ANDIJAN STATE PEDAGOGICAL INSTITUTE

Lecture materials · 2026–2027 academic year

SUBJECT

Information Systems and Digital Technologies

Lecture 21 · Recap and Future Applications

2 hours

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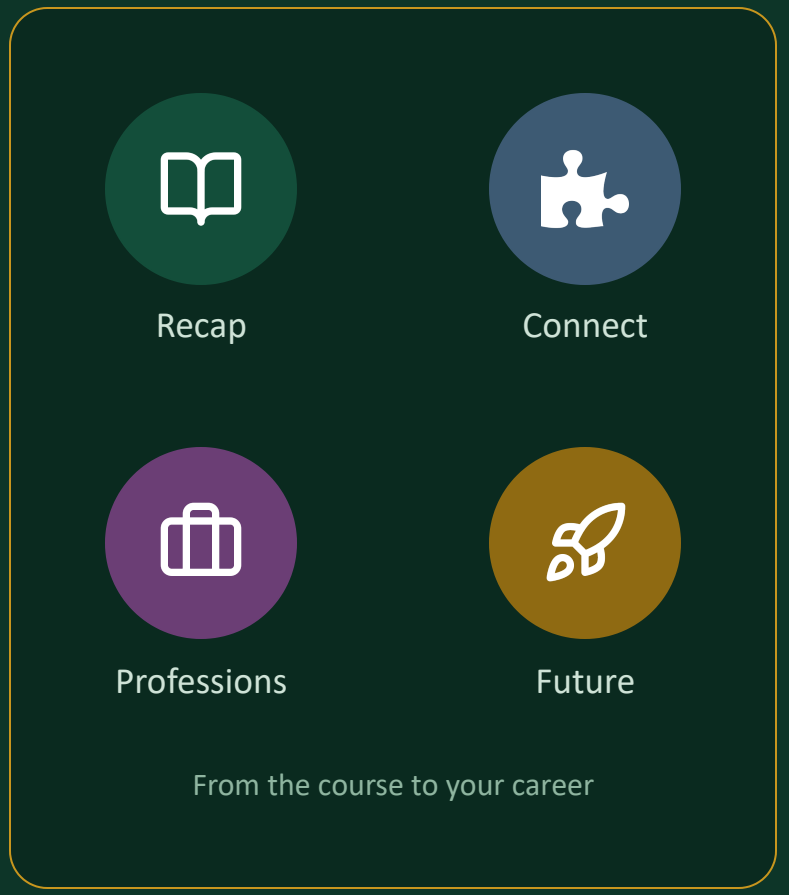
LECTURE 21 · 2 HOURS

FUNDAMENTALS OF COMPUTERS · TOPIC 14

Recap and Future Applications

Connecting everything we learned — and using it in every profession

hardware · software · networks · people



Looking back

Which topic from this course surprised you most — and where will you use it outside the classroom?



Think – Pair – Share (3 min)

1 Which topic was the most useful for you?

2 Which topic was the hardest?

3 What do you now do differently with your devices?

By the end of this lesson, you can…

1. **Recall** how hardware works: CPU, memory, storage, input and output.
2. **Recall** the roles of software, operating systems and the software life cycle.
3. **Recall** networks, the Internet, data security and communication tools.
4. **Connect** the big ideas that link the whole course.
5. **Apply** computer literacy to different fields, professions and future technologies.

The course in four big parts

Hardware

Topics 1–5: what a computer is, CPU, input and output, memory, storage.

Software

Topics 6–7: operating systems, applications and the software life cycle.

Networks and security

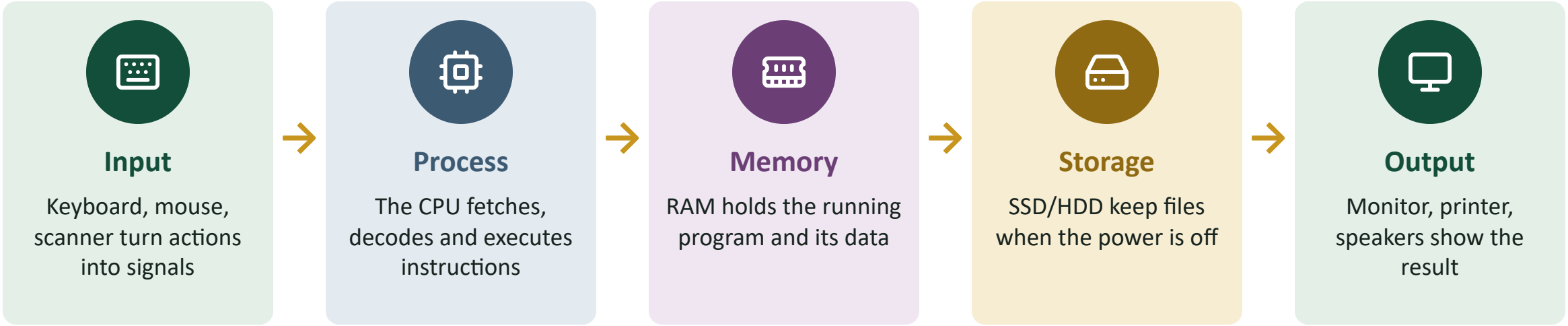
Topics 9–11: data security, the Internet, communication tools.

People and the future

Topics 12–13: impact on society, staying current.

Remember: each part builds on the one before — hardware runs software, software runs networks, and people use them all.

How a computer works, from key press to screen



Key idea (Topic 2)

Stored-program (von Neumann) design: instructions and data share one memory.

Key idea (Topics 4–5)

Memory is fast and volatile; storage is large and permanent.

Hardware in a nutshell

Characteristics (1)

Speed, accuracy, diligence, versatility, storage, reliability.

The CPU (2)

Control unit, ALU and registers; fetch–decode–execute.

Input (3)

Keyboard, mouse, joystick, trackball, light pen, scanners.

Output (3)

Monitors (CRT, LCD, LED, OLED), printers, projectors.

Primary memory (4)

Registers → cache → RAM; RAM and ROM; the hierarchy.

Storage (5)

HDD: platters, heads, tracks. SSD: flash, no moving parts.

CHECK FOR UNDERSTANDING

Hardware quick fire

A	Which part of the CPU does arithmetic and logic?
B	Name a pointing device other than a mouse.
C	Which is faster: cache or RAM?
D	What is lost from RAM when the power goes off?
E	Which storage has no moving parts: HDD or SSD?
F	In the von Neumann design, where are programs kept?

Rules

Answer in pairs, 20 seconds each.

No notes!

Score one point per correct answer.

Software in a nutshell

System vs application

System software runs the computer; applications do users' jobs.

OS functions and services

Process, memory, file, device and security management.

Dual mode

User mode and kernel mode protect the system; system calls cross over.

Device drivers

Translate between the OS and each device.

Open source

Linux and Android: code anyone can study and improve.

The SDLC

Plan, analyse, design, build, test, deploy, maintain; waterfall or incremental.

Networks, security and communication

Networks (10)

LAN, MAN, WAN; topologies; client–server and peer-to-peer.

The Internet (10)

TCP/IP, DNS, ISPs; Internet vs WWW vs intranet.

Data security (9)

CIA triad; threats; encryption; passwords and 2FA.

Backup and physical security (9)

The 3-2-1 rule; recovery; locks, UPS, safe disposal.

Email and messaging (11)

To, Cc, Bcc; netiquette; synchronous vs asynchronous.

Collaboration (11)

Shared documents, permissions, version history.

CHECK FOR UNDERSTANDING

Software, networks and security quick fire

01 Name three functions of an operating system.

02 In which SDLC model is software delivered in several working parts?

03 What is the difference between the Internet and an intranet?

04 What do the letters CIA stand for in data security?

05 Explain the 3-2-1 backup rule.

06 When should you use Bcc instead of Cc?

Big ideas that connect the course

BIG IDEA	Where we met it	Why it matters
Everything is data	Binary in memory and storage; packets on networks	Text, photos and sound all become 0s and 1s
Layers	Hardware → OS → apps; TCP/IP layers	Each layer hides detail from the one above
Trade-offs	Memory hierarchy; HDD vs SSD; waterfall vs incremental	There is rarely one “best” choice — it depends on needs
Security	OS protection; data security; phishing	Every system needs protecting at every level
People	Communication; impact on society; lifelong learning	Technology exists to serve people

Computer literacy in every field (1)

Medicine

Electronic records, scans read with AI, telemedicine.

Education

Online platforms, digital lessons, e-journals.

Business and finance

Spreadsheets, accounting software, online banking.

Engineering and industry

CAD drawings, robots, 3D printing.

Agriculture

Soil sensors, drones, weather apps, smart irrigation.

Media and design

Photo and video editing, social media, web design.

Computer literacy in every field (2)

Law and government

E-government portals, legal databases, digital signatures.

Transport and logistics

GPS navigation, parcel tracking, route planning.

Tourism and hospitality

Online booking, maps, reviews, translation apps.

Science and research

Simulations, data analysis, shared papers.

Arts and music

Digital instruments, animation, online galleries.

Every office

Email, documents, video meetings, cloud files.

Which course skills does each job use?

JOB	Uses…	From topic
Doctor	Patient databases, privacy and security, video consultations	7, 9, 11
Teacher	Learning platforms, presentations, shared documents	7, 11, 13
Accountant	Spreadsheets, backups, strong passwords	7, 9
Engineer	CAD software, hardware knowledge, storage for big files	2, 4, 5, 7
Farmer	Sensors, mobile apps, Internet access	3, 10, 13
Journalist	Checking sources, communication tools, ethics	11, 12, 13

CHECK FOR UNDERSTANDING

Which job, which tool?

A	Designs a new bridge on the computer before it is built.
B	Checks soil moisture on a phone and switches on watering.
C	Gives a consultation to a patient 400 km away.
D	Posts homework and marks it online.
E	Checks three independent sources before publishing a story.
F	Tracks 500 parcels across the country in real time.

Choose from

- CAD software
- IoT sensors
- Telemedicine
- Learning platform
- Source checking
- GPS tracking

If you love computers: IT careers

Software developer

Designs, writes and tests programs (the SDLC, Topic 7).

Network administrator

Builds and runs networks (Topic 10).

Cybersecurity analyst

Protects systems and data (Topic 9).

Data analyst

Finds meaning in data with spreadsheets and code.

IT support specialist

Fixes hardware and software problems for users.

UX/UI designer

Makes apps and websites easy and pleasant to use.

Future applications to watch

AI assistants

Help in every job: writing, coding, diagnosing, translating.

Smart cities

Traffic lights, transport and energy managed by data.

Digital health

Wearables and remote care keep patients healthy at home.

Smart farming

Sensors and drones save water and increase harvests.

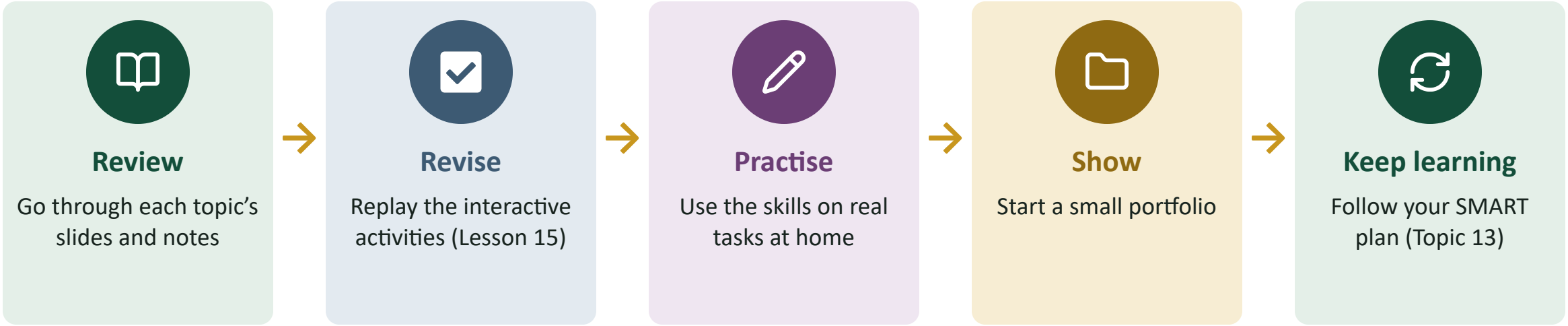
Space and satellites

Satellite Internet and Earth monitoring.

Quantum computing

New computers for problems today’s machines cannot solve.

From this course to your future



Final exam tip: the review questions and checks in each lesson are the best practice.

CHECK FOR UNDERSTANDING

Reflect and connect

01 Which three topics will you use most in your future job? Why?

02 Give one example of a trade-off from this course.

03 Name one habit you changed because of this course.

04 Explain one big idea to a younger student in one sentence.

05 Which future application excites you — and which worries you?

06 What is the first step of your learning plan after the course?

Computer literacy in action

CLINIC

A nurse books appointments and protects records

→ Databases + data security

FARM

A cotton farmer waters fields only when sensors say so

→ IoT + mobile apps

SHOP

A family business sells across Uzbekistan online

→ E-commerce + spreadsheets

SCHOOL

A teacher runs a class project in shared documents

→ Collaboration + netiquette

HOTEL

A Samarkand guesthouse takes bookings from abroad

→ Websites + email + translation

IT COMPANY

A developer in Tashkent builds apps for foreign clients

→ SDLC + collaboration + lifelong learning

Review: can you answer these?

01 Name the four big parts of the course.

02 Describe the input–process–output cycle.

03 Why is RAM faster but smaller than storage?

04 Give three services an operating system provides.

05 Compare the waterfall and incremental models.

06 What does TCP/IP do?

07 Name three ways to protect your data.

08 Give two professions and the computer skills they need.

Exit ticket

Answer on a slip of paper before you leave.

1. Which topic from this course will be most useful in your future profession? Give one concrete example.

2. Name one big idea that connects several topics, and give two examples of it.

3. Which topic do you most need to revise before the final exam?