Vietnam National University HCMC
INTERNATIONAL UNIVERSITY

Lecture 1: Introduction

IT064IU - INTRODUCTION TO COMPUTING

LECTURER: ASSOC. PROF. VO THI LUU PHUONG

Contents

- **Computing systems**
- Majors in ITIU
- Course introduction

Computing systems

Data center

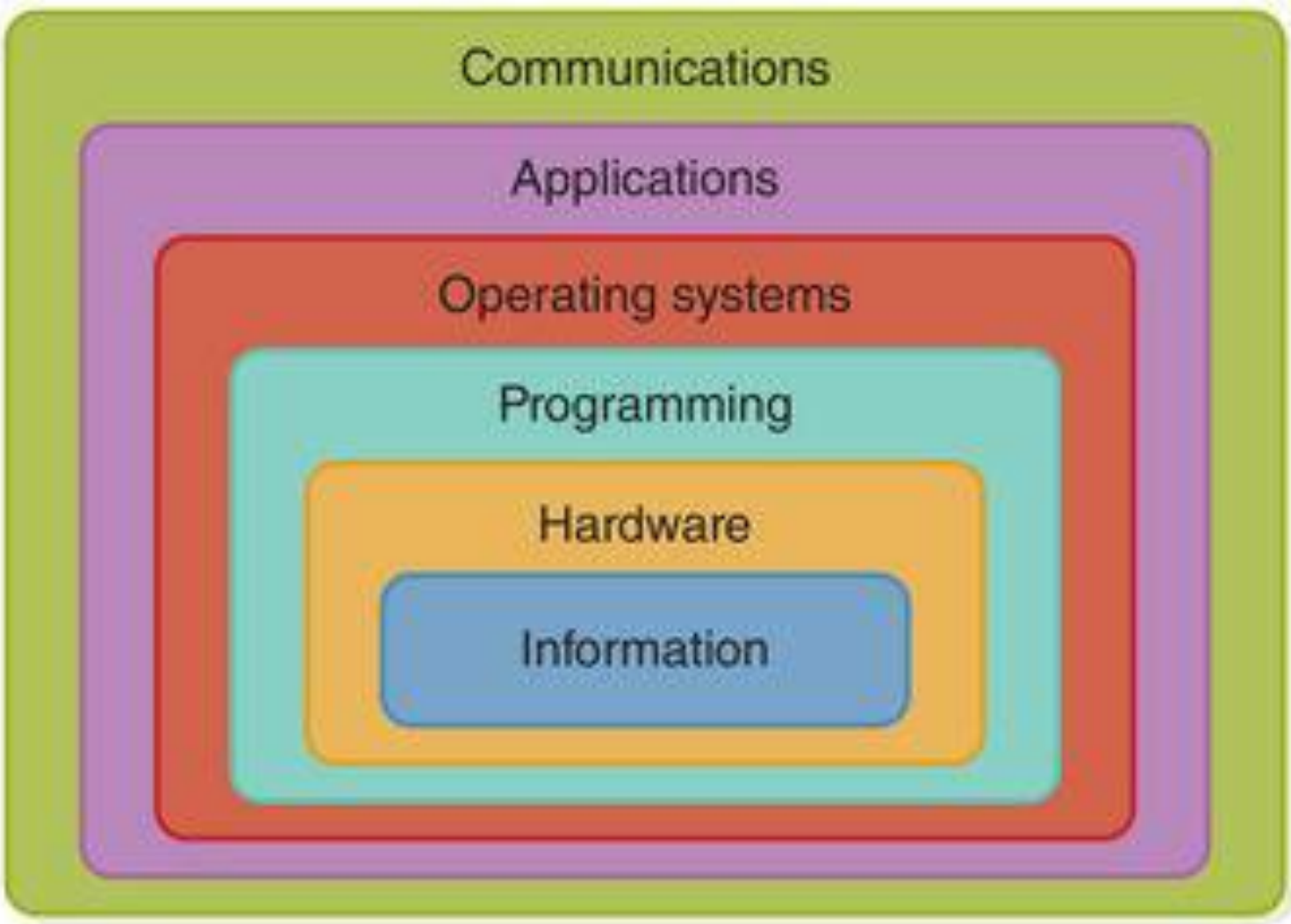
Smart blood pressure meter

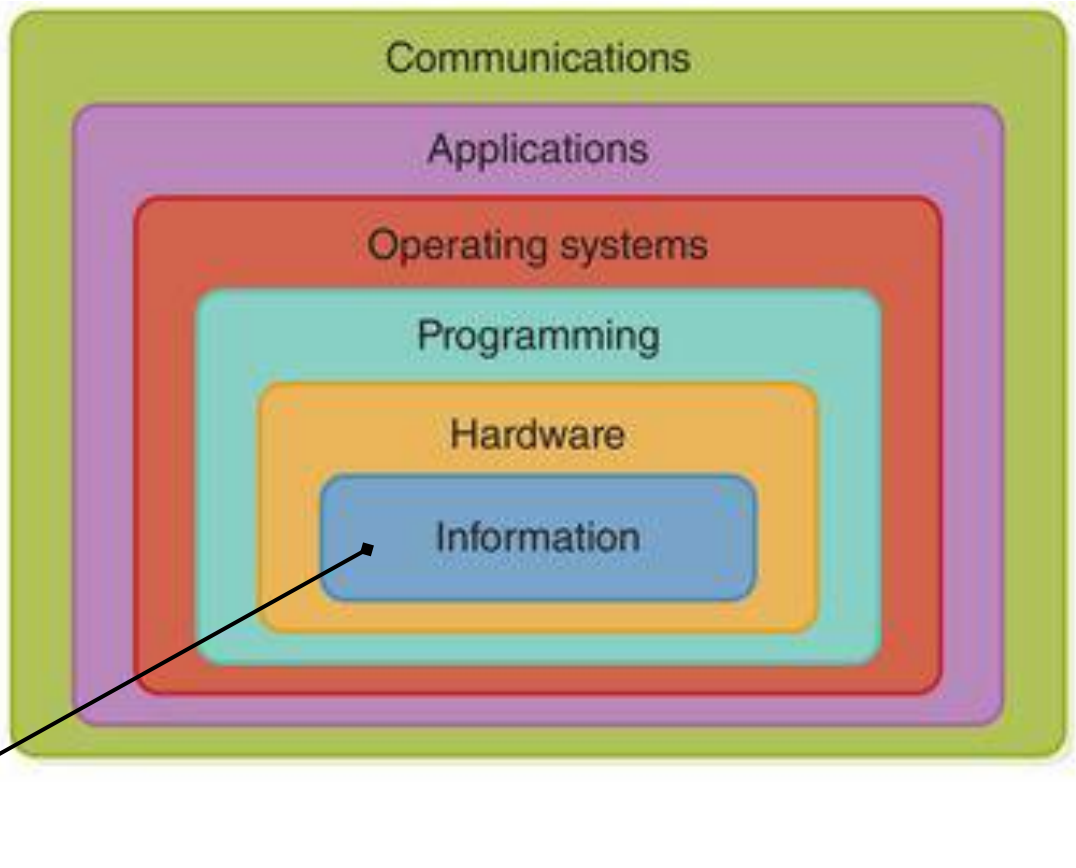
Personal computer (desktop, laptop)

A Computing System

- **Hardware**: The physical elements of a computing system (circuit boards, wires, keyboard,…)
- **Software**: The programs that provide the instructions for a computer to execute
- **Data:** information

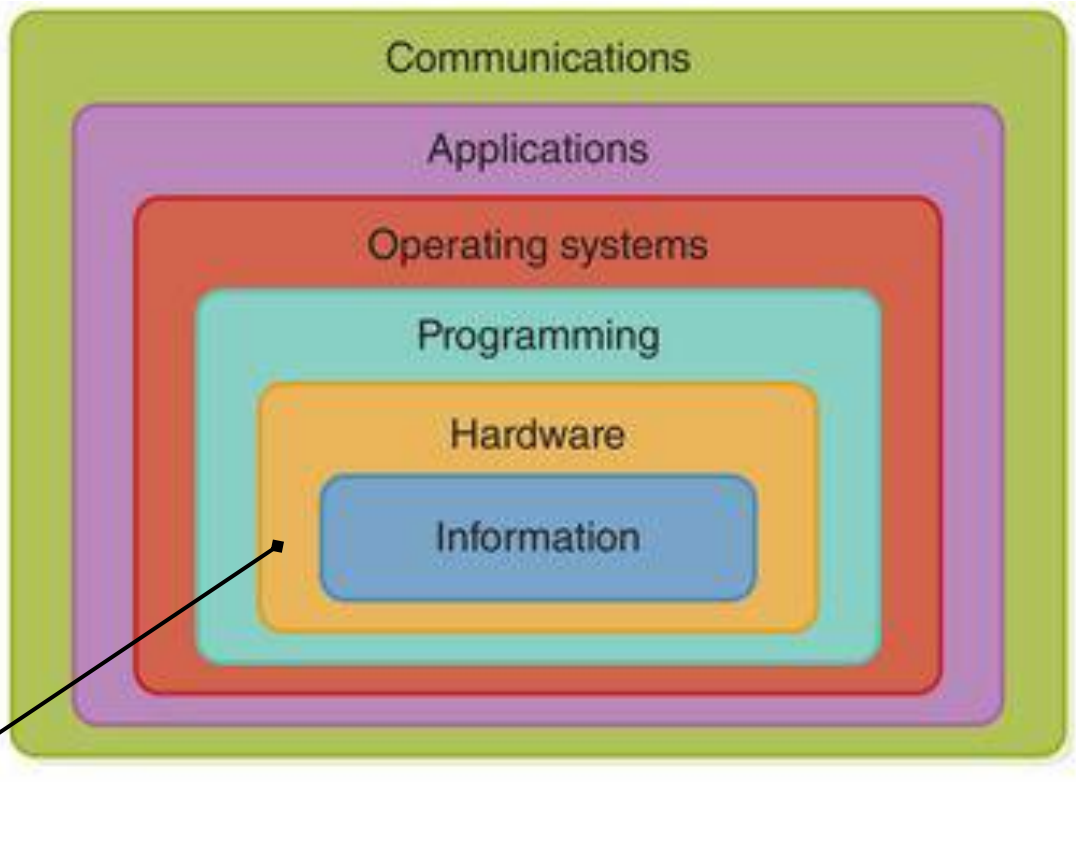
Layers in a computing system





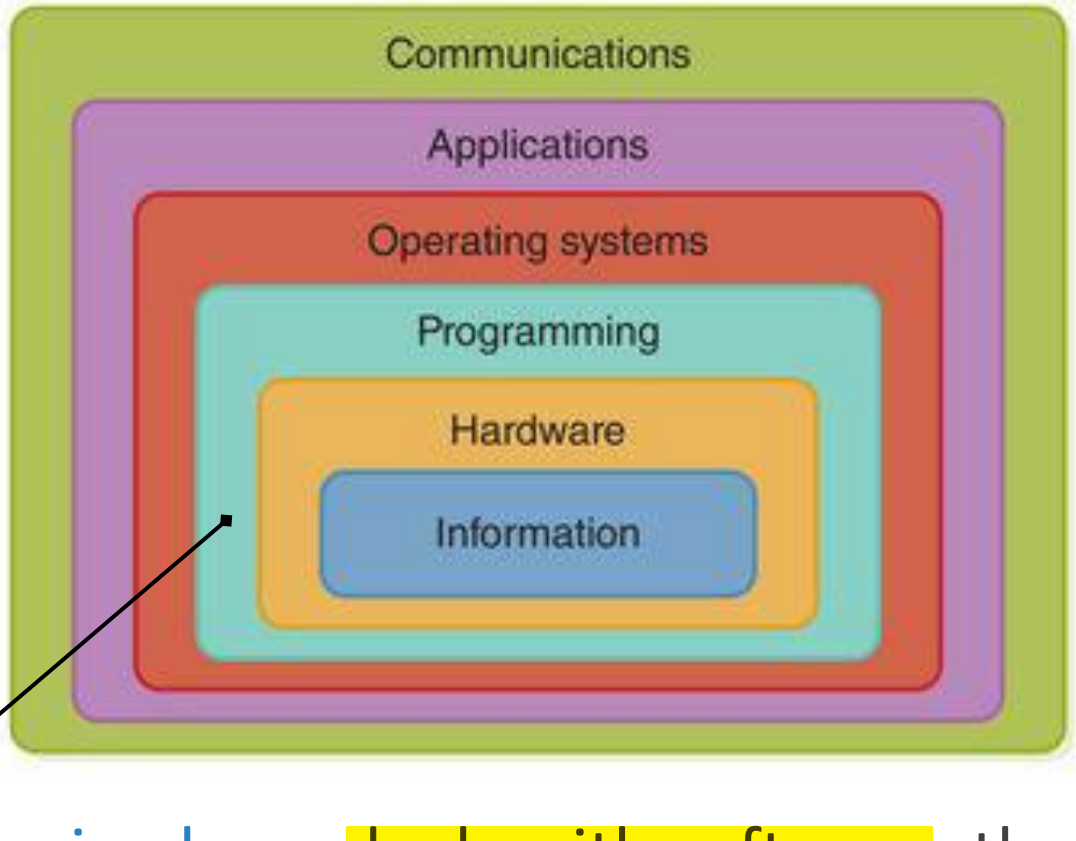
Information layer reflects the way to represent information on a computer

- Bits, bytes, …
- Chapters 2 and 3



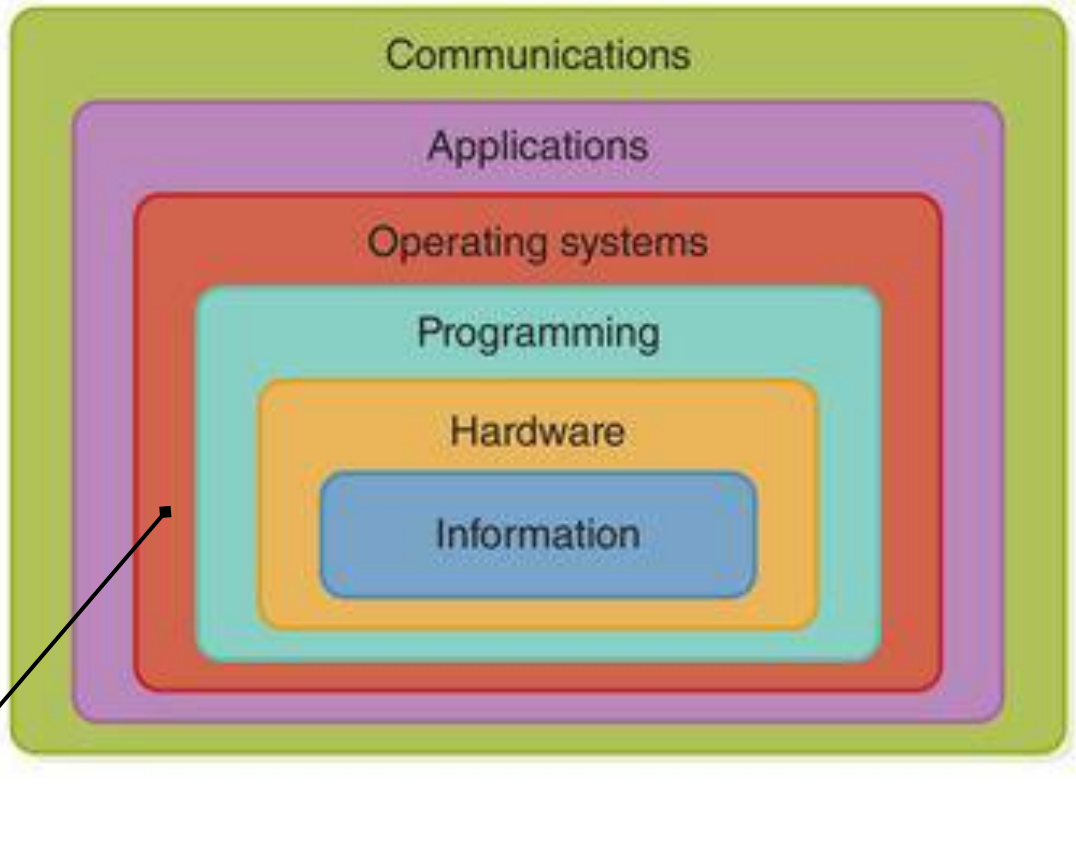
Hardware layer consists of the physical hardware of a computing system

- Logic gates, circuit, CPU, memory,...
- Chapters 4 and 5



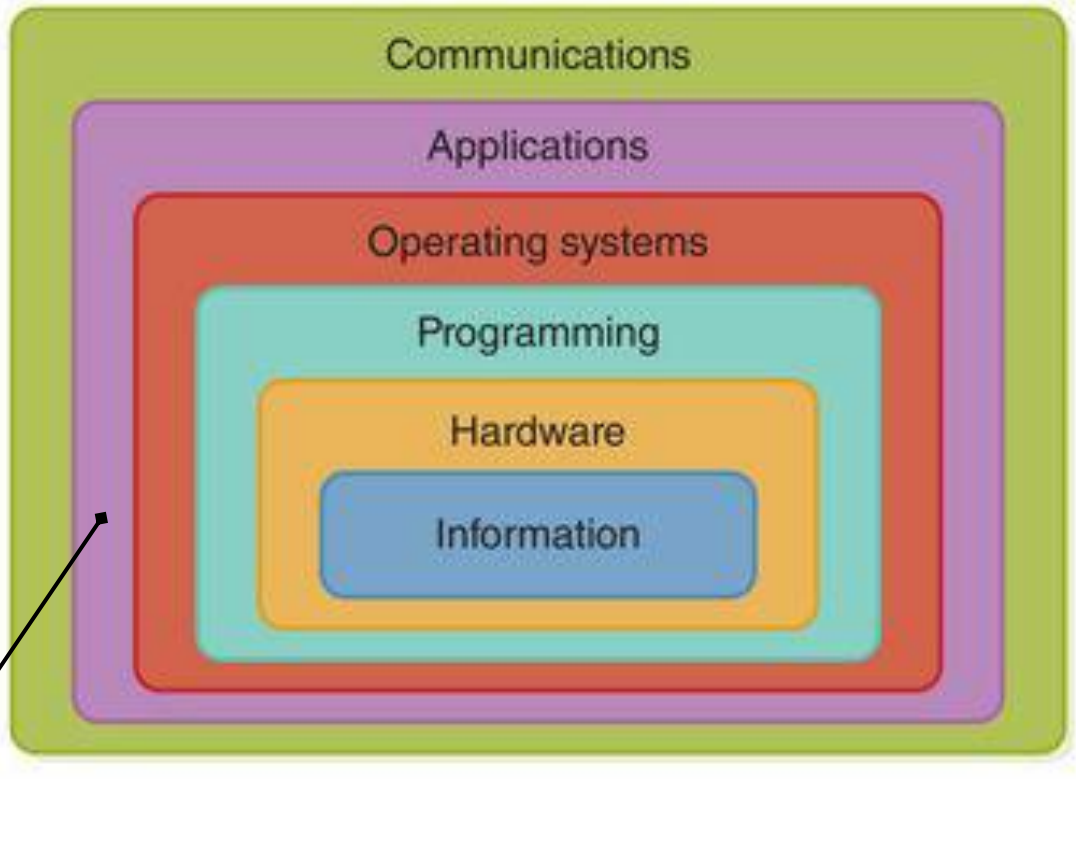
Programming layer deals with software, the instructions used to accomplish computations and manage data

- Low-level programming languages, high-level programming languages,…
- Chapters 6-9



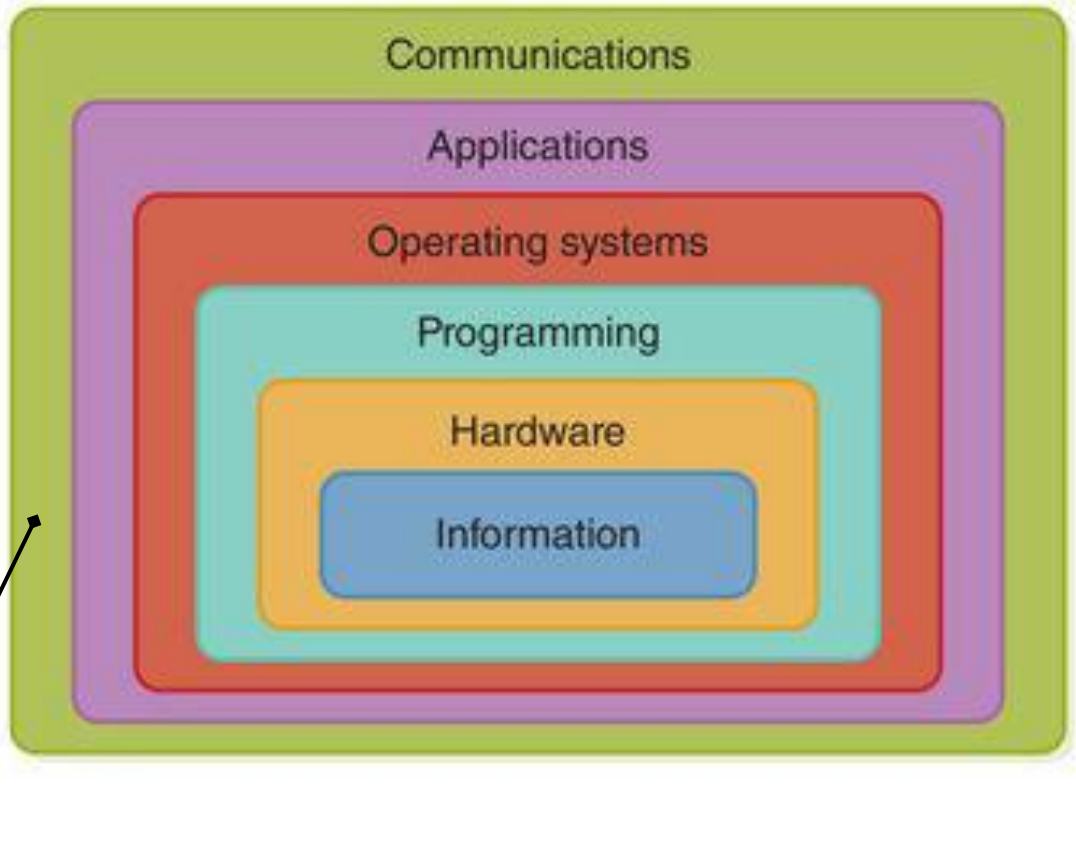
Operating system (OS) manages the computer's resources

- Components in an operating system, files and directories...
- Chapters 10, 11



Applications layer focuses on using the computer to solve specific real-world problems

- WWW, e-mail, artificial intelligent applications,…
- Chapters 12-14



Communications layer is responsible for communication between computing systems

- Computer networks, Internets, Bluetooth, WiFi,…

- Chapters 15, 16

Abstraction

- **Information hiding:** technique for isolating program pieces by eliminating the ability for one piece to access the information in another
- **Abstraction:** a model that hides complex details
  - A driver doesn't need to know the car's engine in detail.
  - A high-level-programming-language programmer may not know details of logic gates, CPU, memory,… of the computer.

History of computing

Reading homework

Contents

- Computing systems
- **Course information**
- Majors in School of Computer Science and Engineering (SCSE)

Course Infomation

- Course title: Introduction to Computing (IT064IU), 03 credits
- Time:

  Tuesday: 8h00 – 10h30AM.
- Lecturer: Assoc. Vo Thi Luu Phuong, PhD

  Email: vtlphuong@hcmiu.edu.vn

  Use label **[IT064IU]** in the subject of the e-mails

References

Textbooks:

- "***Computer science: Illuminated***", 7th Edition by Nell Dale and John Lewis
- "***Computer Science: An Overview***", 13th Edition by J. Glenn Brookshear

References

- "***How to think like a computer scientist***"

Course Outline

1) Introduction
2) Information layer
3) Hardware layer
4) Programming layer
5) Operation system layer
6) Applications layer
7) Communications layer

Other topics:

- Computer graphics
- Artificial Intelligence (AI)

Grading

- Quizzes (3-5), essays (2), attendances: 30%
- Mid-term 30%
- Final exam 40%

Class rules

1) If you attend less than 20% of the classes, you will fail this course.

2) Class information, lecture slides, grades,… are posted on Blackboard

3) Plagiarism checking is applied for the homeworks ans essays

- Requirement: <25%

Contents

- Computing systems
- Course introduction
- **Majors in School of Computer Science and Engineering (SCSE)**

Computing as a Tool and a Discipline

A discipline is defined as a field of study. *E.g.*, topic areas of the Computing Discipline:

- Algorithms and Complexity
- Operating Systems
- Net-Centric Computing
- Programming Languages
- Human-Computer Interaction
- Graphics and Visual Computing
- Information Management
- Software Engineering
- Computer networks
- …

Core subjects

- C/C++
- Theoretical model in computing
- Object-oriented programming
- Computer networks
- Operating system
- Computer architecture
- Algorithm and data structures

Majors in ITIU: Computer Science

- Subjects:
  - Principle of programming languages
  - Data mining
  - Artificial Intelligent
  - Software engineering
  - …
  - https://it.hcmiu.edu.vn/

Natural Language Understanding: Chatbots

Valerie

ALICE: 2004 Loebner Prize winner

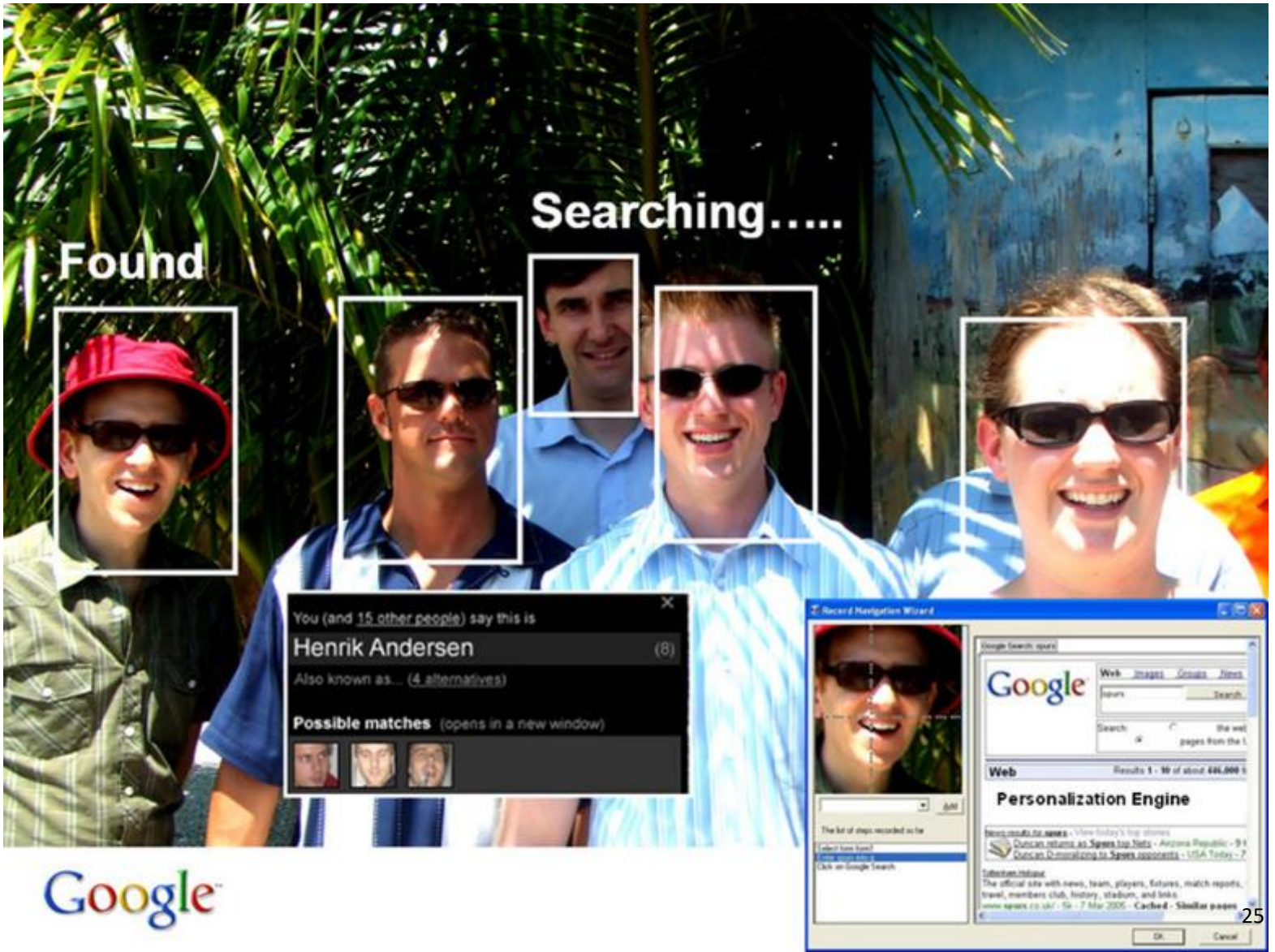
ELIZA: psychotherapist

Valerie: CMU Robot Receptionist

Natural language processing, pattern matching

Loebner Prize, awarded annually to best AI program

Face recognization



Artificial intelligent

https://www.youtube.com/watch?v=5Q14EjnOJZc

Majors in ITIU: Network Engineering

- Subjects:
  - Computer networks
  - Net-centric programming
  - Network and system administration
  - Network and system security
  - Scalable and distributed computing
  - Devops
  - …

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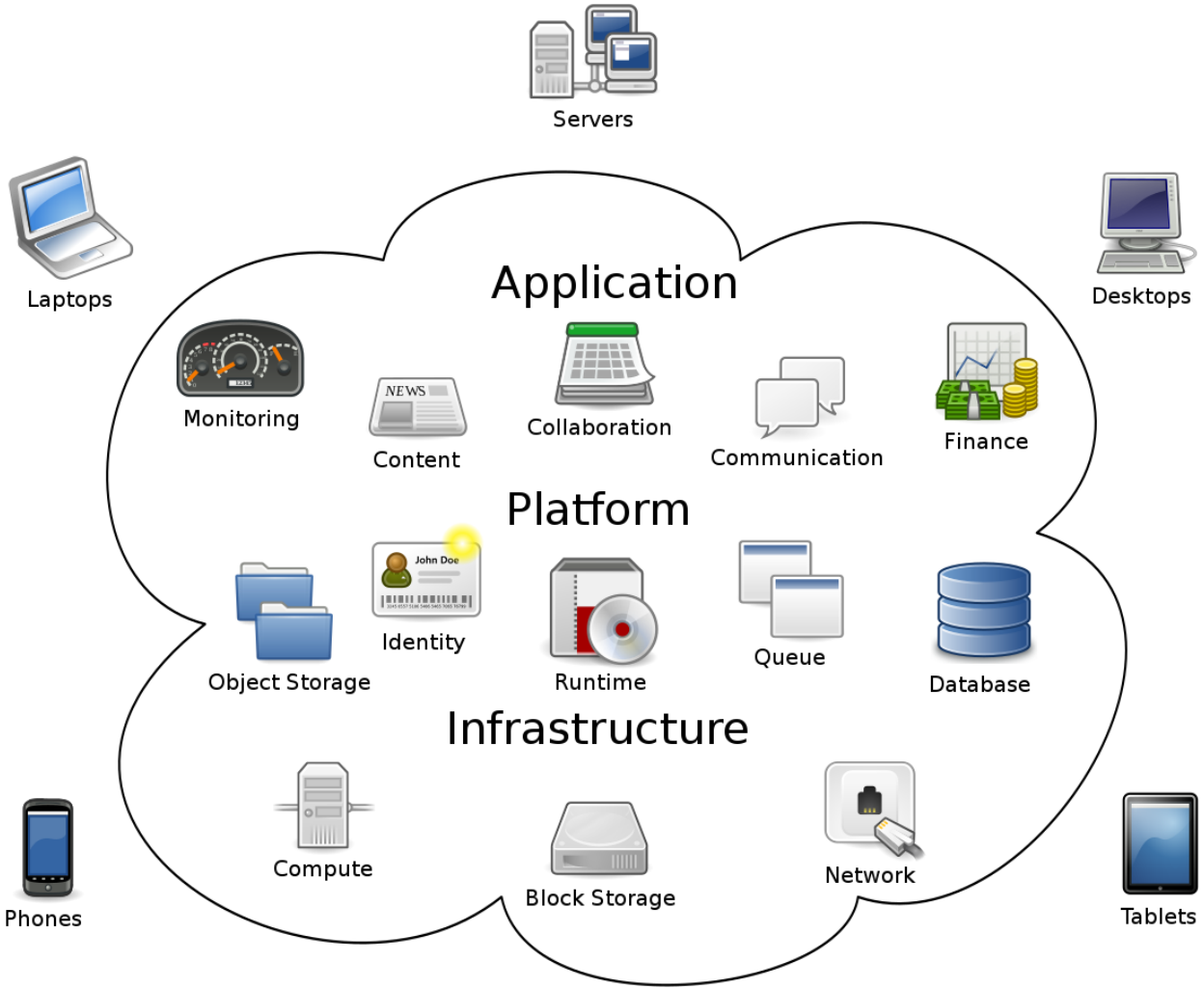
Cloud computing




NETWORK
SECURITY

Majors in ITIU: Computer Engineering

- Subjects:
  - Digital logic design
  - Computer architecture
  - Signal processing
  - Embedded system
  - Internet of things
  - Digital image prcessing
  - …

IoT applications

Smart Home

- Security & alarm
- Light control
- HVAC control
- Remote control
- Door control
- Energy efficiency
- Entertainment
- Appliances

Wearables

- Health monitor
- Fitness trackers
- Smart watch
- Smart glasses
- Smart bands
- E-textiles
- Hearing-aid

Smart City

- Traffic management
- Water distribution
- Waste management
- Security
- Lighting
- Environmental monitoring
- Parking sensor

Industry Automation

- Smart machine
- Surveillance camera
- Factory automation
- Asset tracking
- Logistics and optimization of supply chain

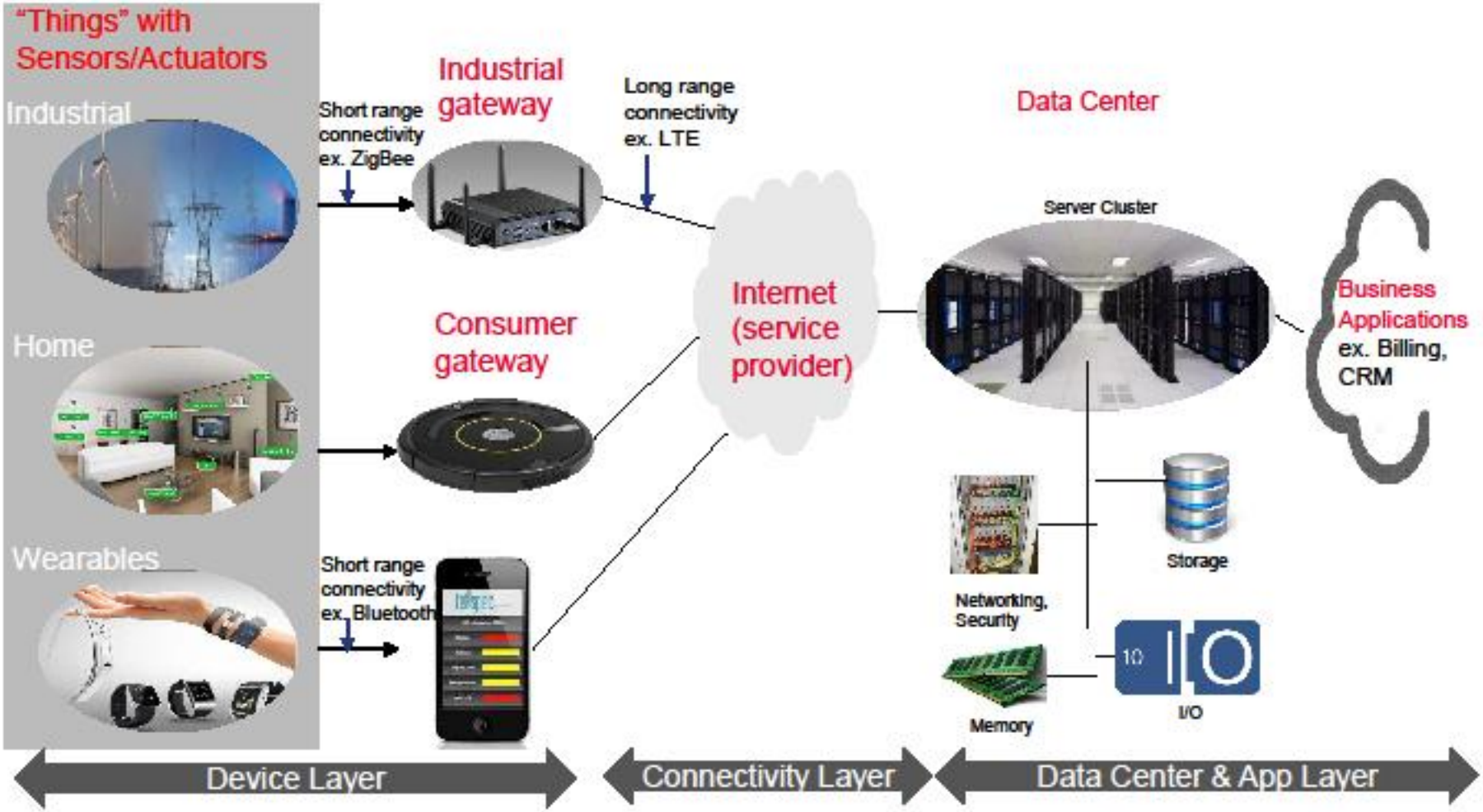
Smart Energy

- Generation & trading
- Transmission
- Distribution & metering
- Storage
- Services

Connected Car

- V2V / V2X /V2I communications
- eCall
- Infotainment
- Traffic control
- Navigation
- Autonomous vehicles
- Maintenance

Internet of Things Value Chain



Hardware programming

Science vs. Engineering

Science:

- Investigation, understanding, and discovery of nature, its composition, and its behavior (i.e., “laws of nature”)
- Why
- Build (experiments, tools, devices, etc.) to learn

Engineering:

- Manipulating the forces of nature to advance humanity
- How
- Learn to build products and services useful for humans, design under constraint

Q&A