English for Computer Science Students

IMPRESSUM

Title: English for Computer Science Students

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Graphic design & layout: Dino Žilić

Publisher: Cambridge Scholars Publishing

Year of publication: 2025

ISBN:

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Printing: Cambridge Scholars Publishing

Edition: First edition

Acknowledgments:
Special thanks to the Faculty of Electrical Engineering, Computer Science and Information technology Osijek, Croatia and students for their valuable feedback and contributions to the development of this coursebook.

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https://www.ferit.unios.hr/2021/djelatnik.php?aai=d1bozic&ime=dragana-bozic-lenard&crosbi=&matbroj=249&domaci=1

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By
Dragana Božić Lenard

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This book first published 2025

Cambridge Scholars Publishing

Lady Stephenson Library, Newcastle upon Tyne, NE6 2PA, UK

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

ISBN: 978-1-0364-5450-0
ISBN (Ebook): 978-1-0364-5451-7

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USER GUIDE

USER GUIDE

Welcome to *English for Computer Science Students*, a coursebook designed to equip university students with the language skills and technical vocabulary needed to thrive in their field of study, specifically in the context of English for Specific Academic Purposes (ESAP), English for Specific Purposes (ESP), and General English (GE). This coursebook blends English language learning with practical, industry-relevant content, fostering both linguistic proficiency and technical competence.

This coursebook is designed to cover approximately 70-90 teaching hours, depending on the pace of instruction and the depth of engagement with the exercises and activities. It is supplemented with a *Teaching English to Computer Science Students: A Comprehensive Approach*, which is an interactive and supplementary section of the coursebook designed to provide students with additional opportunities to deepen their understanding and further enhance their language skills.

The expected exit proficiency level is B2 (upper-intermediate) according to the CEFR (Common European Framework of Reference for Languages). Highly motivated students may achieve B2+, particularly in technical English communication.

To address the rapidly evolving field of computer science, the course will provide regularly updated handouts and supplementary materials available in the virtual learning environment (VLE). These materials will cover emerging trends such as AI, machine learning, cybersecurity advancements, and blockchain applications. Additional resources may include industry case studies, expert interviews, and interactive webinars, ensuring students stay informed about current developments and their real-world applications.

Who is this coursebook for?
This coursebook is tailored for university students studying computer science and related disciplines who wish to improve their English communication skills for academic and professional purposes. It is specifically designed for the undergraduate computer science students taking the course *English for Computer Science*, aligning with their academic and professional needs; though it can be adapted for other levels.

How is this coursebook structured?
The coursebook is divided into three main parts, each carefully crafted to align with your learning progression. It is thoughtfully organized to support one's learning journey, providing a balance of foundational knowledge, practical skills, and reference materials.

1) Core units
The main body of the coursebook is organized into thematic units covering key topics such as the history of computing, computer users, computer architecture, storage devices, operating systems and the internet.

Each unit includes:
- **Lead-in exercises** to introduce the topic and activate prior knowledge.
- **Integrated skills practice** with exercises covering all four language skills:
  - **Listening/watching:** Comprehension tasks based on authentic or simulated audio/video materials.
  - **Reading:** Texts related to computer science topics, followed by comprehension and critical thinking questions.
  - **Speaking:** Activities to develop discussion, presentation, and collaboration skills.
  - **Writing:** Tasks focused on technical and academic writing relevant to the field.

• **Vocabulary and grammar:** Exercises designed to expand technical terminology and reinforce grammatical structures commonly used in computer science contexts.

Selection of core unit topics
The topics in this coursebook were carefully selected based on the following criteria:
• **Needs analysis:** Consultations with computer science faculty and industry professionals to identify relevant technical concepts and communication needs.
• **Balanced language skills development:** Exercises designed to develop listening, reading, speaking, and writing skills in technical contexts.
• **Industry relevance:** Inclusion of both foundational and emerging trends in computer science to provide students with a comprehensive foundation for designing efficient systems, developing user-centric solutions, optimizing software performance, and navigating the evolving technology landscape.
• **Student engagement:** Topics that foster critical thinking, collaboration, and problem-solving relevant to academic and professional environments.
• **Alignment with course outcomes:** Ensuring activities support key learning outcomes for students preparing for academic research, professional roles, and further studies in computer science.

2) Additional resources
• **Checkpoints:** Assessments to evaluate your understanding and track your improvement throughout the course.

3) Reference materials
• **Vocabulary list:** A comprehensive glossary of terms introduced in the course, organized by unit and alphabetically for quick reference.
• **Transcripts:** Full scripts of all listening exercises to assist with comprehension and review.
• **Answer key:** Solutions to all exercises, ideal for self-study and revision.

How to use this coursebook

1) For students

During lessons:
• Follow your teacher's guidance as you work through the units.
• Actively participate in class discussions, group activities, and speaking exercises to practice your communication skills.
• Complete listening/watching, reading, and writing tasks in class to develop a strong foundation in all four language skills.
After class:
• Prepare for upcoming lessons by reviewing vocabulary and grammar from previous units.
• Regularly assess your progress using the Progress tests to identify areas for improvement.

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2) For teachers

Planning lessons:
• Use the thematic units as a guide for structured lessons, integrating the lead-in exercises to spark interest and discussion.
• Focus on all four language skills with the unit exercises, adapting tasks to the proficiency level of your students as needed.
• Assign additional activities from the Teaching English to Computer Science Students: A Comprehensive Approach for homework or as extension tasks for advanced learners.
Monitoring progress:
• Encourage students to take the Progress tests after completing units to evaluate their learning outcomes.
• Use the Vocabulary list and Transcripts as support tools for classroom activities and as references for students during lessons.

3) For self-study learners

Independent learning:
• Work through the units at your own pace, starting with the lead-in exercises to engage with the topic.
• Complete the reading, listening/watching, speaking, and writing tasks, ensuring balanced development in all language skills.
• Use the answer Key to check your responses and track your progress.

Building skills:
• Practice vocabulary and grammar with the unit exercises and use the Vocabulary list to review technical terms.
• Revisit Transcripts after listening/watching exercises to deepen your understanding of the audio/video materials.
• Regularly take the Progress tests to evaluate your growth.

Tips for success
• Set a regular study schedule and practice actively.
• Collaborate: Work with your peers to share insights and solve problems.

A tour of the coursebook
There are six units in the coursebook each of which has seven lessons.

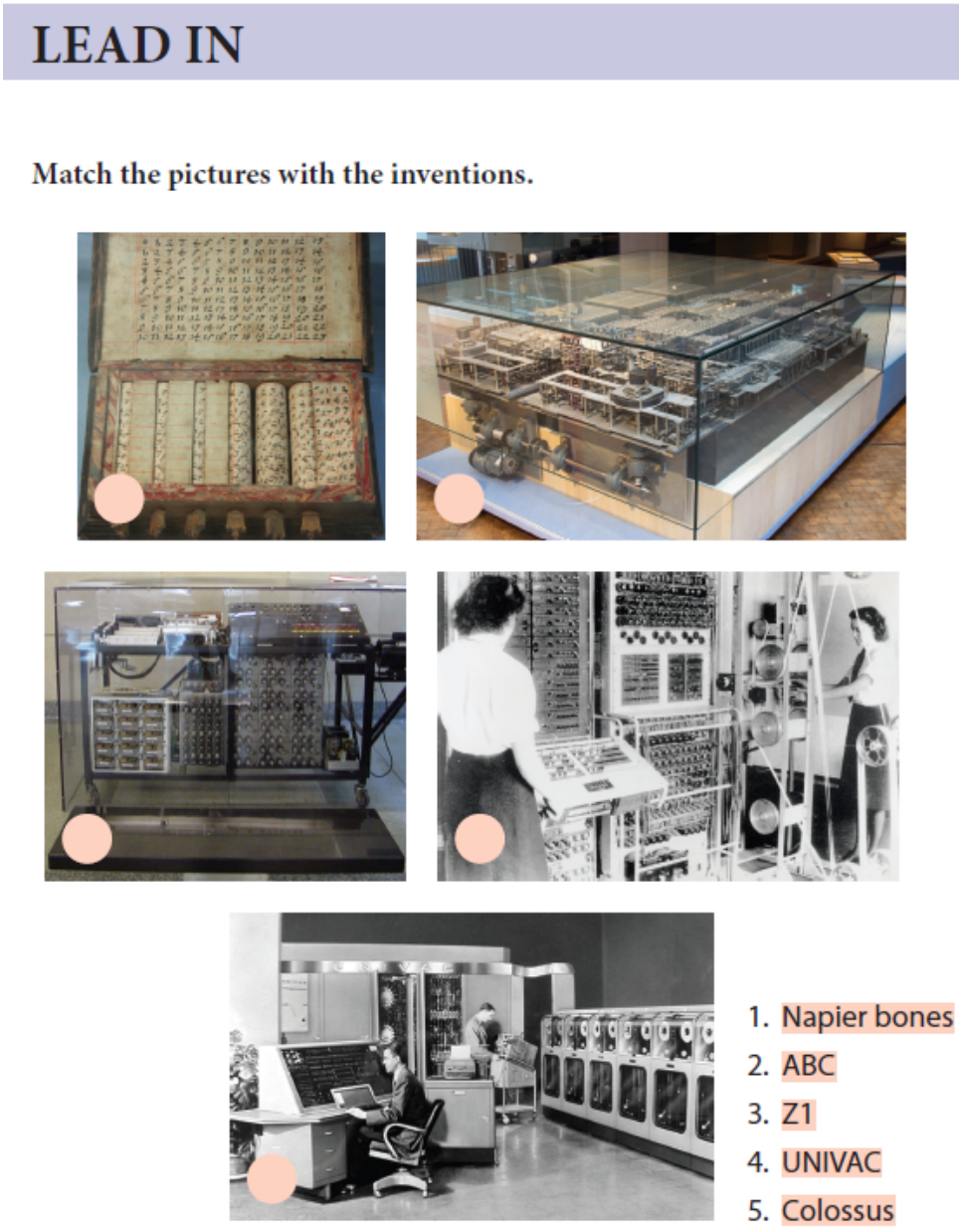
1) Lead-in exercises

Each unit begins with lead-in exercises designed to introduce the topic and activate prior knowledge. These activities aim to engage students and prepare them for the content that follows by:

• **Prompting discussion:** Encouraging students to share their thoughts or experiences related to the topic, activating background knowledge, and building connections to new concepts.

• **Fostering curiosity:** Using thought-provoking questions or scenarios to spark interest and generate ideas, making the upcoming content more relatable and easier to absorb.

• **Setting learning objectives:** Clearly outlining what students will learn in the unit and how the topic connects to their field of study, ensuring relevance and motivating participation.



2) Listening

Listening exercises focus on developing students' comprehension of authentic or simulated audio materials related to computer science topics.

• **Comprehension tasks:** Students listen to short podcasts, lectures, interviews, or dialogues that simulate real-world professional or academic conversations.

• **Focused listening:** Exercises may include listening for specific details, understanding main ideas, and inferring meaning from context.

• **Active listening practice:** Tasks encourage students to take notes, summarize content, and answer comprehension questions based on what they have heard, improving both accuracy and listening speed.

Listening/watching comprehension

Task 7. Watch the video at https://www.youtube.com/watch?v=gjVX47dLlN8&t=35s and choose the correct answers.

1. When was the modern computing developed?
   a) 1800s b) 1930s c) 1941
2. What was the first computer capable of storing data in its memory?
   a) Z4 b) Mark I/Colossus c) Atanasoff-Berry
3. Which computer was used for the ballistic analysis during the WW2?
   a) ENIAC b) Mark I/Colossus c) UNIVAC
4. What was the first prototype computer with transistors?
   a) UNIVAC b) Manchester Baby c) Manchester TC
5. Which device served as a prototype for the term personal computer?
   a) Altair 8800 b) Apple I c) IBM PC 5150

Task 8. Match the inventions with their inventors/developers

1.	Konrad Zuse	a.	COBOL
2.	John William Mauchly and J. Presper Eckert	b.	Lisa
3.	Bill Gates and Paul Alan	c.	Z1/Z3/Z4
4.	Grace Hopper	d.	BASIC
5.	Apple	e.	UNIVAC

https://www.youtube.com/watch?v=gjVX47dLlN8&t=35s

Task 9. Watch the video again. Complete the gaps with the suitable words.

1. The history of the computer dates _____ to the 1800s.
2. Colossus offered immediate solutions and it is believed that its use significantly _____ the duration of the war.
3. ENIAC _____ a room of 1500 m2.
4. The technologies used for this computer _____ to the development of the IBM 360.
5. Slowly, the evolution of the computer _____ what we know today to be.
6. In _____, Apple appeared on the market with Apple I.

3) Reading

Reading exercises involve texts related to computer science topics, followed by questions designed to enhance understanding and stimulate critical thinking.

- **Textual analysis:** Students read academic articles, reports, or case studies about computing technologies, computer architecture, or operating systems. The texts are up-to-date and engaging.

- **Comprehension and critical thinking:** After reading, students answer a mix of factual and opinion-based questions that require them to identify key points, summarize ideas, and analyze arguments.

- **Vocabulary expansion:** Key terms and phrases related to the topic are highlighted, allowing students to acquire technical terminology in context.

A) Reading comprehension check

ABACUS (4000 years ago)

The history of computer begins with the birth of abacus invented around 4,000 years ago by the Babylonians who used it to keep the record of their goods. Abacus had metal rods with beads mounted on them. The beads were moved by the abacus operator according to some rules to perform arithmetic calculations. Abacus is still used in some countries like China, Russia and Japan.

DIFFERENCE AND ANALYTICAL ENGINE (1820-1830)

In the early 1820s, Charles Babbage, who is known as the "Father of a modern computer", designed a difference engine, which was a steam driven calculating machine designed to solve tables of numbers like logarithm tables. Even though engineers could not manufacture an accurate enough device, Babbage was credited as the inventor of the first mechanical computer. In 1830, Babbage developed the analytical engine - a mechanical computer that used punch-cards as input. It was capable of solving any mathematical problem and storing information as a permanent memory. Ada Byron/Lovelace, the first computer programmer, worked alongside Babbage and was the first to recognize that the analytical engine had applications beyond pure calculation.

ENIAC (1946)

Electronic Numerical Integrator Analyzer and Calculator (ENIAC) was built by John Mauchly and J. Presper Eckert. Because of its electronic, it is over 1,000 times faster than any previous computer. It was believed that ENIAC had done more calculation over the ten years it was in operation than all of humanity had until that time.

MARK I (1944)

Built by a team led by engineers Frederick Williams and Tom Kilburn, the Mark I served as the prototype for Ferranti's first computer – the Ferranti Mark 1. The Manchester Mark I used more than 1,300 vacuum tubes and occupied an area the size of a medium room. Its "Williams-Kilburn tube" memory system was later adopted by several other early computer systems around the world.

LISA (1983)

Lisa is the first commercial personal computer with a graphical user interface (GUI). It was thus an important milestone in computing because soon Microsoft Windows and the Apple Macintosh adopted the GUI as their user interface, making it the new paradigm for personal computing.

PASCALINE (1642)

Pascaline is also known as an Arithmetic Machine or Adding Machine. It was invented between 1642 and 1644 by a French mathematician-philosopher Biaise Pascal. It was the first hand-powered automatic calculator, which could only perform addition and subtraction up to eight figures.

COMPLEX NUMBER CALCULATOR (1939)

In 1939, Bell Telephone Laboratories completed the calculator designed by scientist George Stibitz. In 1940, Stibitz demonstrated the CNC at an American Mathematical Society conference held at Dartmouth College. Stibitz stunned the group by performing calculations remotely on the CNC (located in New York City) using a Teletype terminal connected to New York over special telephone lines. This is likely the first example of remote access computing.

MANCHESTER BABY (1948)

University of Manchester researchers Frederic Williams, Tom Kilburn, and Geoff Toothill developed the Small-Scale Experimental Machine (SSEM), better known as the Manchester "Baby." The Baby was built to test a new memory technology developed by Williams and Kilburn – soon known as the Williams Tube – which was the first high-speed electronic random-access memory for computers. This was the first program in history to run on a digital, electronic, stored-program computer.

IBM'S PC (1982)

IBM's brand recognition, along with a massive marketing campaign, ignited the fast growth of the personal computer market with the announcement of its own personal computer (PC). The first IBM PC, formally known as the IBM Model 5150, was based on a 4.77 MHz Intel 8088 microprocessor and used Microsoft´s MS-DOS operating system. The IBM PC revolutionized business computing by becoming the first PC to gain widespread adoption by industry. The IBM PC was widely copied and led to the creation of a vast "ecosystem" of software, peripherals, and other commodities for use with the platform.

Adapted from:
https://www.javatpoint.com/history-of-computer
https://www.computerhistory.org/timeline/computers/

4) Speaking

Speaking activities are designed to build students' abilities to communicate effectively in academic and professional settings, focusing on discussion, presentation, and collaboration.

• **Discussions and debates:** Students engage in structured discussions on topics related to the unit, such as social media or cybersecurity issues. These activities help students practice articulating their ideas, defending their opinions, and negotiating meaning.

• **Presentations:** Students are given tasks to prepare and present on technical topics, developing both their speaking fluency and their ability to use specialized vocabulary accurately.

• **Collaborative tasks:** Group activities such as project planning or problem-solving tasks foster teamwork and oral communication, requiring students to listen to others, share ideas, and contribute to group outcomes.


Speaking

Task 14. Team up and discuss your ideas within your team.

Student A

Do your research on the effects of technology on education and present it to your teammates.

Student B

Do your research on the effects of technology on communication and present it to your teammates.

Student C

Do your research on the effects of technology on the job market and present it to your teammates.

Student D

Do your research on the effects of technology on the society and present it to your teammates.


Speaking

Task 20. Spin the wheel and talk about the topic for one minute.

5) Writing

Writing tasks focus on developing students' technical and academic writing skills relevant to the computer science field.

• **Technical writing:** Students practice writing clear, concise reports, instructions, and documentation commonly required in the field, such as code documentation or system specifications.

• **Academic writing:** Tasks also include academic essays, paraphrasing, comparing and contrasting, where students must present technical concepts and arguments logically and coherently.

• **Writing for different purposes:** Exercises encourage students to adapt their writing style depending on the context - whether it is writing for a professional audience, academic purposes, or communicating technical information to non-experts.

Task 17. Read the email Jane sent to her prospective collaborator and superior. Detect mistakes and correct them.

Message

From: blondjane@gmail.com

To: mark.smith@example.com

CC:

BCC: alex.brown@example.com

Subject: URGENT!!! need your help ASAP!!

Hey Mark!

I hope you're doing well! 😊 I'm writing to follow up regarding the discussion we had at last weeks' meeting. We discussed several important points about the upcoming project, and I wanted to confirm our action steps. You can find my suggestion in the attachment.

I was thinking we can meet on TUESDAY or maybe WEDNESDAY? Let me know what works for u!

Also, can u send me the files we discussed? It would really help me a lot! Pls hurry!!! I need them for my presentation next week!

Looking forward to your reply!!

Cheers,

Jane

P.S. Alex (here in bcc) is doing a presentation with me so she needs the files as well.

6) Vocabulary practice

• **Technical terminology:** Exercises include matching terms with definitions, using vocabulary in context, and learning industry-specific jargon and acronyms that are commonly encountered in the field of computer science.

• **Contextual usage:** Students practice using technical terms in sentences and real-world scenarios, improving their ability to communicate about technical concepts with precision.

Academic vocabulary in use

Task 3. Match the words (1-7) with their definitions (a-g).

1) Edutainment	**a)** a service that is used by the public, such as an electricity or gas supply
2) Tech-savvy	**b)** not working for an employer but finding work for yourself or having your own business
3) Rudimentary	**c)** knowing a lot about modern technology, especially computers
4) Self-employed	**d)** the process of entertaining people at the same time as you are teaching them something
5) To hone something	**e)** to work at home and communicate with your office by phone or email
6) To telecommute	**f)** basic
7) Utility	**g)** to make something perfect or completely suitable for its purpose

Task 4. Match the adjectives and verbs from column A with the prepositions they are usually followed by from column B. Discuss with your partner.

COLUMN A	COLUMN B
proficient relevant look adapt comfortable differ engage figure refer set	2x up with 3x in out 3x to

7) Language in use

• **Grammar structures:** The coursebook emphasizes grammar structures commonly used in technical writing, such as tenses, adjectives and adverbs, and complex sentence structures.

• **Contextual grammar application:** Students apply these structures in writing and speaking tasks, ensuring that they can accurately use grammar in context. Exercises range from form-focused activities (e.g. fill-in-the-blank exercises) to communicative tasks that require the application of grammar in meaningful contexts.

Task 13. Read the text below and decide which answer A, B, C or D best fits each space.

Operating systems have played a 1) _____ role in shaping the digital landscape. In the early days of computing, there were no dedicated operating systems. Users interacted directly with the hardware, executing commands 2) _____. However, as computers grew in complexity, the need for a centralized system to manage resources and facilitate user interactions became apparent.

One important early operating system prototype was the General Motors Research Operating System (GM-RS) developed in the late 3) _____. It was among the first attempts to create a dedicated system for managing a computer's resources, 4) _____ the groundwork for future developments.

The 2000s marked a significant 5) _____ point in the history of operating systems. Microsoft's Windows XP, released in 2001, became widely adopted and is still considered one of the most significant operating systems in history. Its user-friendly interface, stability, and compatibility contributed to its 6) _____ use in both personal and business environments.

During 7) _____ era, experts in the field focused on improving security and efficiency. The rise of Linux, an open-source operating system, gained momentum, especially in server environments. Linux, with its robust design and flexibility, became widely adopted, powering a significant portion of the internet's infrastructure.

The 2000s also saw the 8) _____ of mobile operating systems. Notable among them was Apple's iOS, introduced in 2007 with the launch of the iPhone. iOS revolutionized the smartphone industry with 9) _____ intuitive touch-based interface and an ecosystem of applications, 10) _____ a standard for mobile operating systems.

1.	a) important	b) integral	c) pivotal	d) essential
2.	a) manually	b) manual	c) automatically	d) automatic
3.	a) 19th century	b) 1950	c) 1950s	d) 1950's
4.	a) established	b) laying	c) disregarding	d) putting
5.	a) turning	b) critical	c) milestone	d) starting
6.	a) narrow	b) spread	c) widespreading	d) widespread
7.	a) this	b) these	c) that	d) those
8.	a) appear	b) emergence	c) evolutionary	d) flood
9.	a) it's	b) its	c) his	d) their
10.	a) put	b) haveing	c) setting	d) prescribe

8) Project work

• **Research and practical application:** Students investigate current trends, emerging technologies, or case studies related to the unit's topic. They apply their findings by creating presentations, writing technical reports, or developing small projects, such as UI designs or code snippets with accompanying documentation.

• **Collaboration and communication:** Projects often involve teamwork, encouraging students to discuss, present, and defend their ideas in English. Through peer reviews, group discussions, and final presentations, students refine their ability to explain complex technical concepts clearly and professionally.

PROJECT WORK

Project overview

Topic: Internet censorship around the world

Group size: 3-4 students per group

Duration: 2-3 weeks

Final deliverable: Group presentation (10-15 minutes) or infographic summarizing key findings

Resources

Reports and articles: Freedom House, Reporters Without Borders, Access Now, OpenNet Initiative.

Government websites: Official statements or legal documents outlining censorship laws.

News outlets: Reputable international news sources (e.g., BBC, Reuters, Al Jazeera).

Academic journals: Research papers on internet censorship.

Books and documentaries: Educational materials providing in-depth analyses.

Countries

Countries with notable internet censorship practices are China, Russia, Saudi Arabia, India, United States, Iran, Turkey, North Korea.

China: Discuss the "Great Firewall" and the censorship of Western social media and news websites.

Russia: Cover new laws restricting content deemed as anti-government and the blocking of specific apps or websites.

Saudi Arabia: Explore restrictions on content that doesn't align with cultural or religious beliefs.

India: Examine temporary social media bans or shutdowns in specific regions.

United States: Discuss issues with net neutrality, social media content moderation, or potential regulatory actions.

Iran: Explore Iran's censorship of social media and news sites, the use of VPNs as a workaround, and the government's monitoring and penalties for bypassing restrictions.

Turkey: Research Turkey's control over media and social networks, including temporary and long-term blocks on platforms like Twitter and Wikipedia, and how these actions impact public discourse and information access.

North Korea: Investigate North Korea's strict internet limitations, where access is restricted to an internal network called "Kwangmyong," and only a small elite can access the global internet, shaping citizens' worldview and isolating them from international information.

Organizing information

Introduction: Brief overview of the country and its general stance on internet freedom.

Government Policies: Detailed explanation of laws and regulations.

Censored Content and Methods: Specific examples and technical methods used.

Impact Analysis: Social, economic, and political effects on the population.

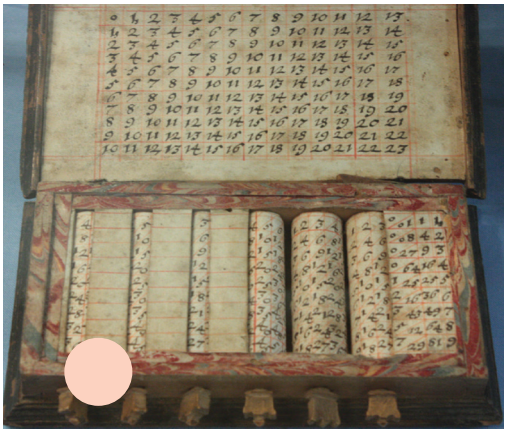
Public and International Response: Reactions from citizens, NGOs, and other nations.

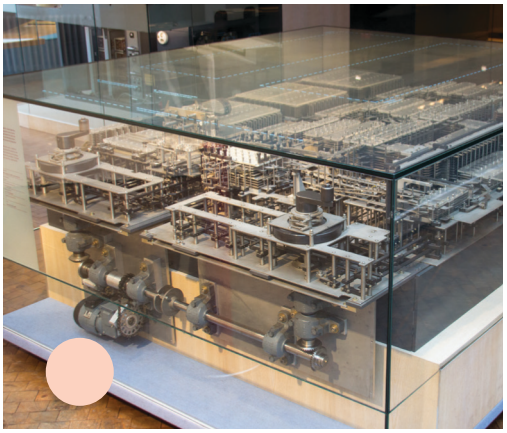
Conclusion: Summarize key points and reflect on the broader implications of internet censorship.

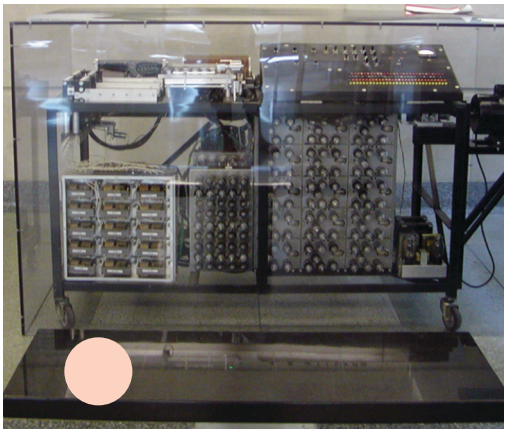
HISTORY OF COMPUTING

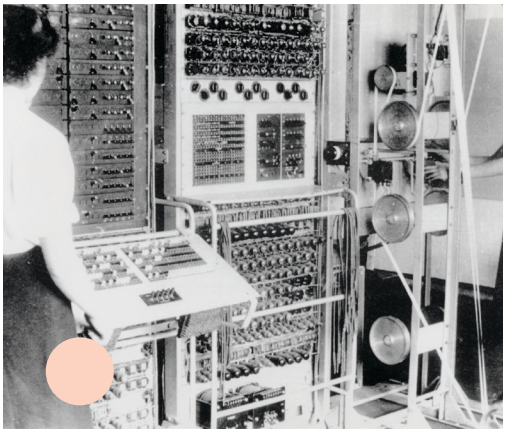
LEAD IN

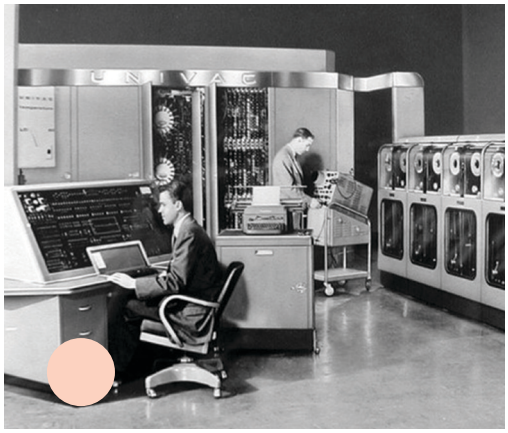
Pair up and match the pictures with the inventions (1-5).











1) Napier bones
2) ABC
3) Z1
4) UNIVAC
5) Colossus

1) Do you recognize the inventions?

2) What do you know about them?

3) Did they change people's lives and if yes, how?

Reading comprehension

ABACUS (4000 years ago)

The history of computer begins with the birth of abacus invented around 4,000 years ago by the Babylonians who used it to keep the record of their goods. Abacus had metal rods with beads mounted on them. The beads were moved by the abacus operator according to some rules to perform arithmetic calculations. Abacus is still used in some countries like China, Russia and Japan.

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Electronic Numerical Integrator Analyzer and Calculator (ENIAC) was built by John Mauchly and J. Presper Eckert. Because of its electronic, it is over 1,000 times faster than any previous computer. It was believed that ENIAC had done more calculations over the ten years it was in operation than all of humanity had until that time.

MARK I (1944)

Built by a team led by engineers Frederick Williams and Tom Kilburn, the Mark I served as the prototype for Ferranti's first computer – the Ferranti Mark 1. The Manchester Mark I used more than 1,300 vacuum tubes and occupied an area the size of a medium room. Its "Williams-Kilburn tube" memory system was later adopted by several other early computer systems around the world.

LISA (1983)

Lisa is the first commercial personal computer with a graphical user interface (GUI). It was thus an important milestone in computing because soon Microsoft Windows and the Apple Macintosh adopted the GUI as their user interface, making it the new paradigm for personal computing.

PASCALINE (1642)

Pascaline is also known as an Arithmetic Machine or Adding Machine. It was invented between 1642 and 1644 by a French mathematician-philosopher Biaise Pascal. It was the first hand-powered automatic calculator, which could only perform addition and subtraction up to eight figures.

COMPLEX NUMBER CALCULATOR (1939)

In 1939, Bell Telephone Laboratories completed the calculator designed by scientist George Stibitz. In 1940, Stibitz demonstrated the CNC at an American Mathematical Society conference held at Dartmouth College. Stibitz stunned the group by performing calculations remotely on the CNC (located in New York City) using a Teletype terminal connected to New York over special telephone lines. This is likely the first example of remote access computing.

MANCHESTER BABY (1948)

University of Manchester researchers Frederic Williams, Tom Kilburn, and Geoff Toothill developed the Small-Scale Experimental Machine (SSEM), better known as the Manchester "Baby." The Baby was built to test a new memory technology developed by Williams and Kilburn -- soon known as the Williams Tube – which was the first high-speed electronic random-access memory for computers. This was the first program in history to run on a digital, electronic, stored-program computer.

IBM'S PC (1982)

IBM's brand recognition, along with a massive marketing campaign, ignited the fast growth of the personal computer market with the announcement of its own personal computer (PC). The first IBM PC, formally known as the IBM Model 5150, was based on a 4.77 MHz Intel 8088 microprocessor and used Microsoft´s MS-DOS operating system. The IBM PC revolutionized business computing by becoming the first PC to gain widespread adoption by industry. The IBM PC was widely copied and led to the creation of a vast "ecosystem" of software, peripherals, and other commodities for use with the platform.

Adapted from:
https://www.javatpoint.com/history-of-computer
https://www.computerhistory.org/timeline/computers/

Task 1. Answer the following questions.

1) What was the early computing device used for?

2) Are there different types of operations systems? Name some of them.

3) What is the function of an operating system?

4) Can a computer work without an operating system?

5) Are operating systems free of charge?

Task 2. Decide whether the statements are true (T) or false (F). If false, correct them.

1)Abacus was replaced by Pascaline all over the world. T / F

2) ENIAC has done more calculations than all other devices up until that moment. T / F

3) The first electronic device introduced in the USA was a digital one. T / F

4) Mark I was a model for the Ferranti Mark 1. T / F

5) Manchester Baby was the first high-speed electronic random-access memory for computers. T / F

Academic vocabulary in use

Task 3. Match the words with similar meanings.

1) permanent	a) distant
2) analytical	b) criterion
3) to store	c) to embrace
4) to switch	d) original
5) remote	e) to accumulate
6) previous	f) to alter
7) prototype	g) breakthrough
8) to adopt	h) long-lasting
9) paradigm	i) systematic
10) milestone	j) preceding

Task 4. Complete the table with the missing forms. Sometimes there are more possible options.

NOUN	VERB	ADJECTIVE
invention/inventor		
	to manufacture	
calculation/calculator		
		performing/performed
	to apply	
difference		
creation/creator		
	to develop	
		commercial
demonstration		

Task 5. Choose the most suitable word ending from the table above to complete the sentences.

1) Napier's Bones were widely appl _____ in trading and navigation.

2) Although manufactur _____ by Remington Rand, UNIVAC 1 was often mistakenly referred to as the IBM Univac.

3) The invent _____ of the first transistor in 1947 led to a new technological revolution.

4) In the early 1940s, Konrad Zuse creat _____ what is considered the first programming language called Plankalkul.

5) The Motorola 68000 microprocessor was a high perform _____ processor.

6) Charles Babbage differ _____ between a difference and an analytical engine.

7) The first commerci _____ general-purpose computer is Ferranti Mark I.

Task 6. Complete the second sentence so that it has a similar meaning to the first sentence using the word given. Do not change the word given. You must use between three and six words, including the word given.

1) We used that microprocessor together with the previous ones.
ALONGSIDE
That microprocessor _____ existing ones.

2) Transistors are believed to have started the digital revolution.
INVENTION
The _____ can be considered the moment that truly ignited the digital revolution.

3) The pivotal moment in the history of computing happened in the 1980s when personal computers were widely used.
WIDESPREAD
The _____ in the 1980s marked a pivotal moment in the history of computing.

4) Pascaline featured a series of rotating wheels with inscriptions from 0 to 9.
FIGURES
Pascaline featured a series of rotating wheels _____ from 0 to 9.

5) In 1981, the introduction of a standardized platform by the IBM PC marked a transformative moment in the history of personal computing.
REVOLUTIONIZED
The IBM PC _____ a standardized platform in 1981.

Listening/watching comprehension

Task 7. Watch the video at https://www.youtube.com/watch?v=gjVX47dLlN8&t=35s and choose the correct answers.

1) When was the modern computing developed?
a) 1800s b) 1930s c) 1941

2) What was the first computer capable of storing data in its memory?
a) Z4 b) Mark I/Colossus c) Atanasoff-Berry

3) Which computer was used for the ballistic analysis during the WW2?
a) ENIAC b) Mark I/Colossus c) UNIVAC

4) What was the first prototype computer with transistors?
a) UNIVAC b) Manchester Baby c) Manchester TC

5) Which device served as a prototype for the term personal computer?
a) Altair 8800 b) Apple 1 c) IBM PC 5150

Task 8. Pair up and match the inventions with their inventors/developers.

1) Konrad Zuse	a) COBOL
2) John William Mauchly and J. Presper Eckert	b) Lisa
3) Bill Gates and Paul Alan	c) Z1/Z3/Z4
4) Grace Hopper	d) BASIC
5) Apple	e) UNIVAC

Task 9. Watch the video again. Complete the gaps with the suitable words.

1) The history of the computer dates _____ to the 1800s.

2) Colossus offered immediate solutions and it is believed that its use significantly _____ the duration of the war.

3) ENIAC _____ a room of 1500 m2.

4) The technologies used for this computer _____ to the development of the IBM 360.

5) Slowly, the evolution of the computer _____ what we know today to be.

6) In _____, Apple appeared on the market with Apple I.

Language in use

Task 10. Read the excerpt from the video below and think of the word which best fits each gap. Use only one word in each gap.

1) Another important moment in the history and evolution of the computer was also _____ 1941, when J.V. Atanasoff, a physics and math teacher, and his student, Clifford Berry, designed a computer that could solve 29 equations _____. Atanasoff-Berry computer was the first computer capable _____ storing data in its memory.

2) Harvard Mark-1/Colossus was used during World War II to break the complex Lorenz ciphers used _____ the Nazis.

3) Another computer that stood _____ at the time was ENIAC, created by John Mauchly and Presper Eckert. The computer was created _____ ballistic analysis, used by the military during World War II.

4) IBM 5150 was the computer that revolutionized the development of computers, being cloned on a large scale and _____ generating the creation of many software and peripherals.

Task 11. Using the correct tense (Past Simple or Past Continuous), complete the text on the history of video games.

Who 1) _____ (invent) video games?

In 2011, the video game industry 2) _____ (pull) in $17.01 billion for physical software, making its way into many, many households globally in the process. How 3) _____ the gaming _____ (start)? The answer is surprisingly complicated. In the late 1940s, Thomas T. Goldsmith Jr. and Estle R. Mann 4) _____ (patent) Cathode-Ray Tube Amusement Device, an electronic device incorporating screen overlays that users would hold while they 5) _____ (play) a few basic games.

In 1958, William Higinbotham 6) _____ (create) another notable precursor to modern video games while he 7) _____ (work) at the U.S. Department of Energy's Brookhaven National Laboratory. He 8) _____ (call) it Tennis for Two.

Although these and other electronic games 9) _____ (capture) audiences and imaginations across the country, the first true video game -- one that 10) _____ (transform) electronic signals into pictures on a screen by way of something called a raster pattern – 11) _____ (not/come) along until 1967. That is when an engineer named Ralph H. Baer 12) _____ (create) the first prototype of Magnavox Odyssey, a groundbreaking video game console that, along with countless imitators, 13) _____ (spark) the video game craze of the '70s.

Today, Baer is widely referred to as the "Father of Video Games," quite a distinction for someone who 14) _____ (begin) his career as a radio technician in the early '40s. After serving as a small arms expert throughout World War II, Baer 15) _____ (enroll) in the American Television Institute of Technology, graduating with a degree in television engineering. In 1951, Baer 16) _____ (find) himself tasked with designing the "world's best television" for a television company named Loral. Wanting to make the television stand out against the competition, Baer 17) _____ (propose) building an electronic game into the television set, but the concept 18) _____ (prove) too outlandish for his manager to approve.

Adapted from: https://science.howstuffworks.com/innovation/inventions/who-invented-video-games.

Task 12. Match the words/expressions with their definitions.

word/expression	**definition**
1) to make your way	a) to be successful and make progress in your life and work
2) precursor	b) to be very noticeable
3) groundbreaking	c) important and deserving attention
4) countless	d) new and different from other things of its type
5) to stand out	e) strange, unusual and difficult to accept or like
6) outlandish	f) something that happened or existed before another thing
7) notable	g) many or too many to be counted

Task 13. Read the text below and decide which answer A, B, C or D best fits each space.

Operating systems have played a 1) _____ role in shaping the digital landscape. In the early days of computing, there were no dedicated operating systems. Users interacted directly with the hardware, executing commands 2) _____. However, as computers grew in complexity, the need for a centralized system to manage resources and facilitate user interactions became apparent.

One important early operating system prototype was the General Motors Research Operating System (GM-RS) developed in the late 3) _____. It was among the first attempts to create a dedicated system for managing a computer's resources, 4) _____ the groundwork for future developments.

The 2000s marked a significant 5) _____ point in the history of operating systems. Microsoft's Windows XP, released in 2001, became widely adopted and is still considered one of the most significant operating systems in history. Its user-friendly interface, stability, and compatibility contributed to its 6) _____ use in both personal and business environments.

During 7) _____ era, experts in the field focused on improving security and efficiency. The rise of Linux, an open-source operating system, gained momentum, especially in server environments. Linux, with its robust design and flexibility, became widely adopted, powering a significant portion of the internet's infrastructure.

The 2000s also saw the 8) _____ of mobile operating systems. Notable among them was Apple's iOS, introduced in 2007 with the launch of the iPhone. iOS revolutionized the smartphone industry with 9) _____ intuitive touch-based interface and an ecosystem of applications, 10) _____ a standard for mobile operating systems.

1)	a) important	b) integral	c) pivotal	d) essential
2)	a) manually	b) manual	c) automatically	d) automatic
3)	a) 19th century	b) 1950	c) 1950s	d) 1950's
4)	a) established	b) laying	c) disregarding	d) putting
5)	a) turning	b) critical	c) milestone	d) starting
6)	a) narrow	b) spread	c) widespreading	d) widespread
7)	a) this	b) these	c) that	d) those
8)	a) appear	b) emergence	c) evolutionary	d) flood
9)	a) it's	b) its	c) his	d) their
10)	a) put	b) haveing	c) setting	d) prescribe

Speaking

Task 14. Team up and discuss your ideas within your team.

Student A

Do your research on the effects of technology on education and present it to your teammates.

Student B

Do your research on the effects of technology on communication and present it to your teammates.

Student C

Do your research on the effects of technology on the job market and present it to your teammates.

Student D

Do your research on the effects of technology on the society and present it to your teammates.

Task 15. Present your ideas to the rest of the class and discuss which field(s) the technology has influenced the most.

Academic writing

Visual representation of data

Data can be graphically represented by using charts, diagrams, figures, tables, etc. Even when visually representing data, one has to elaborate on represented information. Usually, general statements about a topic are followed by more specific comments on the most relevant or less anticipated information.

The advantages of visually representing data are as follows:

- ✓ Scanning information is faster
- ✓ The audience's interest can be sparked or kept by compelling storytelling
- ✓ A large amount of information is compacted
- ✓ The content is easier to remember and/or interpret
- ✓ Patterns and relationships are more effectively visualized
- ✓ Symbolic representation can be globally understood

Common visualization techniques are as follows:

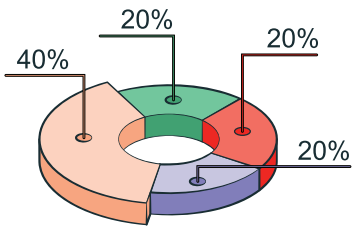
a) Tables

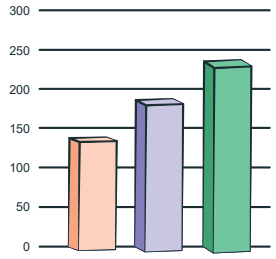
They consist of rows and columns used to compare variables. They provide a great deal of information in a structured way but can overwhelm users who are looking for high-level trends.

Sample headline			
Option 1	✓	x	x
Option 2	x	✓	x
Option 3	x	x	✓
Option 4	✓	✓	x

b) Pie and stacked bar charts

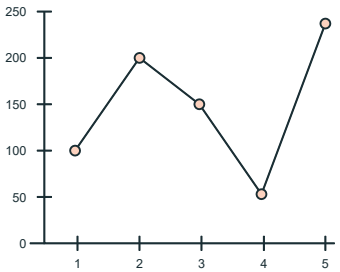
Users can choose among different types of charts depending on their needs. A common feature is a division into sections that represent parts of a whole. Data can be easily organized and the size of each component compared to the other.

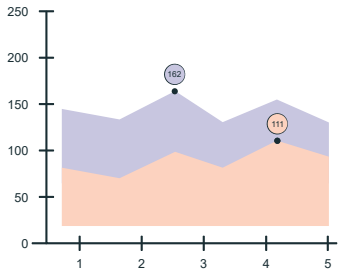




c) Line and area charts

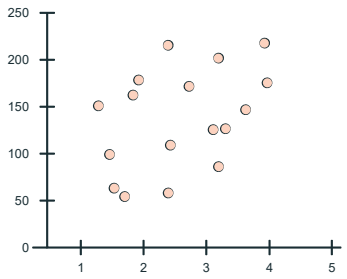
Since these chart types illustrate changes in quantities by plotting a series of data points over time, they are frequently used in predictive analytics. Line charts use lines to illustrate changes while area charts connect data with line segments stacking variables on top of each other and using colors to distinguish between variables.

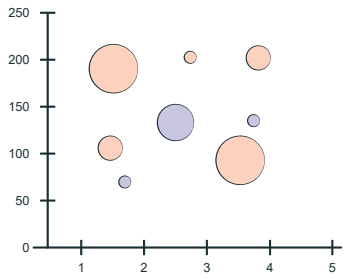




d) Scatter plots and bubble charts

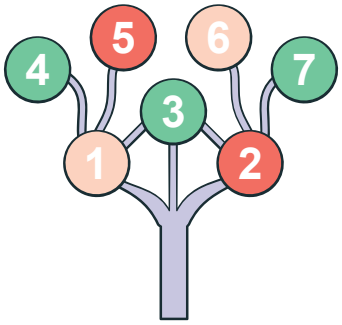
Scatter plots are beneficial for illustrating the relationship between two variables while bubble charts use three variables, namely the x-axis, y-axis and the bubble size.





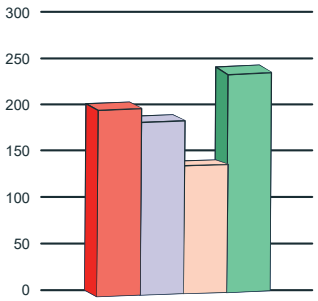
e) Tree maps

Tree maps or organizational charts are usually used for hierarchical data representation.



f) Histograms

A histogram presents the distribution of data over a continuous interval. Each bar represents the frequency of each interval. Histograms are used to show where values are concentrated as well as where the extremes or outliers are.



g) Timeline

A timeline is a graphical way of displaying events in a chronological order. They are useful for time-related information because they allow users to see any patterns appearing over any selected time period.