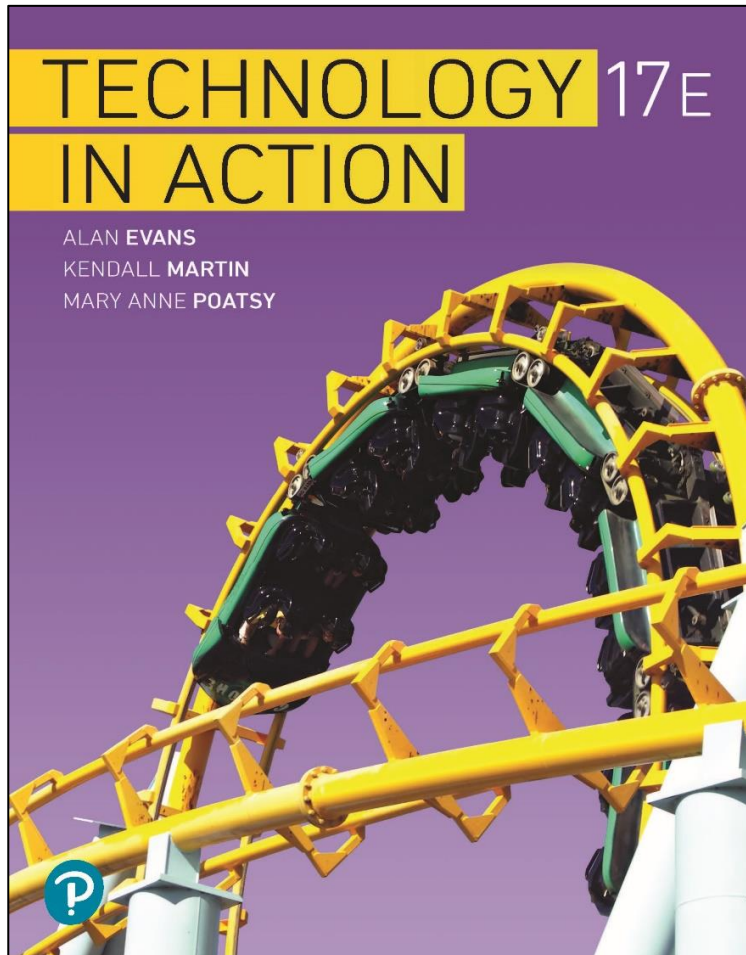# Technology in Action

Seventeenth Edition

Chapter 1

The Impact of Technology in a Changing World

Learning Objectives

1.1 Describe various technological tools being used to impact national and global issues.

1.2 Describe various global social issues that are being affected by technology.

1.3 Describe how technology is changing how and why we connect and collaborate with others.

1.4 Summarize how technology has impacted the way we choose and consume products and services.

1.5 Characterize computer literacy and explain why it is important to be computer literate.

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Learning Objectives

1.6 Describe artificial intelligence systems and explain their main goals.

1.7 Describe how artificial intelligence and other emerging technologies are important in many careers.

1.8 Define ethics and describe various ethical systems.

1.9 Describe influences on the development of your personal ethics.

1.10 Present examples of how technology creates ethical challenges.

Technology in a Global Society
(Objective 1.1)

- Accelerating change around the world

- Galvanizing people in new ways

Technology in a Global Society

Impact of Tools of Modern Technology (Objective 1.1)

- Social networking tools enable groups to connect and exchange ideas

- Crisis-mapping tools collect and map information
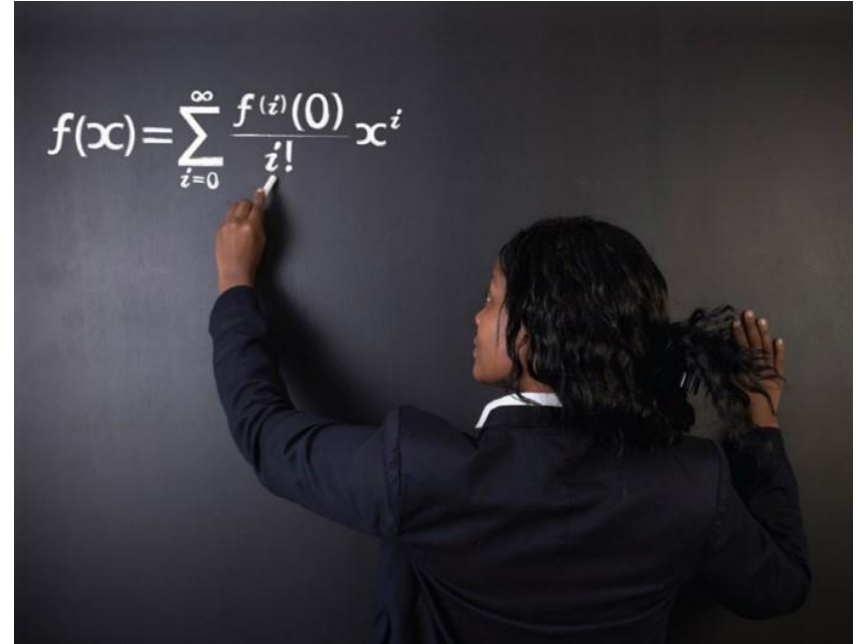
Technology in a Global Society

Global Issues (Objective 1.2)

- Health care
  - Scientific visualization tools help scientists develop antibodies tests
  - Computationally intense modeling software helps increase the pace of vaccine discovery

- The Environment
  - Data could alert scientists to new trends

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Global Issues (Objective 1.2)

- The Digital Divide
  - Gap exists between levels of Internet access and availability of technical tools
  - Prevents use of all minds to solve planet's problems

$$f(x) = \sum_{i=0}^{\infty} \frac{f^{(i)}(0)}{i!} x^i$$

Technology Impacts How and Why We Connect and Collaborate (Objective 1.3)

- Collaborating for the benefit of others
  - Web 2.0
    - Allows easy content contribution
    - Facilitates easy connections with others
  - Cognitive Surplus
    - Combination of leisure time and tools to be creative

- Connecting through business
  - Support others' dreams
  - Crowdfunding asks for small donations from a large number of people

Technology Connects Us with Others (1 of 2)
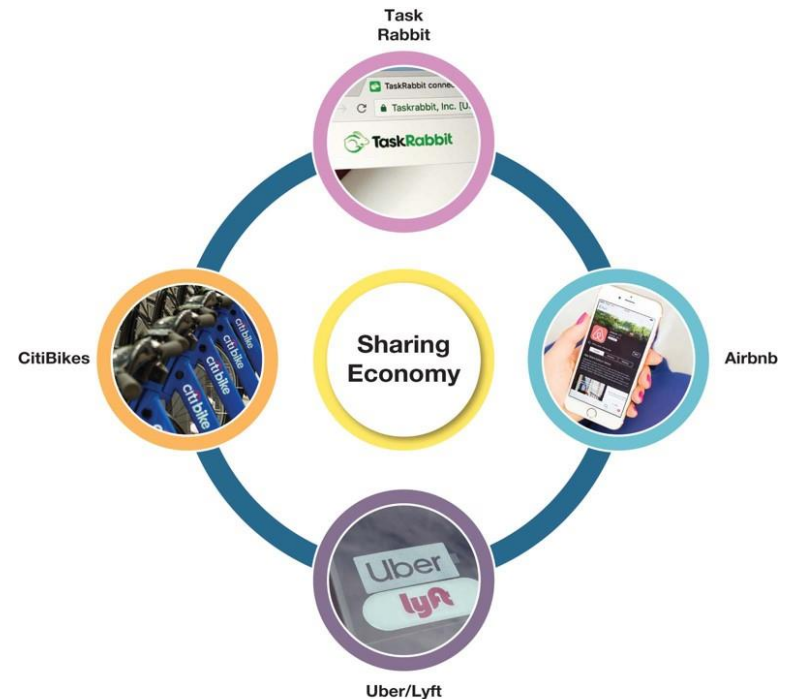**Technology Impacts How We Consume (Objective 1.4)**

- Marketing:
  - Influencers
  - Crowdsourcing

Technology Impacts How We Consume (Objective 1.4)

- Sharing economy
  - ZipCar
  - Citi Bike
  - Collaborative consumption

Computer Literacy (Objective 1.5)

- Computer literacy
  - Understand capabilities and limitations of computers
  - Know how to use safely and efficiently

- Computer literacy
  - Avoiding hackers and viruses
  - Protecting your privacy
  - Understanding the real risks
  - Using the web wisely
  - Avoiding online annoyances
  - Ability to maintain, upgrade, and troubleshoot a computer
  - Keeping up to date

Artificial Intelligence (1 of 3)

Artificial Intelligence Basics (Objective 1.6)

- Intelligence—ability to acquire and apply knowledge and skills
  - Experiences, reasoning, problem solving, perception, and using language

- Artificial intelligence—systems or machines that perform tasks usually associated with human intelligence

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Artificial Intelligence
Artificial Intelligence Basics (Objective 1.6)

- Goal in 1950s was to create a machine that could think like a human

- Central goals of AI
  - Natural language processing (NLP)
  - Perception
  - Knowledge representation
  - Planning
  - Problem solving
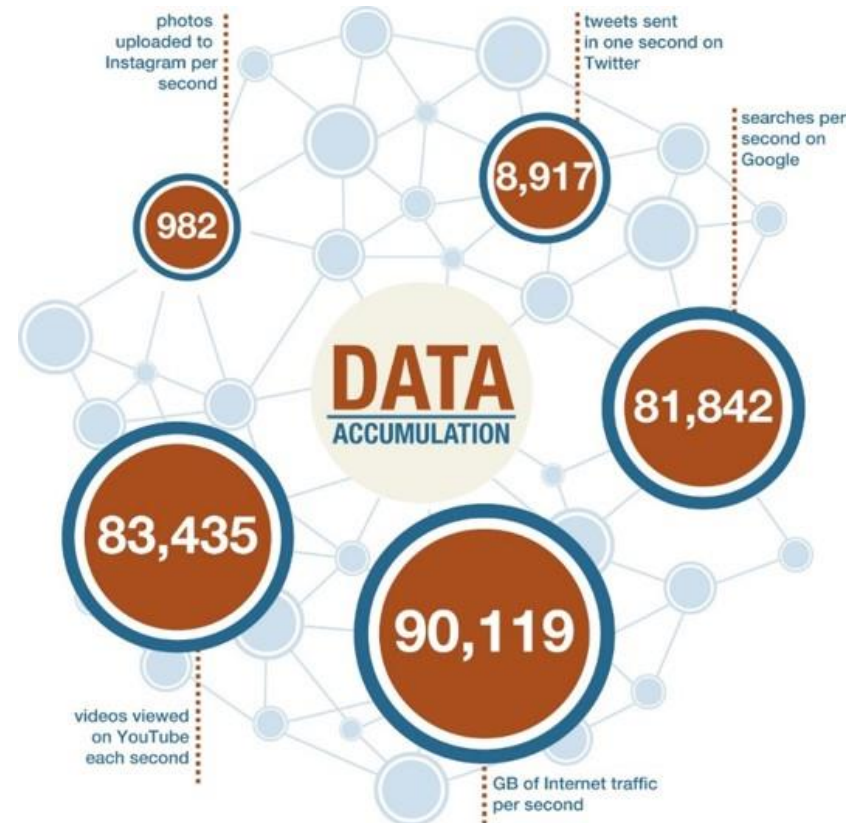 - Learning

Artificial Intelligence

Artificial Intelligence Basics (Objective 1.6)

- Major developments contributing to functional AI systems
  - Expert systems
  - Artificial neural networks
  - Advances in machine learning

Working With Artificial Intelligence and Other Information Technologies (1 of 6)

The Impact of Technology on Your Career (Objective 1.7)

- Retail
  - Data mining
    - Process of searching huge amounts of data for patterns
    - Respond to consumer buying/usage patterns

Working With Artificial Intelligence and Other Information Technologies
The Impact of Technology on Your Career (Objective 1.7)

- Banking
  - Uses AI to help spot fraud

- Transportation
  - Autopilots on commercial airplanes
  - Autonomous vehicles

- Robots and Embodied Agents

Working With Artificial Intelligence and Other Information Technologies
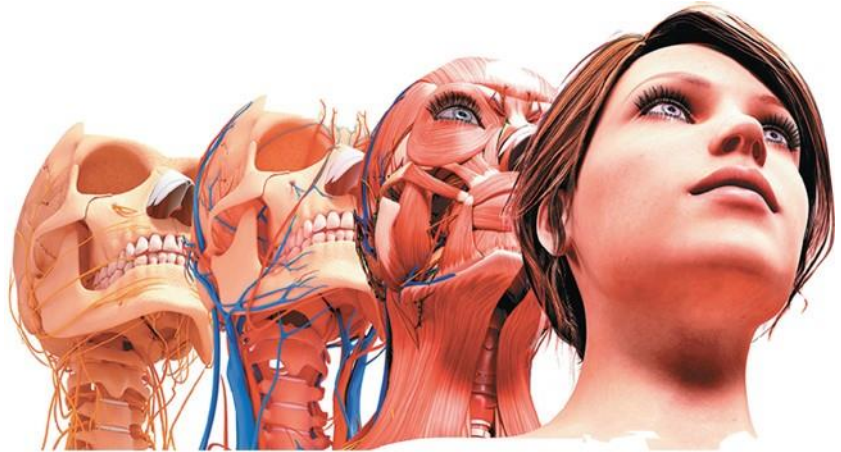
The Impact of Technology on Your Career (Objective 1.7)

- Education
    - Intelligent personal assistants (IPAs) assist students with their individualized learning plans
    - Speed up the grading process
    - Plagiarism checkers

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- Law Enforcement
    - Computers used in cars
    - Facial reconstruction
    - Computer forensics

Working With Artificial Intelligence and Other Information Technologies

The Impact of Technology on Your Career (Objective 1.7)

- Medicine
  - Help doctors diagnose unfamiliar conditions
  - Being integrated into patient information systems
  - Used to design and construct prosthetic devices

Working With Artificial Intelligence and Other Information Technologies

The Impact of Technology on Your Career (Objective 1.7)

- Psychology
  - MACH—My Automated Conversation CoacH
  - Affective computing
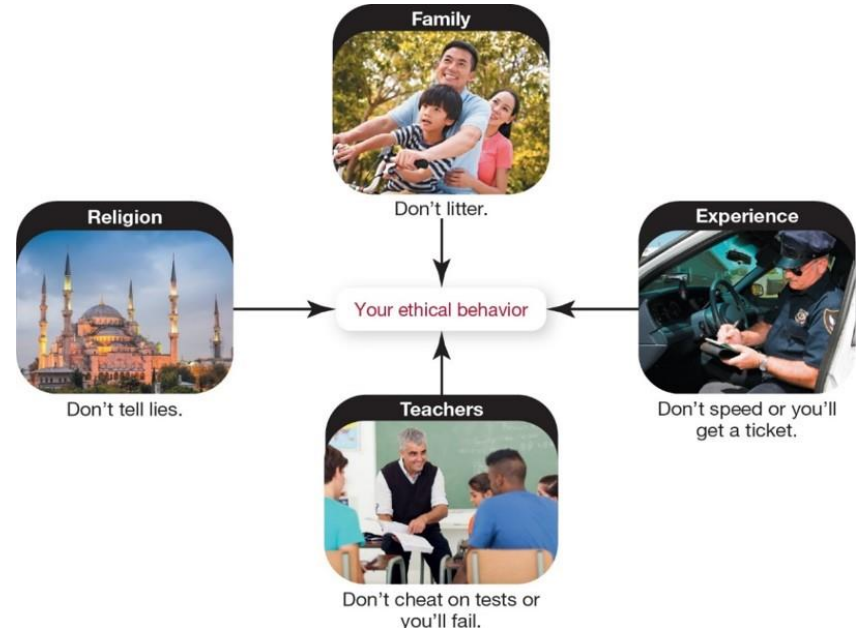
Ethical Computing

Defining Ethics (Objective 1.8)

- Ethics: the study of morals and specific moral choices made

- Laws: formal, written standards designed to apply to everyone

- Unethical behavior: not conforming to approved standards

- Amoral behavior: no sense of right and wrong

Ethical Computing

Personal Ethics (Objective 1.9)

- Determining Your Personal Ethics
  - Describe yourself
  - List key principles you believe in
  - Identify external influences
  - Consider why
  - Prepare statement of values

Ethical Computing (1 of 3)
Ethics and Technology (Objective 1.10)

- Intellectual Property
  - Work that is the result of someone's creativity and knowledge
  - Protected by copyrights, patents, and trademarks

- Privacy
  - Control and privacy of information will continue to be a fine balancing act

Ethical Computing (2 of 3)
Ethics and Technology (Objective 1.10)

- Social Justice
  - Predictive policing to prevent crime
  - Military and government secrets and previously secret documents (WikiLeaks)

- Liability
  - 3D printing can lead to quality control issues

- Censorship
  - Global differences in website blocking

Ethical Computing
Ethics and Technology (Objective 1.10)

- Social Activism
  - Hacktivism is using computers and computer networks in a subversive way
  - Often manifests as denial-of-service attacks

- Automated Robotic Machinery
  - Self-driving cars
  - Choose between sets of bad choices

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