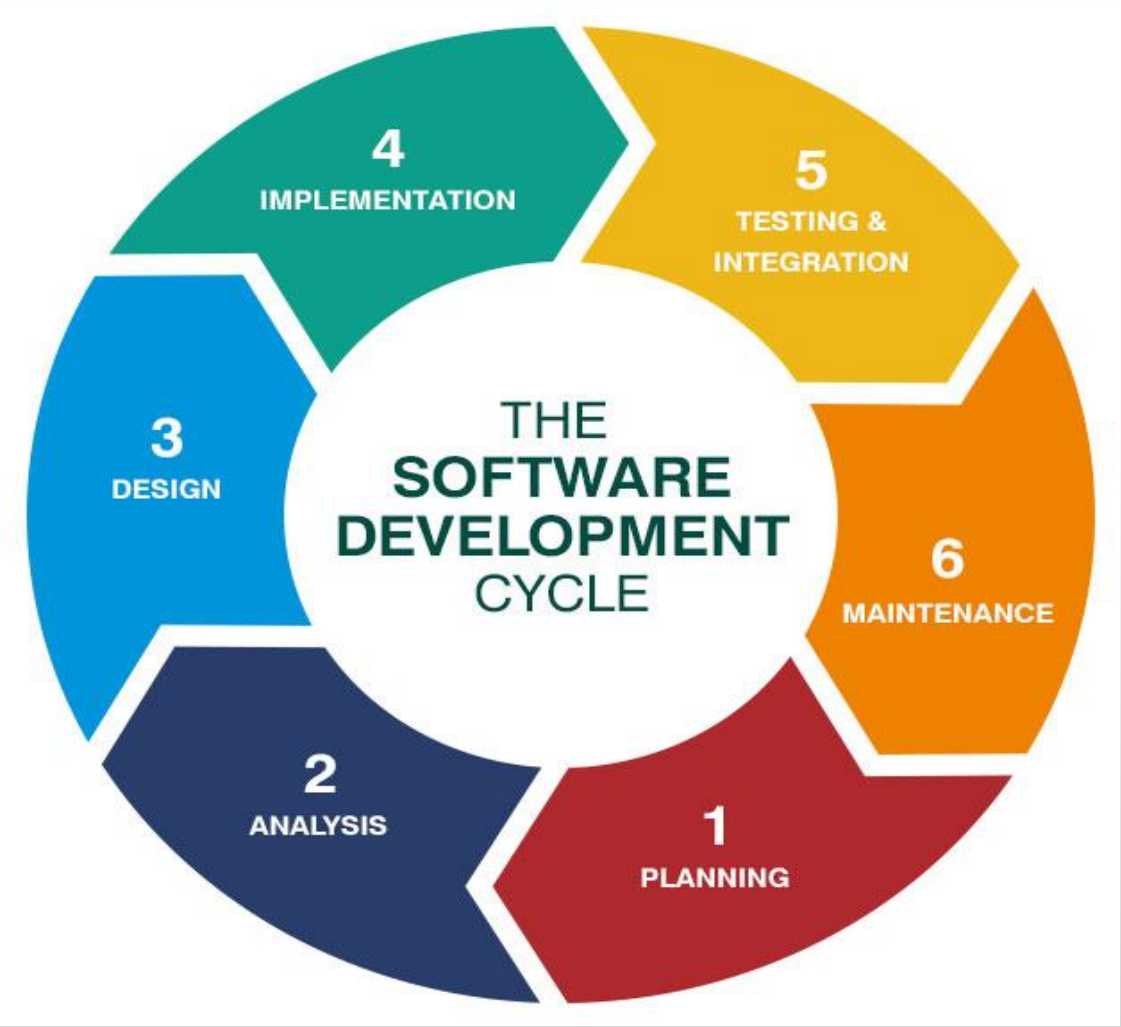
- For safety-critical systems, a very structured development process is required where detailed records are maintained.
- For business systems, with rapidly changing requirements, amore flexible ,agile process is likely to be better

Software process model

- It is a simplified representation of software process.



Software Development Life Cycle



Software Development Life Cycle Models

- A Software Development Life Cycle Model
  - has a series of stages that a software product undergoes during its life time.
  - is a descriptive and diagrammatic representation of the software life cycle.
  - is often referred as software process model.
  - maps the basic development activities to phases in different ways

General Software Process Models

- Waterfall Model
  - Classic
  - Iterative
- Prototyping
- Evolutionary Model
  - Incremental
  - Spiral
- Agile development.

Software Engineering Ethics

As a Professional Software Engineer,

- You should accept that your work involves wider responsibility than simply application of technical skills
- You should behave in an ethical way and morally responsible way
- You should not use your skills and abilities to behave in a dishonest way that will bring disrepute to the software engineering profession

Software Engineering Ethics Con.

Standards

- Confidentiality
- Competence
- Intellectual Property rights
- Computer misuse

Case Studies

- Library Management System

Library Management System

- Sri Lanka Institute of Information Technology (SLIIT) is the largest degree awarding institute in Sri Lanka with degree programs diversified to computing, business and engineering. In order to cater to its growing need of knowledge the institute maintains a Library Information System connecting Malabe, Metropolitan and Matara campuses. Each holds a latest collection of books and periodicals, particularly in the field of Information Technology, business management, engineering, general English, architecture and quantity surveying. The library of the Malabe Campus acts as the main resource center through which all library development activities are coordinated. SLIIT libraries are open to SLIIT students daily including weekends from 7.30 AM to 7.00 PM.

Tasks carried out at the library

- Add library materials
- Manage Library membership
- borrow books
- return books
- Pay fine on overdue materials
- Refund library deposit
- Replace lost library material
- Search library materials
- Generate reports

Next Lecture

Software Development Life Cycle Models