

# Computing

Lecture # 02

# Five sub-disciplines of the *computing* field:

- Computer Science,
- Computer Engineering,
- Information Systems,
- Information Technology, and
- Software Engineering.

# Sub-disciplines of computing

## Computer Science (CS):

- Computer science or computing science is the scientific and practical approach to computation and its applications.
- A computer scientist specializes in the theory of computation and the design of computational systems.
- Its subfields can be divided into practical techniques for its implementation and application in computer systems and purely theoretical areas.
- focus on the challenges in implementing computations such as programming language theory , computer programming and complex systems, human-computer interaction etc.

# Sub-disciplines of computing

## Computer Engineering:

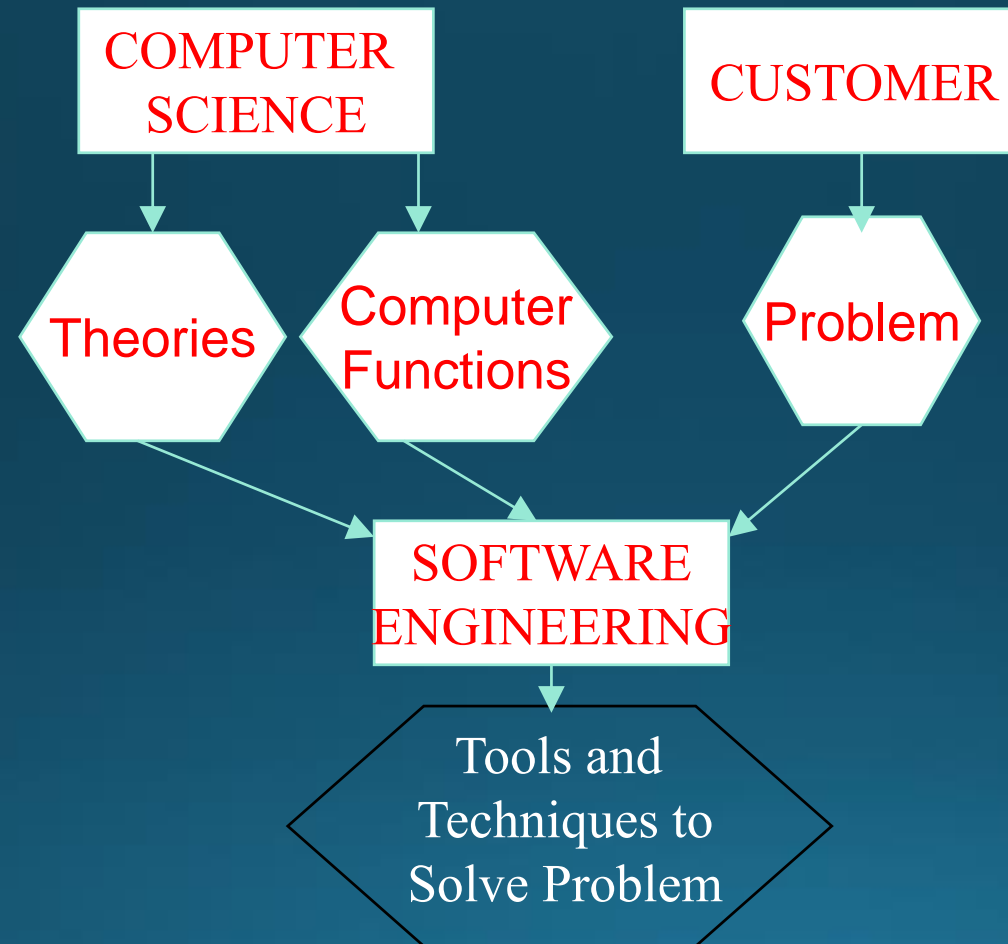
- Computer engineering is a discipline that integrates several fields of electrical engineering and computer science required to develop computer hardware and software.
- Computer engineers usually have training in electronic engineering (or electrical engineering), software design, and hardware-software integration instead of only software engineering or electronic engineering.
- Computer engineers are involved in many hardware and software aspects of computing, from the design of individual microprocessors, personal computers, and supercomputers, to circuit design.
- This field of engineering not only focuses on how computer systems themselves work, but also how they integrate into the larger picture.

# Sub-disciplines of computing

## Software Engineering (SE):

- Software engineering (SE) is the application of a systematic, disciplined, measurable approach to the design, development, operation, and maintenance of software, and the study of these approaches; that is, the application of engineering to software.
- The first reference to the term is the 1968 NATO Software Engineering Conference and was meant to provoke thought regarding the perceived "software crisis(**difficulty of writing useful and efficient computer programs in the required time** )" at the time.
- The generally accepted concepts of Software Engineering as an engineering discipline have been specified in the Guide to the Software Engineering Body of Knowledge (SWEBOK) that is an internationally accepting standard.

# Software Engineering vs. Computer Science



# Sub-disciplines of computing

## Information Technology (IT):

- Information technology (IT) is the application of computers and telecommunications equipment to store, retrieve, transmit and manipulate data, often in the context of a business or other enterprise.
- The term is commonly used as an alternative word for computers and computer networks, but it also involves other information distribution technologies such as television and telephones.
- Several industries are associated with information technology, such as computer hardware, software, electronics, semiconductors, internet and telecom equipment, e-commerce and computer services.

# Sub-disciplines of computing

## Information System (IS):

- "Information systems" is the study of complementary networks of hardware and software that people and organizations use to collect, filter, process, create, and distribute data.
- The study bridges business and computer science using the theoretical foundations of information and computation to study various business models and related algorithmic processes within a computer science discipline.
- **Computer Information System(s) (CIS)** is a field studying computers and algorithmic processes, including their principles, their software and hardware designs, their applications, and their impact on society while IS emphasizes functionality over design such as MIS, AIS, DSS etc.

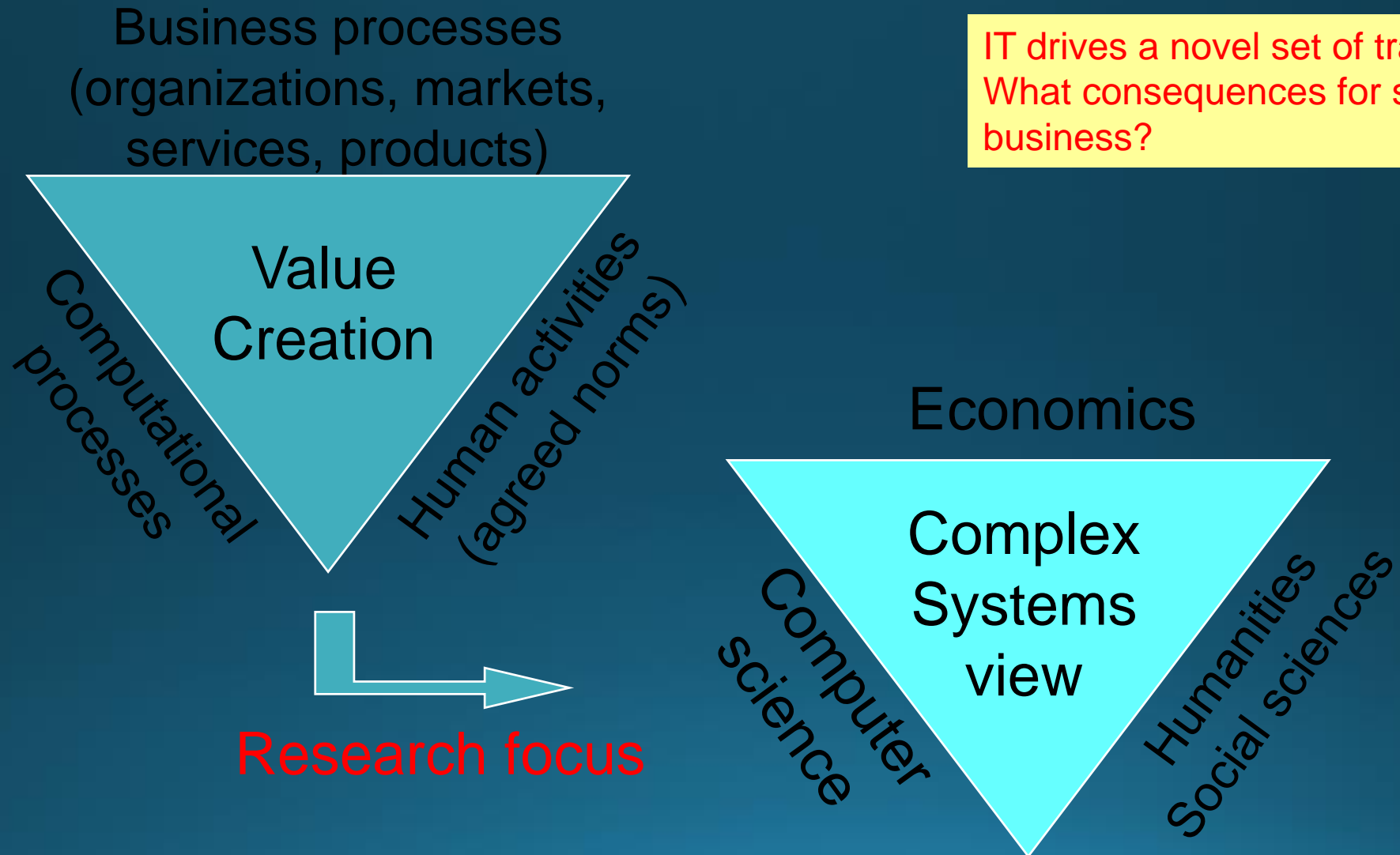


## System Administrator:

- Systems administrator, is a person employed to maintain and operate a computer system and/or network.
- The duties of a system administrator are wide-ranging and vary widely from one organization to another.
- System administrators are usually charged with installing, supporting and maintaining servers or other computer systems, and planning for and responding to service outages and other problems.
- Other duties may include scripting or light programming, project management for systems-related projects, supervising or training computer operators, and being the consultant for computer problems beyond the knowledge of technical support staff.

# How CS/IT reshapes business?

## Bridging human and computational processes



# Towards “Service Science”

