



**HO CHI MINH CITY UNIVERSITY OF TRANSPORT  
FACULTY OF INFORMATION TECHNOLOGY  
SOFTWARE ENGINEERING DEPARTMENT**

# **CHAPTER 1 CAREERS IN INFORMATION TECHNOLOGY**



# Contents

1. IT in the Organization
2. IT as a Discipline
3. Development trends
4. Demand for IT human resources
5. Jobs and skills in IT
6. Career Opportunities for IT
7. Computer Ethics



# Prepare for Job in IT

## 1. Focusing Your Interest

- Decide if you're suited to IT
  - Use computer for more than just homework, games, and casually browsing the web ?
  - Work independently, solve problems on your own, push yourself to improve?
- Identify your passions and work with them
  - Software, game, design, web, network,...
- Get to know the right people



# Prepare for Job in IT

## 2. Getting Educated and Certified

- Search for educational opportunities, determine requirements of every job → college degrees, professional certifications
- Review your self-taught skills
- Get an internship in a reputable IT department

## 3. Seeking Your First Job

- Form curriculum vitae (CV) → send to company or post on job search and networking sites
- Apply with a broad focus
- Interview smart
- Keep honing your skills



# 1. IT in the Organization

- Many organizations have leveraged information technologies (IT) to advance their business goals, provide better services and products to their customers, or accelerate internal processes.
- **Information technology (IT)** is a term that includes software, the Internet, and computer systems used to create, process, store, retrieve, and exchange all kinds of data and information.
- The **IT industry** has become a key economic sector, playing a very important role for the sustainable development of the economy and society.
- Vietnam's IT sector is experiencing high growth, driven by low costs and high-quality labor.
- Vietnam has now become the eighth largest provider of IT services globally.



# The IT Function in the Organization

- **User Support**
  - IT professionals must provide various levels of support to enable employees to complete their tasks.
- **Data and Information Management**
  - IT professionals build systems to enable storage, retrieval, analysis, and effective use of organization data and information
- **Networks**
  - Support communication between the elements of an IT system
- **Systems Integration**
  - Different systems used by an organization often need to work together → IT professionals engage in complex activities to ensure the new product integrates with the organization's infrastructure ecosystem.



## 2. IT as a Discipline

- **Computing**
  - is generally understood as any activity using a computer to manage, process, or share information.
  - provides a wide range of professions a society needs.
- Four of the most commonly recognized computing disciplines include
  - Computer Engineering
  - Computer Science
  - Information Systems
  - Information Technology



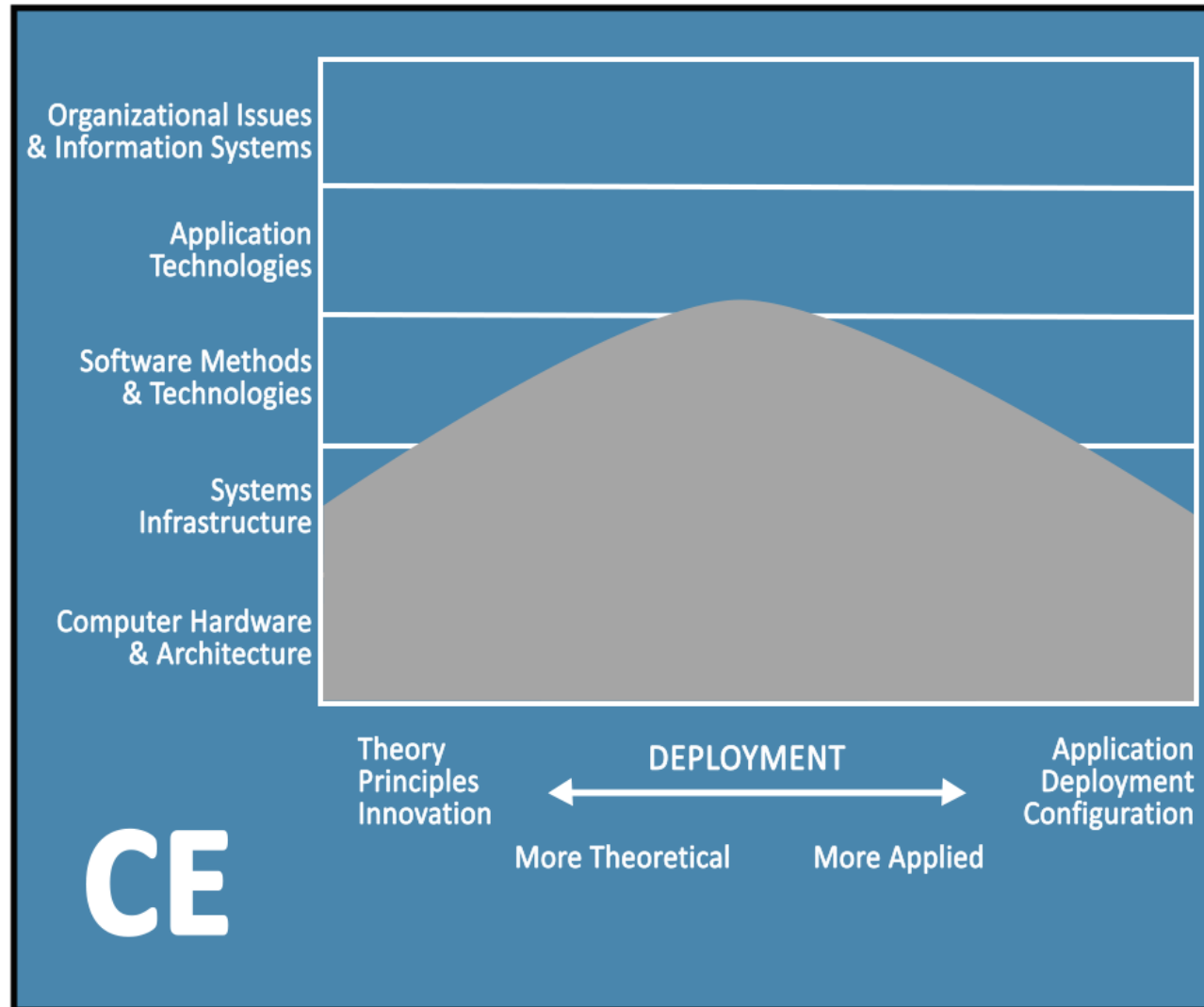
# Computer Engineering

- Focuses on the design of hardware systems and the software that makes them work.
- Writes drivers for peripheral devices, such as keyboards and printers
- Addresses the development of solutions that use computers embedded in other devices like alarm systems, refrigerators, or self-driving cars.





# The Computer Engineering Problem Space



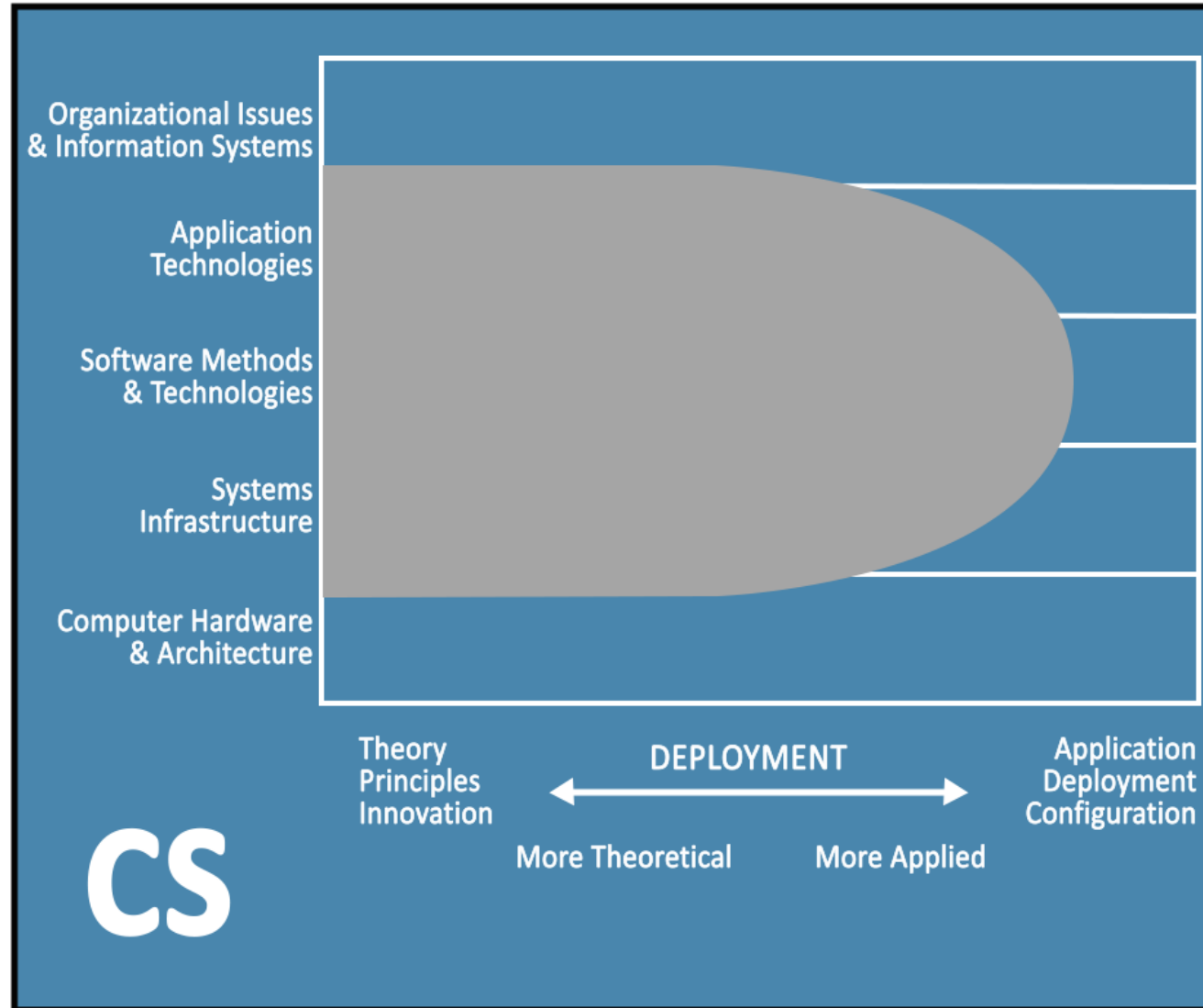


# Computer Science

- Addresses the design and implementation of software with an emphasis on developing effective ways to solve computing problems and creating new ways to use computers.
- Encompasses a range of computing-related tasks such as robotics, artificial intelligence, augmented reality, and designing algorithms to solve problems.



# The Computer Science Problem Space



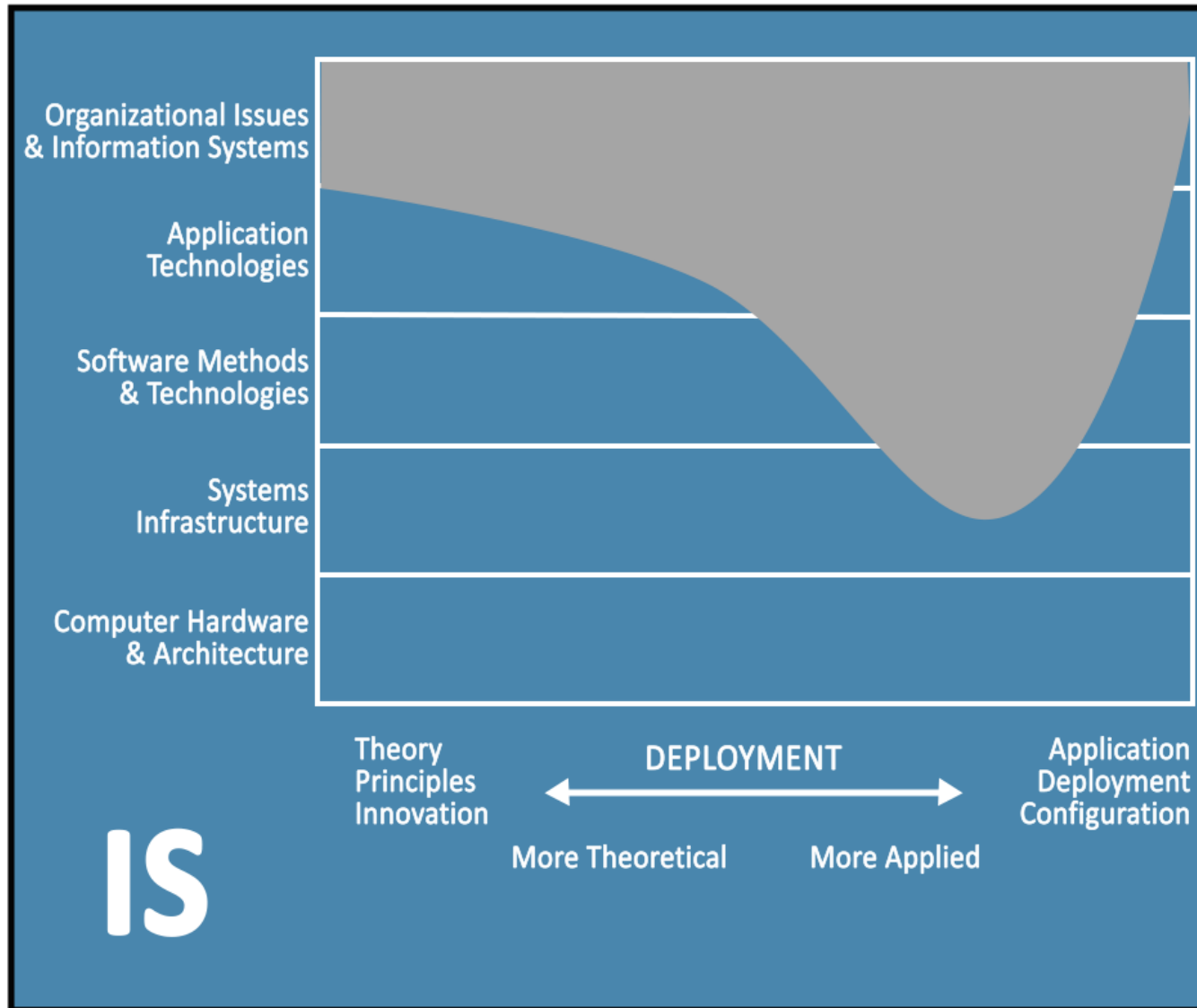


# Information Systems

- Integrate IT solutions meant to meet organizational business goals
- Addresses systems that generate, process, and distribute information, and support organizational communication and collaboration, their design, and their implementation.



# The Information Systems Problem Space



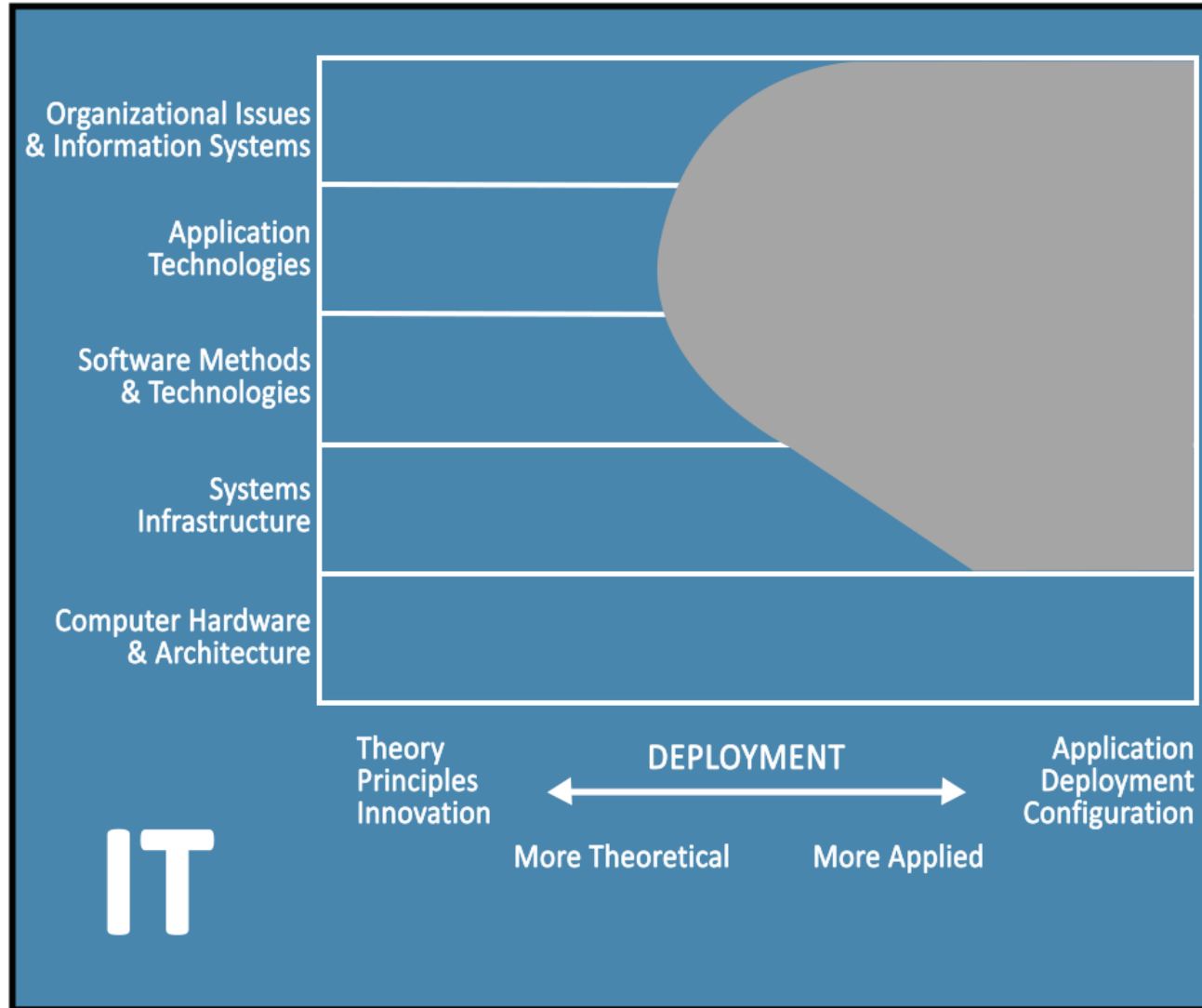


# Information Technology

- Focuses more on the technology supporting information systems in an organization rather than the information residing on them or being communicated with them.
- IT responds to the practical needs of the organization, including reliable and secure solutions that are appropriately maintained, updated, or replaced.



# The Information Technology Problem Space





# 3. Development trends



## 1. Artificial Intelligence/Machine Learning

Artificial intelligence leverages computers and machines to mimic the problem-solving and decision-making capabilities of the human mind.

**Example:** Chatbots use AI to understand customer problems faster and provide more efficient answers. Recommendation engines can provide automated recommendations for TV shows based on users' viewing habits.

## 2. Cloud Computing

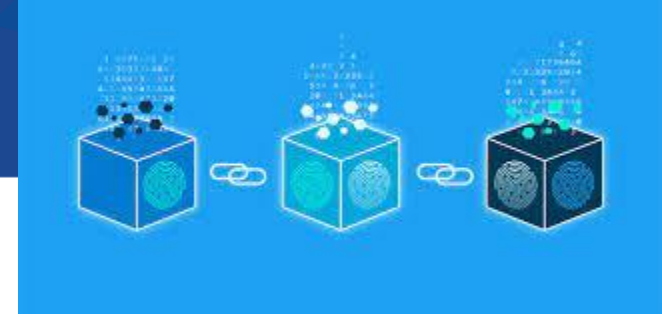
Cloud computing is the delivery of computing services—including servers, storage, databases, networking, software, analytics, and intelligence—over the Internet (“the cloud”) to offer faster innovation, flexible resources, and economies of scale.

Types of cloud services: IaaS, PaaS, serverless, and SaaS





# Development trends



## 3. Big Data Analytics

The use of advanced analytic techniques against very large, diverse data sets that include structured, semi-structured and unstructured data, from different sources, and in different sizes from terabytes to zettabytes.

## 4. Blockchain

A blockchain is essentially a distributed database of records or public ledger of all transactions or digital events that have been executed and shared among participating parties. Each transaction in the public ledger is verified by consensus of a majority of the participants in the system. And, once entered, information can never be erased. The blockchain contains a certain and verifiable record of every single transaction ever made.



# Development trends



## 5. Cyber Security

Cyber security is the application of technologies, processes, and controls to protect systems, networks, programs, devices and data from cyber attacks.

## 6. Internet Of Things (IoT)

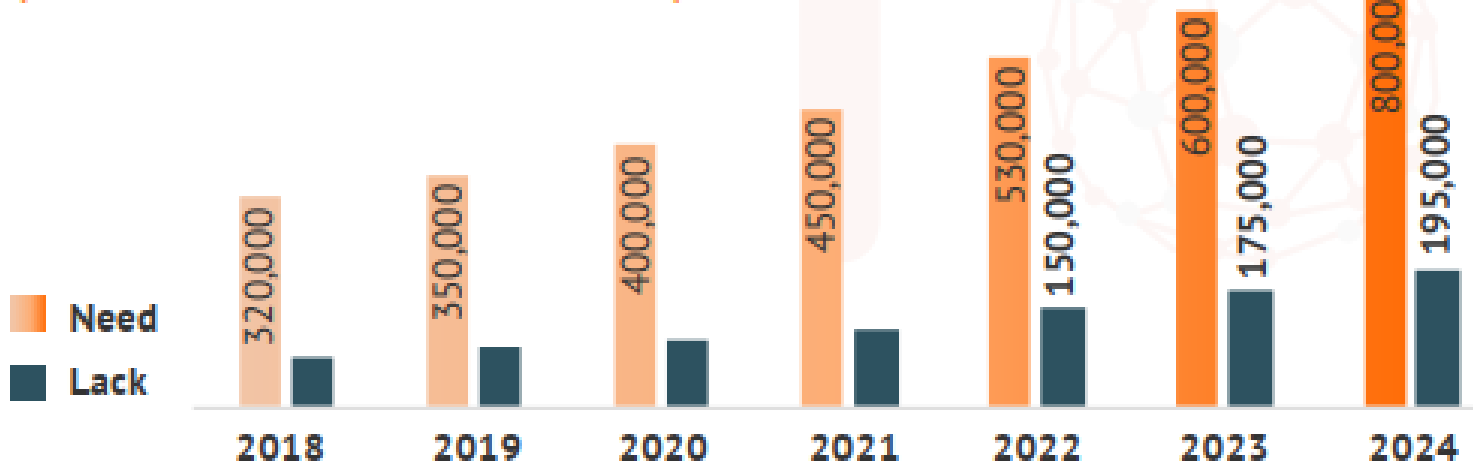
IoT describes the network of physical objects—“things”—that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet. These devices range from ordinary household objects to sophisticated industrial tools.



## 4. Demand for IT human resources

- Vietnam is having a promising IT human resource in both quality and quantity → The advantage of **an ideal software outsourcing destination**

**IT PERSONNELS DEMAND IN VIETNAM 2018 - 2024  
(SOFTWARE INDUSTRY ONLY)**

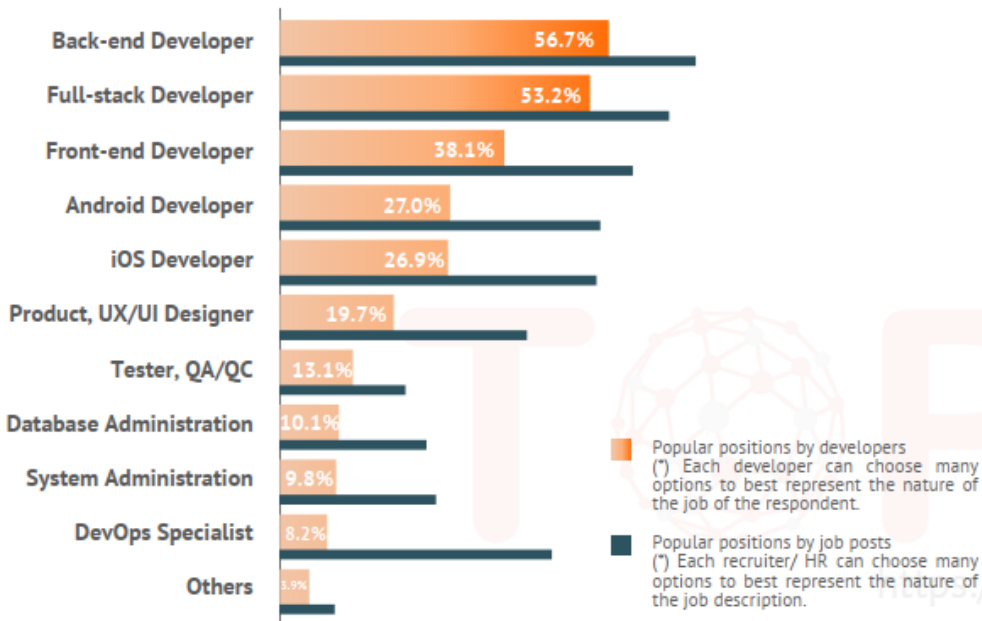


Source: TopDev

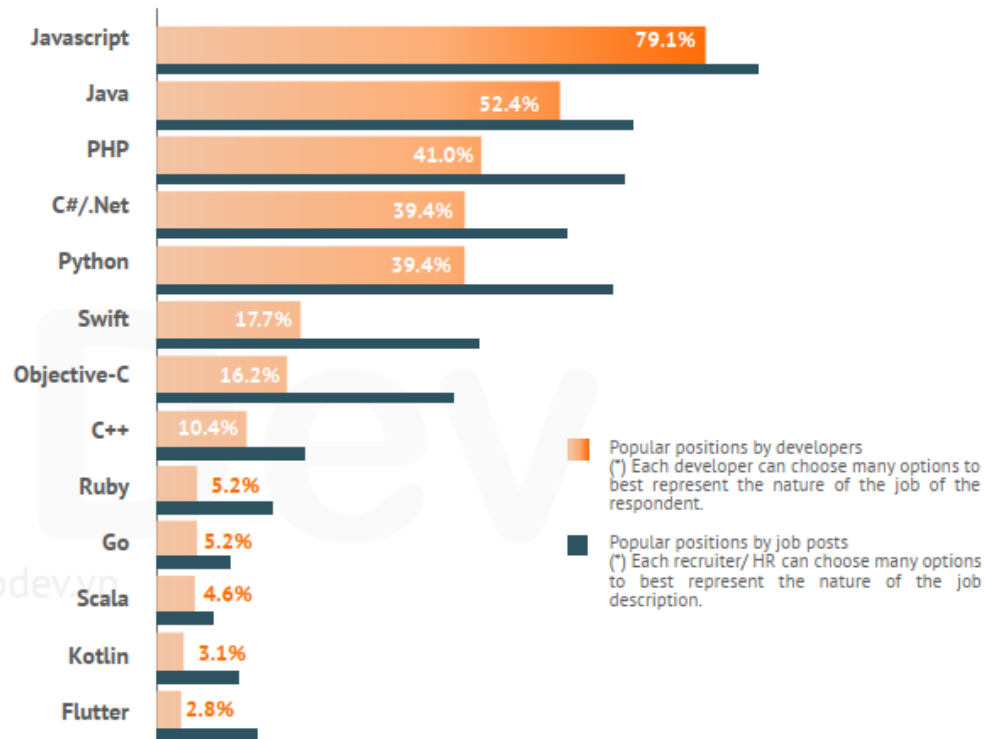


# Demand for IT human resources

## THE MOST POPULAR VS ON-DEMAND IT JOBS?



## THE MOST POPULAR VS ON-DEMAND TECH STACKS?



Source: TopDev



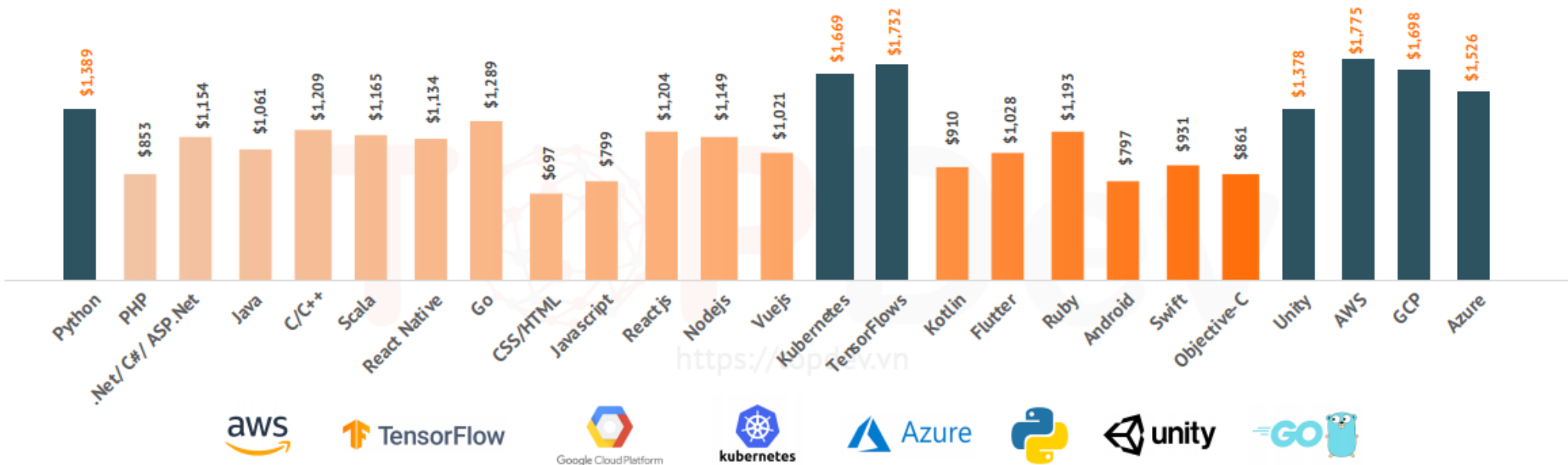
# Demand for IT human resources

## DEVELOPER SALARY BY TECHNOLOGIES

(relatively up to 3 years of experience working in specific technology)

[Unit: USD]

Note: All salary data stated in this page refers to monthly gross salary before tax and excludes other benefits like overtime, bonus, etc.



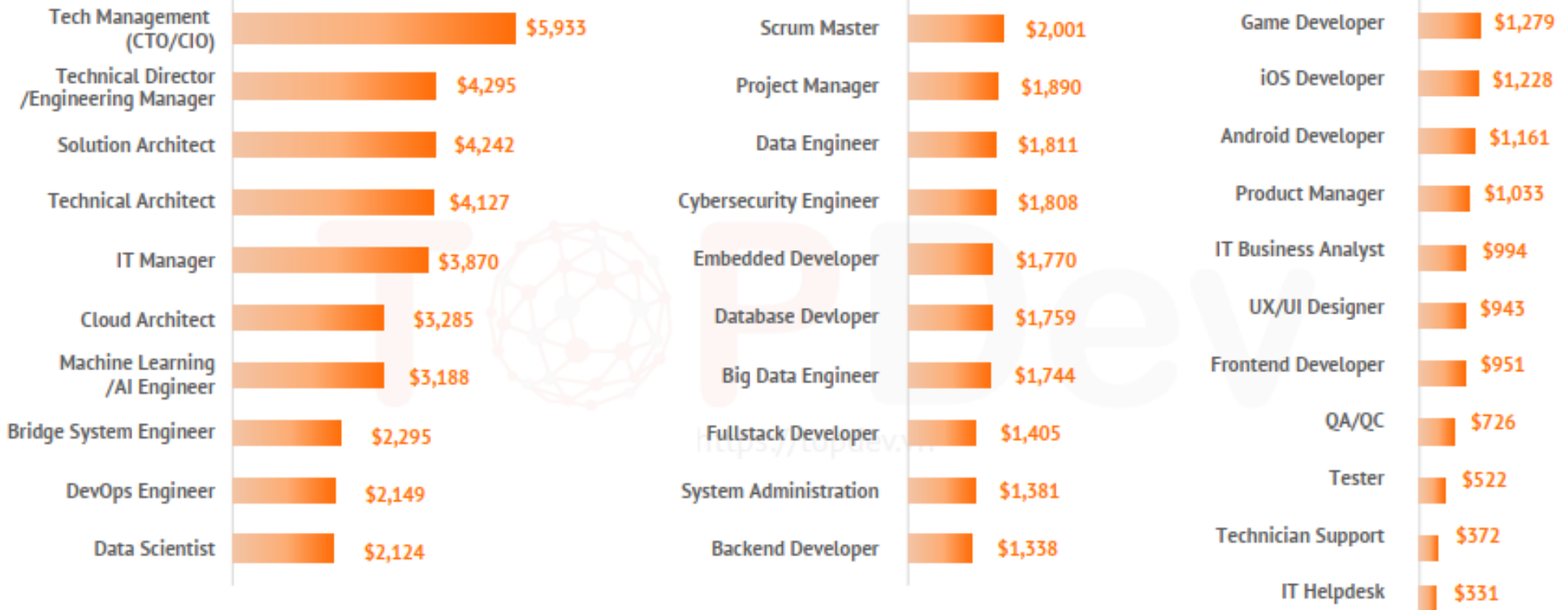
Source: TopDev



# Demand for IT human resources

## DEVELOPER SALARY BY POSITIONS IN IT INDUSTRY (relatively up to 3 years of experience working in specific technology)

[Unit: USD]  
Note: All salary data stated in this page refers to monthly gross salary before tax and excludes other benefits like overtime, bonus, etc.



Source: TopDev



# 5. Jobs and skills in IT

Software  
Engineer

System  
Analyst

Web  
Developer

User  
Interface  
Designer

Network  
Engineer

Information  
Security  
Analyst

Software  
Tester

Database  
Administrator

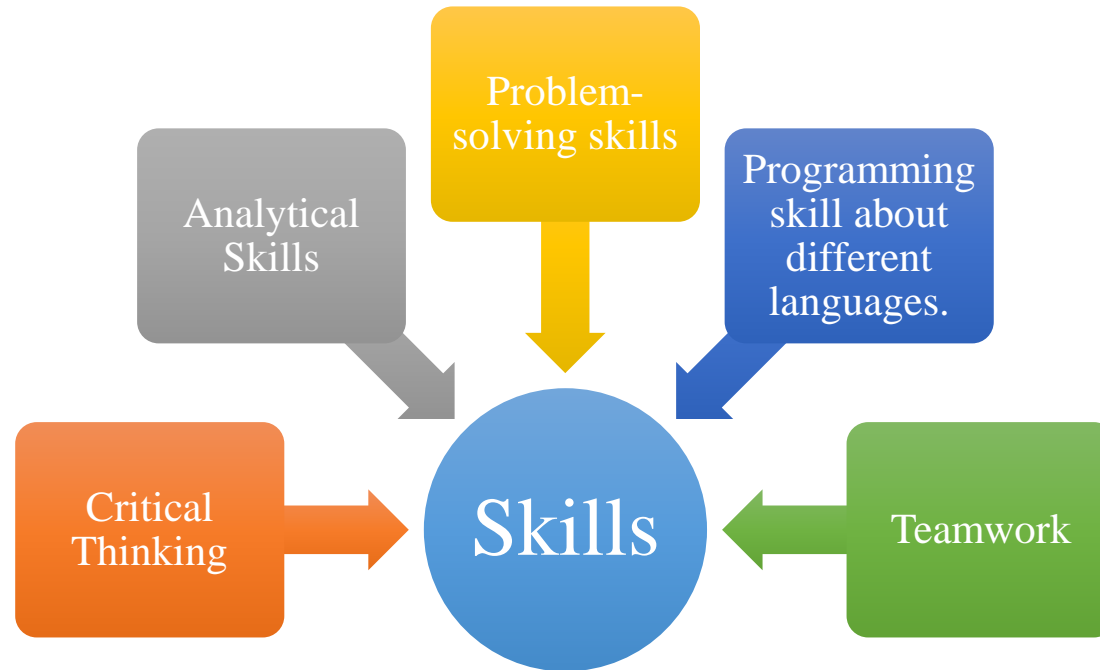
Data Scientist



# Software Engineer

- **Description:**

- Analyze, design, develop, test software



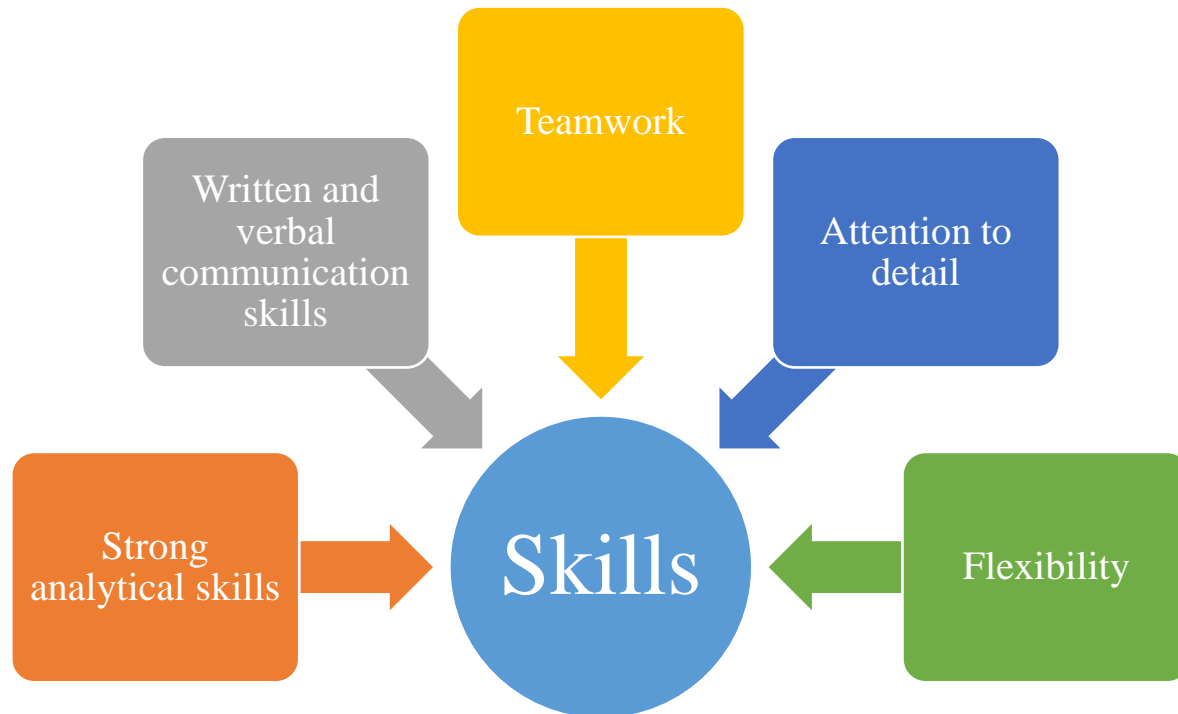




# System Analyst

- **Description:**

- Analyse software, hardware and the wider IT system fit the business needs of their employer or of a client
- Write requirements for new systems and help implement and monitor their effectiveness

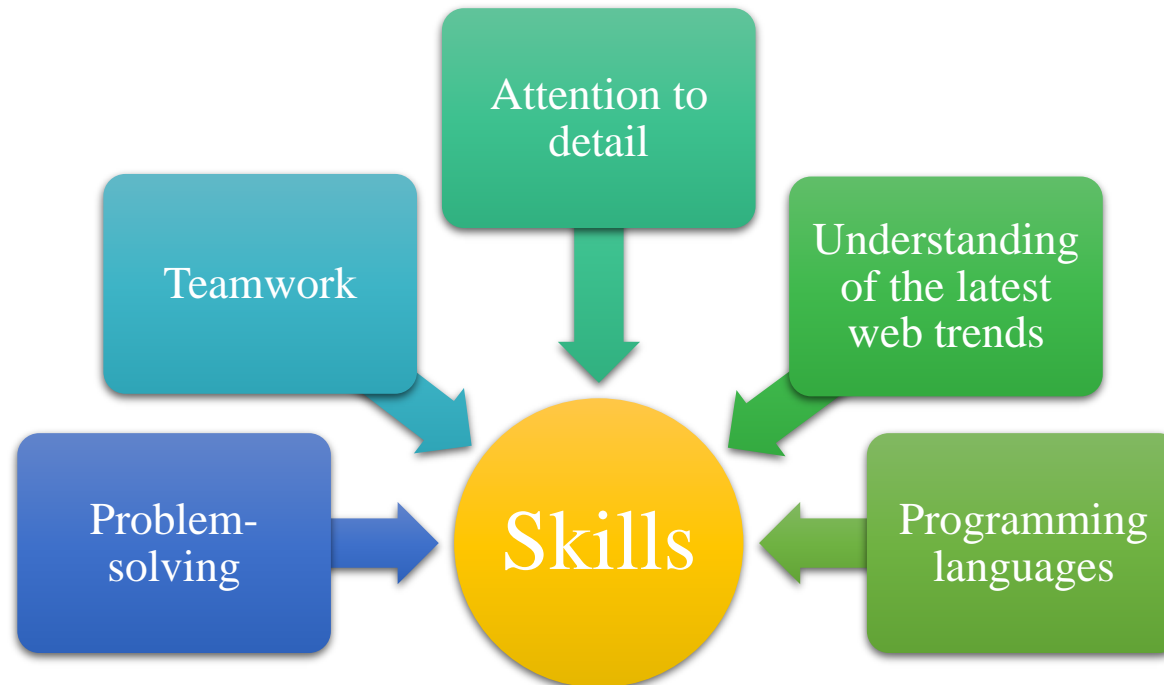




# Web Developer

- **Description:**

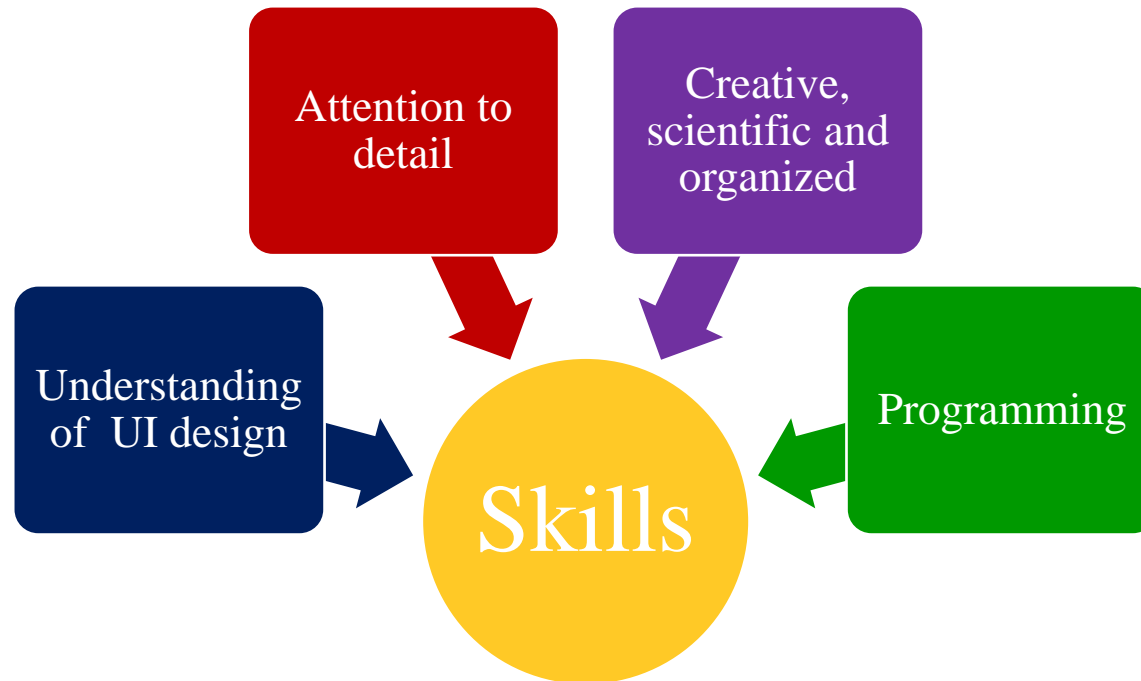
- Create website and web applications
- Design, coding, test, maintenance
- A type of software developer using web technologies





# User Interface Designer

- **Description:**
  - Design the presentation and interactivity of a product

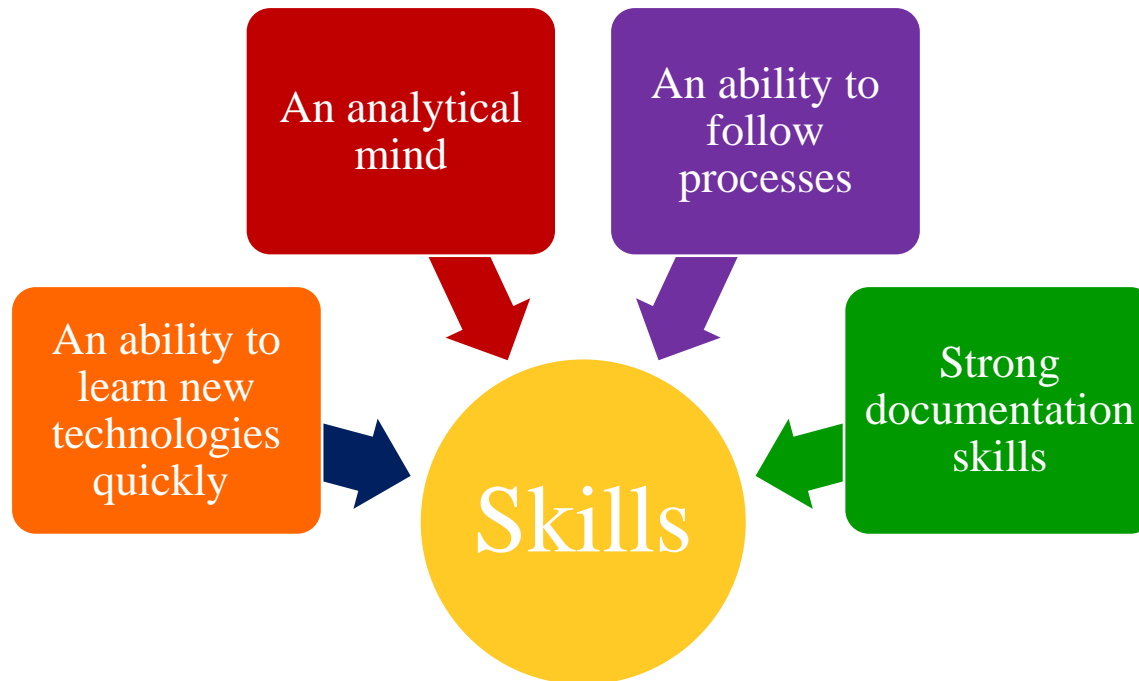




# Network Engineer

- **Description:**

- Designing, implementing, monitoring and managing the local and wide area networks.
- Installing, configuring and supporting network equipment.

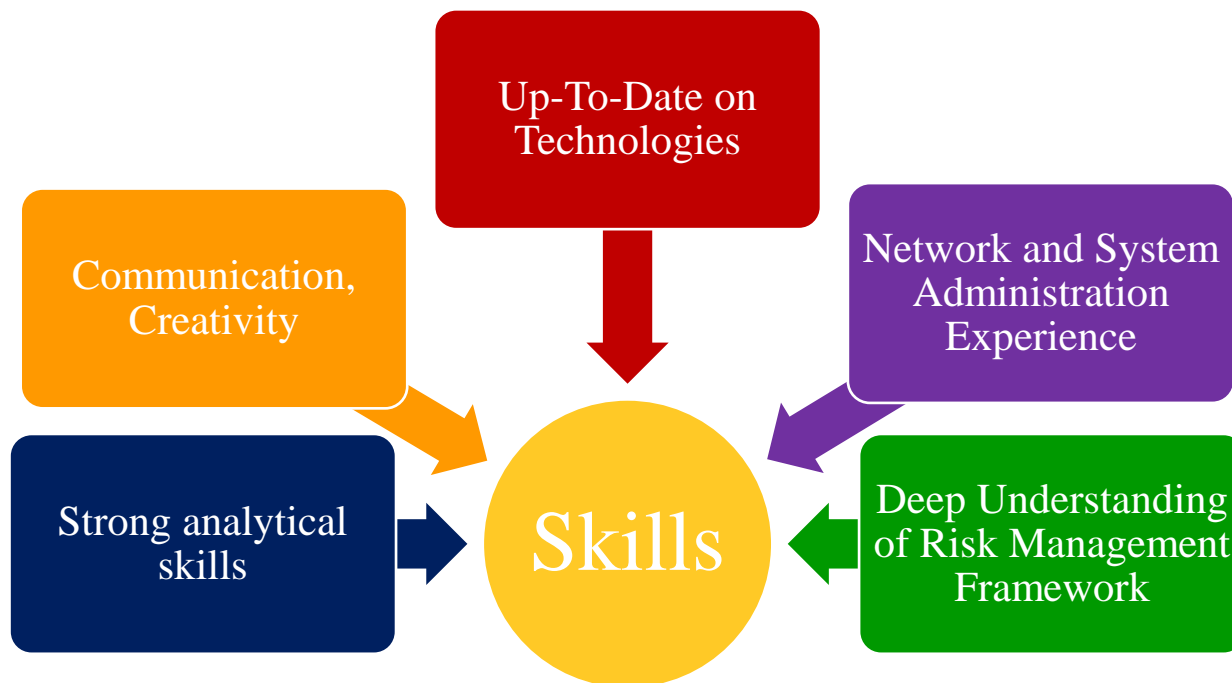




# Information Security Analyst

- **Description:**

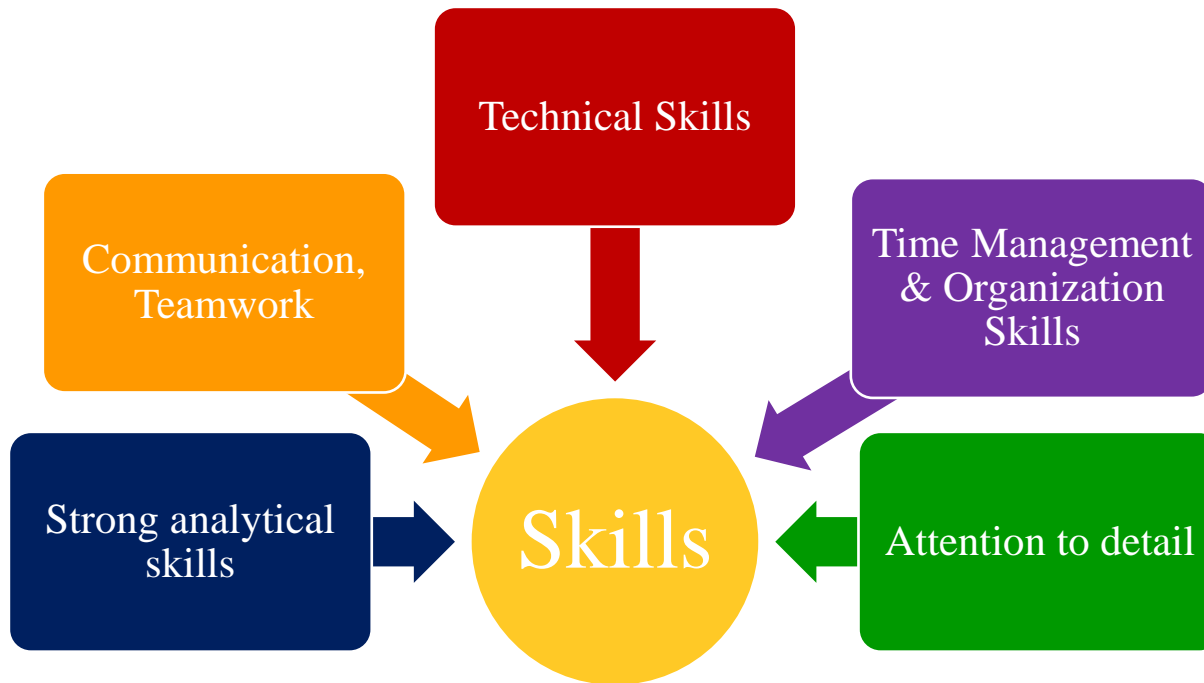
- Develop and implement computer and network security strategies and systems to protect vital information from computer crime and cyber warfare



# Software Tester

- **Description:**

- Performing automated and manual tests to ensure the software created by developers is fit for requirements.





# Database Administrator

- **Description:**

- Working with database software to store, organise and manage data
- Managing database access, database security/integrity and backup procedures

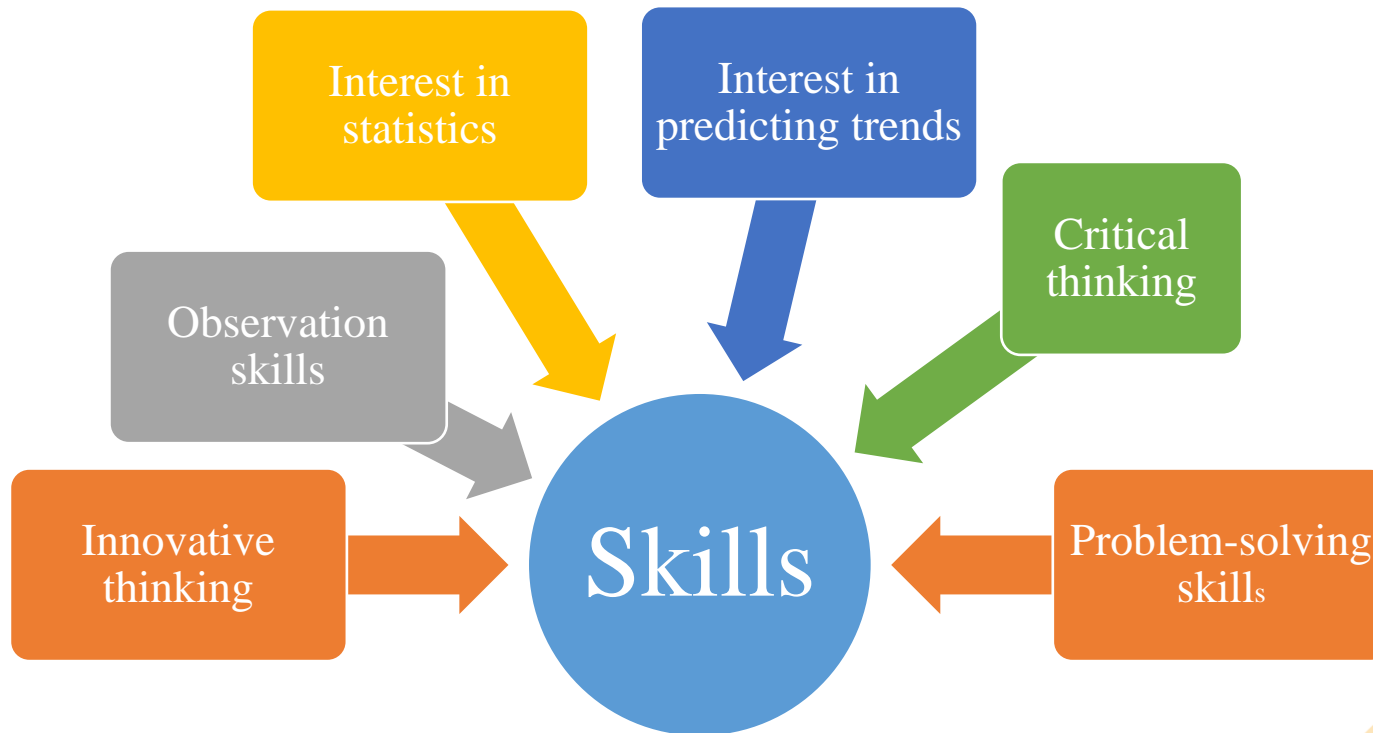




# Data Scientist

- **Description:**

- Interpret and analyse data from multiple sources to come up with imaginative solutions to problems.







# 6. Career Opportunities for IT



Global CyberSoft





# IT Revolution

- IT has begun to affect (in both good and bad ways) community life, family life, human relationships,...
- IT has altered many aspects of life - in banking and commerce, work and employment, medical care, national defense, transportation and entertainment,...
- New Technology → New Risks



# Issues of using computer

- **Privacy and personal information**
  - Theft of information
  - Inadvertent leakage of information
  - Being tracked, followed, watched (Sophisticated tools for surveillance and data analysis - GPS tracking device, Eagle eye)
  - Invisible information gathering → Secondary use
  - Computer profiling
  - Selling your customer data



# Issues of using computer

- **Freedom Of Speech**
  - Fake and Malicious information
  - Anonymous, offensive speech
  - E-mail spam
    - Spyware
    - Phishing
    - ....



# Issues of using computer

- **Intellectual Property**

- What is intellectual property?
  - The rights of creative workers in literary, artistic, industrial and scientific fields which can be protected either by copyright, trademarks, patents, etc.
  - Creative work: books, articles, plays, songs, works of art, movies, and software.
- Challenges of New Technologies
  - The Soft copy!
  - Storage media, Scanners.



# Issues of using computer

- **Computer Crime**
  - Hacking
  - Online scams
    - Auction Fraud
  - Forgery
  - Identity theft and fraud
    - phishing
    - vishing
    - pharming
    - using job-hunting sites.
    - trojan horse



# 7. Computer Ethics

- **Computer ethics** is a new branch of ethics that is growing and changing rapidly as computer technology also grows and develops
- **Computer ethics** identifies and analyzes the impacts of information technology upon human values like health, opportunity, freedom, privacy,...

*Moore*



# Ten Commandments of Computer Ethics

1. Not use a computer to harm other people.
2. Not interfere with other people's computer work.
3. Not snoop around in other people's computer files
4. Not use a computer to steal
5. Not use a computer to bear false witness
6. Not copy or use proprietary software for which you have not paid (without permission)
7. Not use other people's computer resources without authorization or proper compensation
8. Not appropriate other people's intellectual output
9. Think about the social consequences of the program you are writing or the system you are designing
10. Always use a computer in ways that ensure consideration and respect for your fellow humans





# Q&A