INTRODUCTION TO SOFTWARE ENGINEERING

LECTURE - 3

FEBRUARY 13, 2017

AGENDA

- **Information systems**
  - Components
  - Classes
  - Categories
- **Software Engineering**
  - Layers
  - Software process
  - Process framework
  - Practice
  - General principles
-

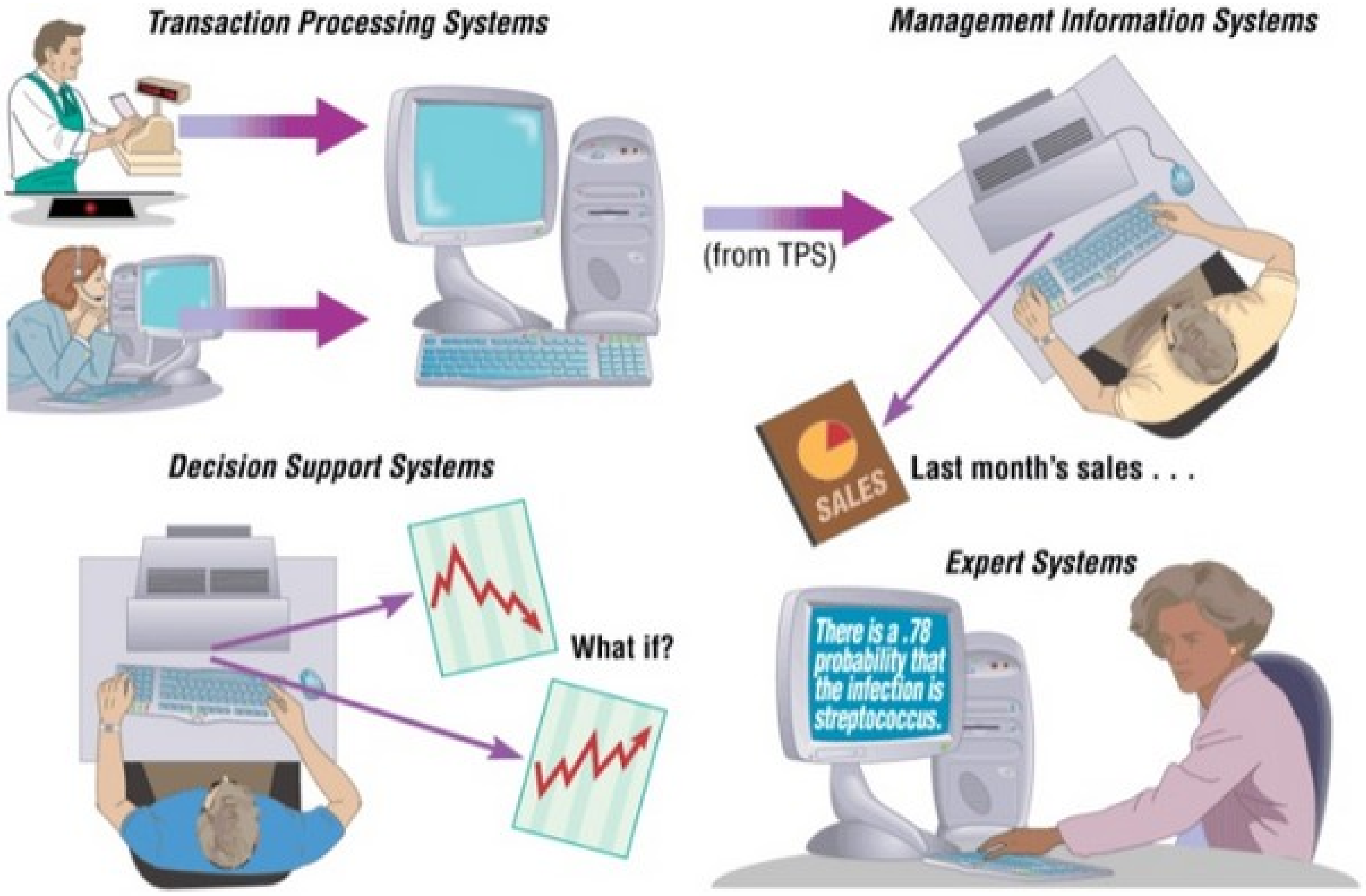
INFORMATION SYSTEMS

- **Software for specific business purposes to be used by others apart from developer(s)**
- **Software that helps to organize and analyse data**
  - General Purpose Information Systems
    - Database Management Systems (DBMS)
    - Electronic spreadsheets
  - Specialized Information Systems
    - ERP (Enterprise Resource Planning) systems
    - GIS (Geographical Information Systems)
- **The systems not only facilitate business operations but also may help decision making for the management**

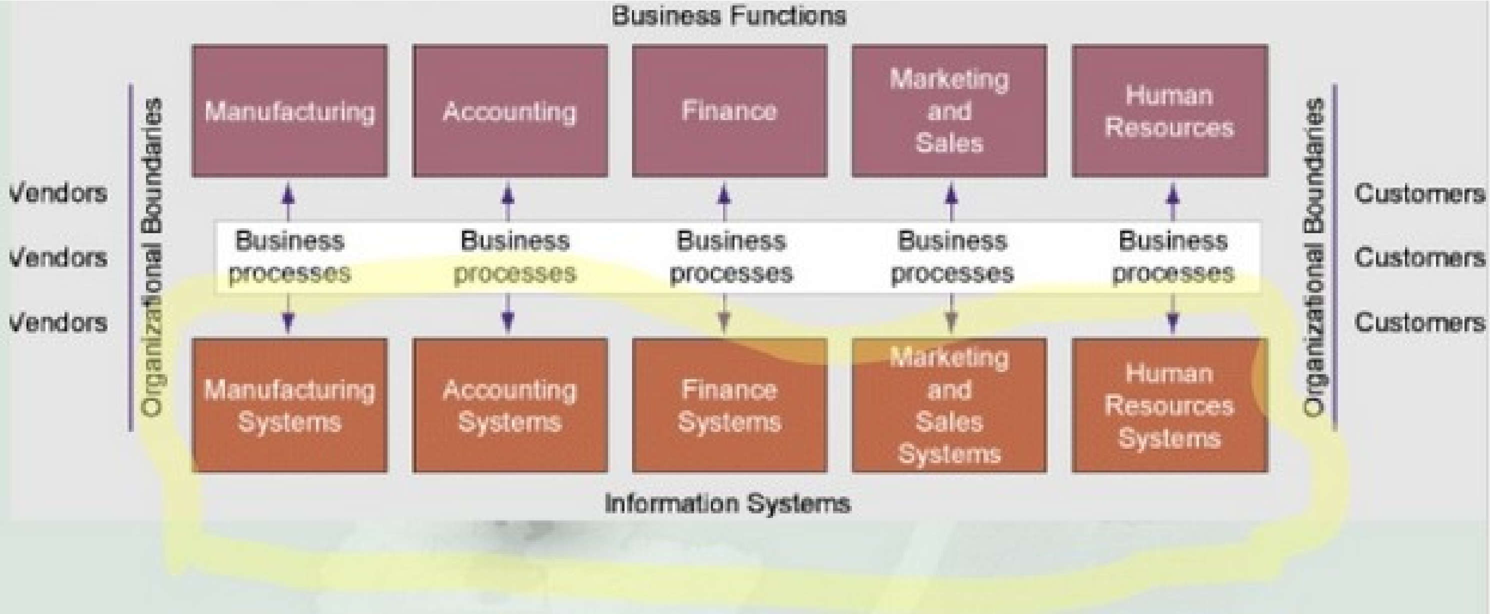
COMPONENTS OF INFORMATION SYSTEMS

- **An information system would typically have the following components**
  - Hardware
  - Software
  - Databases
  - Network
  - Procedures

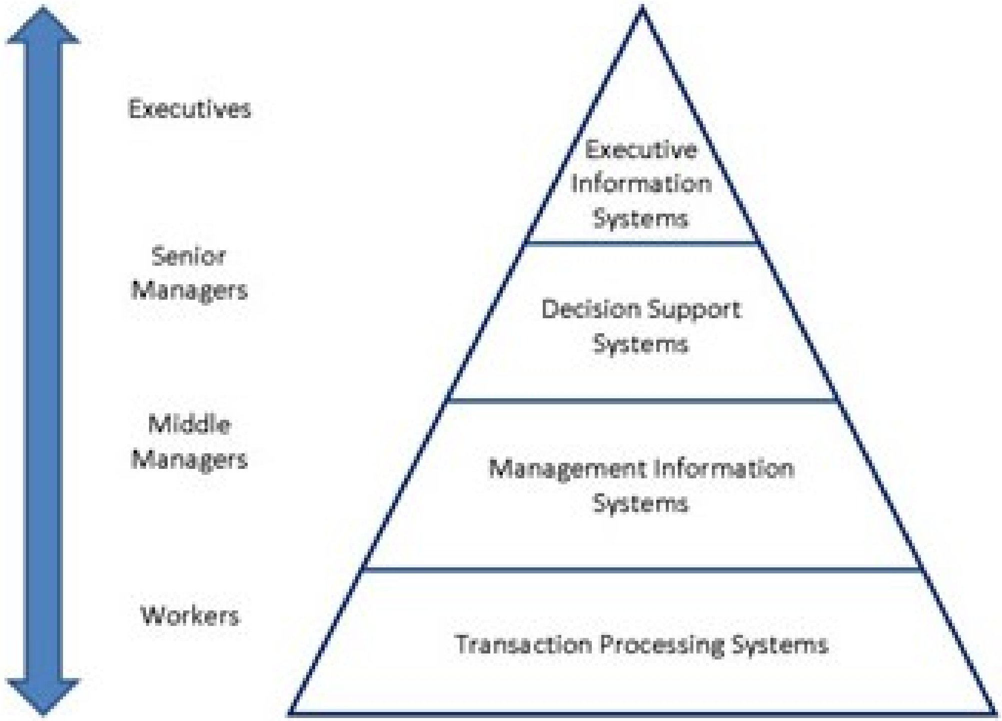
CLASSES OF INFORMATION SYSTEM


Transaction Processing Systems
Management Information Systems
(from TPS)
SALES
Last month's sales . . .
Decision Support Systems
What if?
Expert Systems
There is a .78 probability that the infection is streptococcus.

TRADITIONAL VIEW



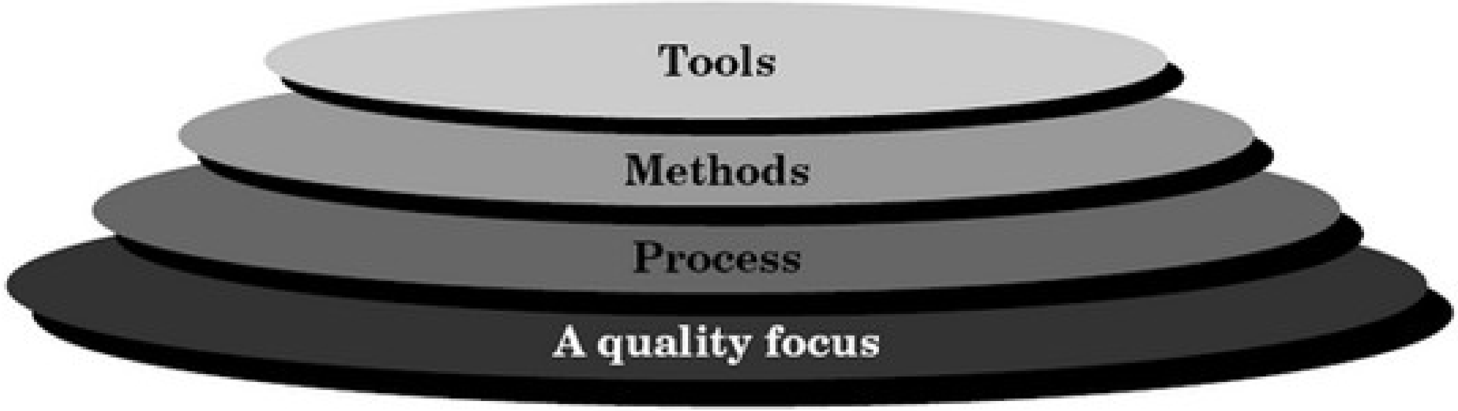
CATEGORIES OF INFORMATION SYSTEMS


Executives
Senior Managers
Middle Managers
Workers
Executive Information Systems
Decision Support Systems
Management Information Systems
Transaction Processing Systems

SOFTWARE ENGINEERING

LAYERS OF SOFTWARE ENGINEERING

- **Software engineering is a layered technology**



LAYERS OF SOFTWARE ENGINEERING

- **The foundation for software engineering is the *process* layer**
- **The software engineering process is the glue that holds the technology layers together**
- **Process defines a framework that must be established for effective delivery of software engineering technology**
- **The software process forms the basis for management control of software projects**
  - Work products are produced
  - Milestones are established
  - Quality is ensured
  - Change is managed

LAYERS OF SOFTWARE ENGINEERING

- **Software engineering *methods* provide the technical how-to's for building software**
  - Methods encompass tasks that include
  - Communication
  - Requirements analysis
  - Design modeling
  - Program construction
  - Testing and support
- **Software engineering *tools* provide automated or semi-automated support for the process and the methods**

THE SOFTWARE PROCESS

- **A *process* is a collection of activities, actions, and tasks that are performed when some work product is to be created**
  - An *activity* is applied regardless of the application domain, size of the project
  - An *action* includes a set of tasks that produce a major work product; e.g. an architectural model
  - A *task* focuses on a small but well-defined objective that produces a tangible outcome; e.g. conducting a unit test
- **A process is not a rigid remedy. Rather, it is an adaptable approach**
  - It enables people to pick and choose the appropriate actions of work and tasks

THE PROCESS FRAMEWORK

- **A *process framework* establishes the foundation for a complete software engineering process by identifying a small number of framework activities that are applicable to all software project**
- **A generic process framework encompasses five activities**
  - Communication
  - Planning
  - Modeling
  - Construction
  - Deployment

THE PROCESS FRAMEWORK

- **Umbrella activities**
  - Software project tracking and control
  - Risk management
  - Software quality assurance
  - Technical reviews
  - Measurement
  - Software configuration management
  - Reusability management
  - Work product preparation and production

SOFTWARE ENGINEERING PRACTICE

- **The essence of software engineering practice:**
  - Understand the problem
  - Plan a solution
  - Carry out the plan
  - Examine the result for accuracy

GENERAL PRINCIPLES

- **The reason it all exists**
- **Keep it simple**
- **Maintain the vision**
- **What you produce, others will consume**
- **Be open to the future**
- **Plan ahead for reuse**
- **Think**

Q&A