НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ
«КИЄВО-МОГИЛЯНСЬКА АКАДЕМІЯ»

Мальвіна Гусар

VIDEO COURSE

COMPUTING

Навчальний посібник
з англійської мови
для студентів НаУКМА
факультету інформаційних технологій

2024

Анотація

Навчальний посібник з англійської мови **«Video course: Computing»** створений для студентів факультету інформаційних технологій НаУКМА. Він орієнтований на розвиток лексичних і комунікативних навичок у контексті вивчення сучасних інформаційних технологій.

Посібник охоплює шість тем, що стосуються актуальних питань у сфері обчислювальної техніки та технологій, а саме: «Optical Drives» («Оптичні накопичувачі»), SSD vs Hard Drive vs Hybrid Drive («SSD. Жорсткі диски. Гібридні диски»), «NOR or NAND Flash Memory?» («Флеш-пам'ять»), «The First Programming Languages» («Перші мови програмування»), «Top 9 Microsoft Word Hacks» («9 корисних функцій Microsoft Word») та «What Can You Do with a Spreadsheet?» («Можливості електронних таблиць»). Кожна тема включає завдання на розширення словникового запасу, обговорення, перегляд відео та виконання завдань після перегляду відео, що сприяють глибшому розумінню матеріалу.

Особливістю посібника є інтеграція відеоматеріалів, що дозволяють студентам практикувати аудіювання на автентичних прикладах. Завдання на основі відео покликані розвивати критичне мислення, покращувати розуміння технічних текстів англійською мовою та формувати навички аналізу.

Цей посібник стане незамінним ресурсом для студентів, які прагнуть поглибити свої знання англійської мови та розширити технічний словниковий запас, необхідний для роботи в галузі інформаційних технологій.

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TOPIC 1. OPTICAL DRIVES

I. Lead-in

1. What is an optical drive? Do you use it? Why? Why not?

2. What are the primary types of optical drives, and how do they differ in terms of functionality and usage?

3. In today's digital age, how relevant are optical drives compared to other storage solutions like cloud storage, USB drives, and SSDs?

4. What advantages do optical drives offer that make them still useful in specific industries or for certain users?

II. Practicing Vocabulary

Task 1. Match the words on the left with the correct definitions on the right

Word	Definition
1. Optical drive	A. A drive that can read newer media but can only write to older media
2. Laser	B. A connection interface used primarily for internal computer drives
3. Disc mount	C. A device used to read or burn data on CDs, DVDs, or Blu-ray discs
4. Pits	D. A high-capacity optical disc format using a blue laser
5. Blu-ray	E. A drive that can be connected to a computer externally via USB or Thunderbolt
6. Combo drive	F. The part inside the optical drive that holds the disc and allows it to spin
7. USB 3	G. A faster version of the USB interface that provides more power

Word	Definition
8. SATA	H. The ability of a device to work with older formats and technologies
9. Portable drive	I. Small depressions on an optical disc that store data
10. Backward compatible	J. A beam of light used to read or write data to an optical disc

Task 2. Complete the sentences with the words given:

lens assembly DVD internal connector frequency
compatible data burning external inside

1. USB 3 drive has two plugs which are the type A and the type C _____.
2. USB 2 has two USB plugs, one is for power and the other one is for _____.
3. A laptop usually requires an _____ USB optical drive or it has it fixed_____.
4. For business, often a _____ drive will be good enough.
5. The optical drive will be backward _____.
6. The word multi, unlike combo, means that the drive supports _____ for CD and DVD.
7. If you are purchasing a new optical drive, you need to know if it is _____ or external and if it supports DVD or Blu-ray.
8. Changing the _____ of the laser also changes the colour of the laser.
9. _____ holds the laser in place and also allows it to be moved to different parts of the optical discs as required.

III. Pre-Video Discussion:

1. *What do you already know about how optical drives work and their components?*
2. *Why do you think the usage of optical drives has declined over time?*
3. *What are some alternatives to optical drives for storing and transferring data today?*

4. *Have you ever used different types of optical media, such as CDs, DVDs, or Blu-rays? What was your experience?*
5. *Do you think optical drives still have relevance in business or personal use? Why or why not?*

IV. Watching a Video

Task 1. Watch the video about optical drives. Choose "True" or "False" to the following statements.

1. Optical drives are still frequently used in modern laptops.

a) True

b) False

2. The laser in an optical drive is used to either read or burn data onto optical discs.

a) True

b) False

3. CDs with Blu-ray have bigger pits on the disc.

a) True

b) False

4. Optical drives don't have the market share that they once did; however, you will find that they still get used in business.

a) True

b) False

5. USB 3 provides more power than USB 2.

a) True

b) False

6. In order to operate, USB3 needs one USB plug plugged in.

a) True

b) False

7. An optical drive could be easily installed or removed from the desktop.

a) True

b) False

8. An optical drive may not always support burning on all media.

a) True

b) False

9. A combo drive can read and write to newer and older media.

a) True

b) False

10. Combo drives can burn both Blu-ray discs and DVDs.

a) True

b) False

Task 2. Complete the sentences with the words missing. Then, watch the video again and check the answers.

1. Optical drives have lost much of their market share but are still used in some cases, particularly in _____.

2. Inside the optical drive, there is a _____ that holds the disc in place and allows it to spin.

3. The laser in an optical drive needs to be _____ in order to read or write to the disc.

4. The size of the _____ on an optical disc differs between CDs, DVDs, and Blu-rays.

5. The blue color in Blu-ray comes from the _____ of the laser used to read the disc.

6. Internal SATA optical drives are not portable and are typically installed in _____ computers.

7. Some portable USB drives require _____ USB plugs, one for power and the other for data.

8. Modern laptops generally do not include _____ drives anymore due to their reduced use.

9. A combo drive can read both older and newer media but can only write to _____ media.

10. If there are no logos on the front of an optical drive, you can check the _____ for more information about its features.

V. Post-Video Discussion:

1. *How does the laser and lens assembly inside an optical drive function to read or write data?*
2. *What are the key differences between CDs, DVDs, and Blu-rays in terms of data storage and technology?*
3. *Which type of optical drive would you choose for business use and why?*
4. *Why are combo drives still sold, even though they are rarer nowadays?*
5. *Do you think optical drives have a future in technology, or are they headed toward complete obsolescence? Why or why not?*

TOPIC 2. SSD vs HARD DRIVE vs HYBRID DRIVE

I. Lead-in

1) What is a magnetic drive?

2) Do you know what the abbreviation SSD stands for?

3) What is a hybrid drive?

4) What type of storage device do you use in your computer (laptop)?

II. Practicing Vocabulary

Task 1. Match words to their explanations:

1) permanent 2) non-volatile 3) retain 4) a sealed case 5) actuator arm 6) higher-end 7) ATA interface 8) firmware 9) IDrive 10) M.2 Slot	a) directed by instructions in the operating system to move the head to a specific track. b) a microprogram stored in ROM, designed to implement a function that had previously been provided in software c) provides online cloud backup for PCs d) Keep, preserve e) Long-lasting, stable f) it connects hard drives, CD-ROM (compact disc read-only memory) drives, and other drives; g) A slot on a computer's motherboard designed for faster SSD connections. h) Unchangeable, steady i) A plastic or metal housing that contains the discs j) more expensive and of better quality

Task 2. Complete the sentences with the correct word from the box:

Primary Memory, Secondary Memory, Non-volatile, Magnetic Disk, Actuator Arm, RPM, SSD, SATA, M.2 Slot, Hybrid Drive

1. The _____ is responsible for reading or writing data to the spinning magnetic disks in a hard drive.

2. _____ memory stores the operating system and files on a computer and is permanent.
3. An SSD is much faster than a hard drive because it doesn't have moving parts, unlike a traditional hard drive's _____.
4. A typical desktop hard drive operates at 7200 _____, which affects the speed at which data is read and written.
5. _____ drives are becoming more popular because they combine the low cost of hard drives with the speed of flash memory.
6. RAM is an example of _____ memory because it is temporary and loses data when the power is turned off.
7. The _____ interface allows for fast data transfer rates between the storage drive and the motherboard.
8. Data stored on a hard drive is _____, meaning it stays intact even when the computer is turned off.
9. The newer _____ is a form factor designed for faster SSDs that plug directly into the motherboard.
10. A _____ is much faster than a traditional hard drive and is also quieter and more energy efficient.

III. Pre-Video Discussion:

1. *What data types do you think a computer needs to store?*
2. *List examples of devices or storage tools used to save data.*
3. *Have you heard the terms "primary memory" and "secondary memory"? How do you think they differ?*
4. *Why do you think computers need storage drives that retain data even when the power is off?*
5. *What advantages do you expect from newer storage technologies compared to older ones?*

IV. Watching a Video

Task 1. Watch the video about magnetic drives. Choose "True" or "False" to the following statements:

1. There are 3 different types of internal storage drives.

a) True
b) False

2. Magnetic hard drives were introduced by IBM in 1966.
a) True
b) False

3. Today the hard drive in desktop computers operates at the 7200 RPM range.
a) True
b) False

4. Very soon higher-end hard drives will operate at 10 000 RPM range
a) True
b) False

5. One of the advantages of SSDs is that they are more resistant to physical shock than hard drives.
a) True
b) False

6. It is cheaper to use both an SSD and a hard drive
a) True
b) False

7. In hybrid drives, the files that are accessed infrequently will be cached and stored on the flash memory, while the frequently used data will be stored on the disks. (F)

a) True

b) False

8. A hybrid drive, or SSHD, combines magnetic disks and flash memory to enhance performance.

a) True

b) False

9. The firmware in a hybrid drive automatically decides where to store frequently used and infrequently used data.

a) True

b) False

10. All types of storage drives, including SSDs and hard drives, will never fail as long as they are properly maintained.

a) True

b) False

Task 2. Watch the video and fill in the gaps with the words missing:

1. Primary memory is temporary, while secondary memory is _____.
2. A computer uses _____ drives to store data like photos, documents, and videos.
3. Magnetic hard drives were introduced by IBM in _____.
4. SSDs store data using _____ memory chips instead of magnetic disks.
5. Hard drives use a _____ RPM speed to read and write data, with desktop drives typically operating at 7200 RPM.
6. The _____ interface allows for faster data transfer in hard drives compared to the older parallel ATA interface.

7. SSDs are more resistant to physical _____ compared to magnetic hard drives.

8. _____ drives combine the storage capacity of magnetic disks with the speed of SSDs.

9. Files that are accessed frequently are stored on the _____ memory of a hybrid drive.

10. It's important to regularly back up your data because all storage drives will eventually _____ due to wear and tear.

V. Post-Video Discussion:

1. Which type of a magnetic drive makes the price of a computer cheaper?

2. What is the difference between primary memory (RAM) and secondary memory (storage drives)?

3. How do magnetic hard drives store data, and what speeds can they operate at?

4. Why are SSDs (Solid State Drives) considered faster and more durable than magnetic hard drives?

5. Will the hard drive be replaced completely by the SSD?

TOPIC 3. NOR OR NAND FLASH MEMORY?

I. Lead-in

1) *What do you know about flash memory?*

2) What flash memory devices do you use?

*3) What advantages and disadvantages of flash memory devices could you mention***?**

II. Practicing Vocabulary

Task 1. Match words to their explanations:

Description box	A. A method of reading data from random locations in memory.
NOR flash memory	B. The amount of electrical power a device consumes while in a low-power state.
NAND flash memory	C. The total amount of data stored in a memory device.
Logic gate	D. A method of reading data in the order it is stored in memory.
Bit line	E. A memory type that uses a structure similar to NOR logic gates, with larger cells and fast read speeds.
Source line	F. The line that connects one end of a memory cell to its power source.
Sequential read	G. A digital circuit that performs logical operations on one or more binary inputs.
Random read	H. It refers to the section below a video, article, or post where additional information, links, and details about the content are provided.
Standby power consumption	I. A line that connects the memory cells to read or write data in a memory circuit.
.Memory capacity	J. A memory type that uses a structure similar to

	NAND logic gates, with smaller cells and fast write/erase speeds.

Task 2. Complete the sentences with the correct vocabulary word from the box:

NOR flash memory, NAND flash memory, description box, Bit line, Random read, Sequential read, Standby power consumption, Memory capacity, Source line, Logic gate

1. You can find more details about the product in the _____ below the video.
2. _____ is typically faster for reading data but slower for writing and erasing.
3. In _____, memory cells are connected in series and are more efficient for writing and erasing data.
4. A _____ is responsible for connecting one end of a memory cell to a source.
5. Devices that need low-power states rely on low _____ to conserve energy.
6. NAND flash memory has a higher _____ compared to NOR flash, making it suitable for larger storage needs.
7. _____ allows quick access to random memory locations, making it useful for certain applications like mobile phones.
8. Digital cameras and USB flash drives use _____, which is more efficient for reading data in a set order.
9. A _____ is a device that performs binary operations based on input signals.
10. The line in a flash memory circuit that connects memory cells and transfers data is called the _____.

III. Pre-video discussion

1. What do you know about the differences between NOR and NAND flash memory technologies?

2. How do you think storage technologies impact the performance of electronic devices like smartphones or USB drives?

3. Can you predict how the organization of memory cells might affect the read and write speeds of flash memory?

4. Why might some devices use different types of memory for different functions?

IV. Watching a Video

Task 1. Watch the video about magnetic drives. Choose "True" or "False" to the following statements.

1. NOR and NAND flash memory are both volatile storage technologies.

a) True

b) False

2. NOR flash memory is faster to read than NAND flash memory.

a) True

b) False

3. NAND flash memory is more expensive than NOR flash memory because it has a smaller cell size.

a) True

b) False

4. NOR flash memory is slower to erase and write new data than NAND flash memory.

a) True

b) False

5. NAND flash memory has a higher memory capacity than NOR flash memory despite its smaller size.

a) True

b) False

6. NOR flash memory consumes less power than NAND flash memory when first turned on.

a) True

b) False

7. NAND flash memory is better for sequential reads and writes than NOR flash memory.

a) True

b) False

8. NOR flash memory is commonly used in high-reliability applications like mobile phones and medical devices.

a) True

b) False

9. NAND flash memory is suited for applications that require fast read times, such as USB flash drives.

a) True

b) False

10. Some devices use both NOR and NAND flash memory for different purposes, such as smartphones.

a) True

b) False

Task 2. ***Watch the video again and complete the sentences with the words missing*****.**

1. With NOR flash memory, one end of each memory cell connects to the _____, and the other end to a bit line resembling NOR gate.
2. With NAND flash memory, several memory cells connect in a _____ series like a NAND gate.

3. NOR flash is faster to _____ than NAND flash memory.

4. NOR flash is _____ to erase and write new data.

5. NAND flash memory is also much smaller than NOR flash, less expensive, and has a _____ capacity.

6. NOR flash memory is better suited for _____read from memory.

7. NAND is more efficient at _____, erasing and sequential readings.

8. NOR flash is most often used for _____, scientific instruments and medical devices.

9. NAND is best suited for high-memory capacity applications that don't require fast read times, like digital cameras, _____, and other SD card-compatible devices.

10. Smartphones and tablets might have NOR embedded to _____ the OS and a removable NAND card for other memory or storage requirements.

V. Post-video discussion

1. What are the key differences between NOR and NAND flash memory in terms of read, write, and erase speeds?

2. Why is NOR flash typically used for low-capacity applications like mobile phones, while NAND flash is used for high-memory capacity devices like USB drives?

3. How does the power consumption differ between NOR and NAND flash memory?

4. In what situations might a device use both NOR and NAND flash memory, and why would this be beneficial?

5. How might the physical structure of NOR and NAND flash memory cells influence their performance and cost?

TOPIC 4. THE FIRST PROGRAMMING LANGUAGES

I. Lead-in

1. How do programming languages evolve over time, and what role does community support play in that evolution?

2. What are the main differences between compiled and interpreted languages, and how do they affect performance and development processes?

3. What programming languages are best suited for certain industries (e.g., web development, AI, game development), and why?

4. Should programmers aim to specialize in a few languages or gain general proficiency in many? Why?

II. Practicing Vocabulary

Task 1. Match each term with its correct definition

a) Pseudo-Code b) Mnemonic c) Assembler d) Compiler e) Abstraction f) Variables g) Punch tape h) Veneer i) Nifty j) JUMP address k) Opcode g) Operands	A program that translates high-level language into machine code. A simplified, human-readable version of a program that represents the steps. A text-based name for a machine code instruction. A system that hides low-level complexities to focus on larger concepts. A program that converts assembly language into machine code. A thin, decorative surface used to make something appear more polished. A memory location that a program jumps to when needed. Handy, clever, or useful tricks or solutions in programming. A storage location used in programming to hold data that can change during execution.

	.The binary language instruction set that tells the CPU what operation to perform. .The data or memory location that a CPU uses during a machine code operation. .A long strip of paper used in early computers to input data or programs.

Task 2. Complete the sentences with the correct vocabulary word.

Pseudo-Code *Mnemonic* *Assembler* *Compiler*
Abstraction *Variables* *Punch tape* *Veneer*
Nifty *JUMP address* *Opcode* *Operands*

1. A(n) _____ converts assembly language directly into machine code.
2. A (n) _____ helps simplify complex machine code by representing it with readable instructions.
3. Early computers only understood _____, which was cumbersome for programmers to work with.
4. Using _____, programmers can focus on tasks without worrying about specific memory addresses or registers.
5. A single line of _____ might translate into several lines of machine code, making programming more efficient.
6. When writing a program in _____, programmers don't have to worry about managing low-level machine functions.
7. In programming, _____ are used to store data that can be changed and referenced throughout a program.
8. Early computers used _____ to store and input programs, which involved feeding long strips of paper into the machine.
9. Assembly languages are a thin _____ over machine code, making them easier for humans to read but still closely tied to hardware.
10. Programmers often use _____ tricks, like auto-linking, to make coding faster and more efficient.

11. _____ tell the computer where in memory to go when certain conditions are met, such as when a loop repeats.
12. After the opcode, instructions in machine language often include _____, which tell the computer which data or memory addresses to use.

III. Pre-Video Discussion:

1. What do you think is the difference between computer hardware and software?

2. Have you ever heard of machine code or assembly language? What do you know about them?

3. Why might programming at the hardware level be cumbersome for programmers?

4. What role do you think high-level programming languages play in making computers more accessible to different fields?

5. What is your understanding of how programming languages have evolved over time?

IV. Watching a Video

Task 1. Watch the video about optical drives. Choose "True" or "False" to the following statements.

1. Machine code is the only language that computer processors can natively understand.

a) True

b) False

2. Assemblers were developed to help programmers convert high-level programming languages directly into machine code.

a) True

b) False

3. In early computing, all programs had to be written directly in binary machine code.

a) True

b) False

4. Grace Hopper designed the first high-level programming language, A-0, which used a compiler to translate code into machine instructions.

a) True

b) False

5. Assembly language is completely independent of the hardware it runs on.

a) True

b) False

6. FORTRAN was a significant improvement over assembly language because it allowed programs to be much shorter and easier to write.

a) True

b) False

7. COBOL was created to be a machine-independent programming language that could run on any computer.

a) True

b) False

8. High-level programming languages like Python require programmers to manage memory locations and registers manually.

a) True

b) False

9. FORTRAN was initially designed for general-purpose computing rather than scientific applications.

a) True

b) False

10. The evolution of programming languages has made it possible for people from many different fields, not just computer experts, to use computers effectively**.**

a) True

b) False

Task 2. Watch a video and complete the sentences with the words missing:

1. Opcodes were given simple names, called mnemonics, which were followed by operands, to form_____.
2. A CPU doesn't understand text-based language, only _____.
3. CPU reads in a program written in an _____ and converts it to a native machine code.
4. Each assembly language instruction converts directly to a corresponding machine instruction – a one-to-one_____.
5. Programming the Mark 1 was kind of a _____.
6. A compiler is a specialized program that transforms "source" code written in a programming language into a _____ language.
7. FORTRAN is derived from "_____".
8. FORTRAN code could only be compiled and run on _____ computers.
9. COBOL is a common programming language that can be used across _____.
10. Each new language attempts to leverage new and clever abstractions to make some aspect of programming easier or more _____.

V. Post-Video Discussion:

1. How did the introduction of assembly language make programming easier compared to using raw machine code?

2. What was the significance of Dr. Grace Hopper's work in creating the first compiler?

3. How do modern high-level programming languages, like Python, differ from assembly languages in terms of abstraction?

4. Why was FORTRAN considered a major milestone in programming, and how did it change the way programmers worked?

5. How has the evolution of programming languages over time impacted fields beyond just computer science?

6. Do you think there will ever be a "perfect" programming language, or will trade-offs always exist? Why or why not?

TOPIC 5. TOP 9 MICROSOFT WORD HACKS

I. Lead-in

1. How often do you use Microsoft Word?

2. What are some of the most useful features in Microsoft Word that help you streamline your document creation and formatting process?

3. What challenges have you faced while collaborating on documents in Microsoft Word?

II. Practicing Vocabulary

Task 1. Match the words with their correct definitions:

1. Adjust the text	a. Placeholder text used in drafts or designs to represent future content.
2. Caveat	b. To assign or officially appoint someone to a specific task or role.
3. Shortcuts	c. A section of a word processor used to check spelling and grammar.
4. Proofing tab	d. A warning or condition attached to an agreement or statement.
5. Lorem ipsum	e. To move something, typically by clicking and holding with a mouse.
6. Browse	f. To modify or tweak the appearance or placement of written content.
7. Drag	
8. Generic	
9. Serve (much of a purpose)	

10. Designate	g. Keyboard combinations or commands that allow for faster actions. h. To look or search through websites, documents, or files. i. Not specific or unique; applicable to many situations. j. To fulfill a useful or significant function.

Task 2. Complete the sentences by filling in the blanks with the appropriate word from the list:

serve adjust caveat to browse shortcuts drag proofing tab designate lorem ipsum text generic text

1. While editing, you can _____ the text the size of the font to improve readability.
2. One important _____ is that this software only works on Mac.
3. Instead of typing out long commands, you can use _____ to save time.
4. Make sure you visit the _____ to check for any grammar or spelling mistakes.
5. For now, we'll use _____ text until we get the final copy.
6. When you _____ through websites, be mindful of security warnings.
7. You can _____ and drop the image to rearrange the layout.
8. The sample is just _____ text, not the actual content.
9. His feedback didn't _____ much of a purpose since it was too vague.
10. Please, _____ the new team leader for this project.

III. Pre-Video Discussion:

1. *How familiar are you with Microsoft Word? Can you share any tips or tricks that you regularly use?*

2. *What challenges do you typically face when working with large documents in Word?*
3. *Do you know how to use the 'AutoCorrect' feature in Word? How could it help speed up your work?*
4. *Have you ever needed to generate random or placeholder text in Word? How did you go about doing it?*
5. *What do you expect to learn from a video that promises to show secret Microsoft Word hacks?*

IV. Watching a Video

1. Typing '=lorem(3,5)' in Microsoft Word will generate three paragraphs with five sentences each of random text.

a) True

b) False

2. You can select non-contiguous blocks of text in Microsoft Word by holding the 'Alt' key and dragging the mouse.

a) True

b) False

3. To bold the selected text, you should click the 'Bold' button in the ribbon toolbar.

a) True

b) False

4. The 'Proofing Tab' is where you can set up autocorrect shortcuts.

a) True

b) False

5. By holding 'Ctrl' and tapping 'Backspace,' you can delete entire words instead of single letters.

a) True

b) False

6. Microsoft Word cannot convert PDFs into editable Word documents.

a) True

b) False

7. Double-clicking in the gray area above the text will minimize or hide the white space.

a) True

b) False

8. If you set the theme in Microsoft Word to 'Dark Gray,' it cannot be changed back to the default.

a) True

b) False

9. Double-clicking in an empty area of the document allows you to add text in that location instantly.

a) True

b) False

10. When using the 'rand' function to generate random text, you cannot specify the number of sentences per paragraph.

a) True

b) False

Task 3. Complete the sentences with the words given. Watch a video again and check your answers

grey space shortcuts rectangular group the formatting 'account' convert right parenthesis delete the sentencecaveat

1. Anytime you need some generic text, click on the document and type ‘=’ and then type in "rand’, left parenthesis, then put in any number that's how many paragraphs will be generated, then put a comma, and then how many sentences per paragraph, _____ and tap 'enter'.
2. To select any _____ of text, hold the 'alt' key on the keyboard and then click on the text and drag.
3. To change or set up auto-correct rules, go to 'file', go down to 'more options' go to the 'proofing tab' and then click 'auto-correct options'. Here you can set up _____.
4. Select the text, hold 'ctrl', and tap the 'spacebar', and it removes _____.
5. To _____, hold 'ctrl' on the keyboard, and then tap 'backspace', and it deletes not one letter at a time, but one word at a time.
6. Microsoft Word can now easily and very successfully _____ PDFs into Word.
7. When Microsoft Word is trying to convert the PDF into an editable Word document, there is one _____ to this process - it says: "It will be optimized to allow you to edit the text", press 'ok'.
8. If you don't like the way the Word looks, go to the 'file', and then _____, and then here it says 'office theme', and change that.
9. Double-click the _____ above the text, to hide it or minimize it and use more of the screen.

V. Post-Video Discussion:

1. *Which of the Microsoft Word hacks mentioned surprised you the most, and how would you use it in your work?*
2. *What are the advantages of using the ‘Alt’ key to select rectangular blocks of text, and in what situations could this be helpful?*

3.How does the ‘Ctrl + Backspace’ shortcut improve efficiency when editing documents?

4.After learning about the 'PDF to Word' conversion, how could this feature be beneficial for your projects?

5.Now that you know how to hide white space in Word, how do you think this feature would improve your document-viewing experience?

TOPIC 6. WHAT CAN YOU DO WITH A SPREADSHEET?

I. Lead-in

1. How often do you use spreadsheets in your personal or professional life, and what tasks do you typically accomplish with them?

2. Have you ever automated a process using spreadsheet formulas or macros? How did it change your workflow?

3. In what ways do you think spreadsheets can enhance decision-making or problem-solving in a business setting?

4. Can you think of any industries or jobs that could not function efficiently without the use of spreadsheets? Why?

5. Are spreadsheets becoming outdated with the rise of more advanced data analysis tools, or are they still relevant? Why?

II. Practicing Vocabulary

Task 1. Match the terms with their correct definitions:

1. Microsoft Excel 2. Apple Numbers 3. Google Sheets 4. LibreOffice/OpenOffice 5. Trend Line 6. Liabilities 7. Gantt Chart 8. Corel Calculate 9. Pie Chart 10. Forecasting	A. A type of chart that shows parts of a whole in the shape of a circle, divided into slices. B. A free, web-based spreadsheet program that can be accessed from any device with internet access. C. The most widely used spreadsheet program, part of Microsoft Office, with advanced productivity features. D. A tool used to predict future trends based on existing data. E. A smaller spreadsheet program from Corel, evolved from Quattro Pro. F. A program designed for Mac and iPad users, offering basic spreadsheet functionality. G. Open-source spreadsheet software that is free and

	highly compatible with Excel. H. Opposite of revenue or assets, typically involving debts or obligations. I. A project management tool that uses bars to illustrate tasks over time. J. A line added to a chart to represent data trends or patterns over time.

Task 2. Complete the sentences with the words given:

Microsoft Excel *Google Sheets* *liabilities* *Apple Numbers* *trend lines* *forecasting* *Corel Calculate* *investments* *graphs* *pie chart*

1. You can use a spreadsheet to keep track of sales, expenses, or even _____ that you are thinking of making.
2. One common visual representation of data in a spreadsheet is a _____.
3. _____ is a feature that helps predict future events based on historical data.
4. Spreadsheet programs like _____ allow you to track both revenue and _____ like loans.
5. If you want to work on spreadsheets from multiple devices, _____ offers a free, web-based solution.
6. In addition to creating simple tables, spreadsheets also let you generate _____ like column charts and bar charts.
7. _____ is an Apple-exclusive spreadsheet program designed for use on Mac and iPad devices.
8. You can use Excel for advanced tasks like adding _____ to your data charts to predict future trends.
9. Though less common, _____ is a spreadsheet program offered by Corel.
10. _____ remains the industry leader, integrating seamlessly with other Microsoft Office products.

III. Pre-Video Discussion:

1. *What tasks or activities can be managed using spreadsheets?*
2. *Have you used a spreadsheet program before, and if so, which one? What did you use it for?*
3. *What do you expect to learn about the different spreadsheet programs available?*
4. *Why do you think businesses and individuals rely so heavily on spreadsheets for organizing data?*
5. *What advanced features do you believe spreadsheets offer beyond basic data entry and calculations?*

IV. Watching a Video

Task 1. Watch the video about spreadsheets. Choose "True" or "False" to the following statements.

1. A spreadsheet can only be used for tracking expenses and revenue.

a) True

b) False

2. You can use a spreadsheet to create various types of charts, including pie charts, bar charts, and trend lines.

a) True

b) False

3. Spreadsheets are useful for forecasting future trends and budgeting.

a) True

b) False

4. Excel cannot be used to create small invoices or estimates.

a) True

b) False

5. Spreadsheets are not limited to financial data; they can also be used to track things like vacation time or manage projects.

a) True

b) False

6. Microsoft Excel has 95% of the market share in spreadsheet programs.

a) True

b) False

7. Google Sheets is a paid service.

a) True

b) False

8. LibreOffice and Apache OpenOffice are almost identical spreadsheet programs.

a) True

b) False

9. Excel is only compatible with Windows operating systems.

a) True

b) False

10. All free spreadsheet programs offer the same advanced features as Excel.

a) True

b) False

Task 2. Fill in the blanks with the correct words missing. Watch the video again and check your answers.

1. A spreadsheet can be used to track both _____ and revenue.

2. In addition to pie charts, you can also create bar charts and _____ in a spreadsheet.
3. Spreadsheets are not just for tracking past events, but also for _____ the future.
4. For small businesses, spreadsheets can be used to create invoices and _____.
5. Aside from numbers, spreadsheets can help manage projects, similar to a _____ chart.
6. Microsoft _____ holds 95% of the spreadsheet market share.
7. _____ Sheets is a free web-based spreadsheet program.
8. LibreOffice and _____ OpenOffice are almost identical spreadsheet programs.
9. Excel can run on Windows PCs, Macintoshes, and even _____ devices.
10. Excel integrates well with other Microsoft Office programs, such as _____ and Word.

V. Post-Video Discussion:

1. *What are some key advantages of using Microsoft Excel over free spreadsheet programs like Google Sheets or LibreOffice?*
2. *How can spreadsheets be used for tasks beyond financial tracking, as mentioned in the text?*
3. *Why might forecasting and trend lines be essential tools in managing data with spreadsheets?*
4. *What features of spreadsheet programs make them versatile tools for small businesses and individuals?*
5. *Which spreadsheet program would most benefit your needs, and why?*

KEYS

TOPIC 1. OPTICAL DRIVES

II. Practicing Vocabulary:

Task 1.

1. C; 2. J; 3. F; 4. I; 5. D; 6. A; 7. G; 8. B; 9. E; 10. H

Task 2.

1. connector; 2. Data; 3. External; 4. Inside; 5. DVD; 6. Compatible; 7. Burning; 8. Internal; 9. Frequency; 10. Lens assembly.

IV. Watching a Video:

Task 1.

1. F; 2. T; 3. T; 4. F; 5. T; 6. F; 7. F; 8. T; 9. F; 10. F.

Task 2. 1. business, 2. disc mount; 3. Focused; 4. Pits; 5. Frequency; 6. Desktop; 7. Two; 8. Optical; 9. Older; 10. Stickers.

TOPIC 2. SSD vs HARD DRIVE vs HYBRID DRIVE

II. Practicing Vocabulary

Task 1.

1) e; 2) h; 3) d;4) I; 5) a; 6) j; 7) f; 8) b; 9) c; 10) g.

Task 2.

1. actuator arm; 2. Secondary memory; 3. magnetic disk; 4. RPM; 5. Hybrid; 6. Primary; 7. SATA; 8. non-volatile; 9. M.2 slot; 10. SSD

IV. Watching a Video

Task 1.

1. T; 2.F; 3.T; 4. F; 5. T; 6. T; 7. F; 8.T; 9.T; 10. F.

Task 2.

1. permanent; 2. storage; 3. 1956; 4. flash; 5. rotating; 6. SATA; 7. shock; 8. hybrid; 9. flash; 10. crash

TOPIC 3. NOR OR NAND?

II. Practicing Vocabulary

Task 1.

1. h; 2. e; 3. j; 4. g; 5. i; 6. f; 7. a; 8. d; 9. b; 10. c

Task 2.

1. description box; 2. NOR flash memory; 3. NAND flash memory; 4. source line; 5. standby power consumption; 6. memory capacity; 7. Random read; 8. sequential read; 9. A logic gate; 10. bit line.

IV. Watching a Video

Task 1.

1. F; 2. T; 3. F; 4. T; 5. T; 6. F; 7. T; 8. T; 9. F; 10. T.

Task 2.

1. source line; 2. parallel; 3. read; 4. slower; 5. higher memory; 6. random; 7. writing; 8. mobile phones; 9. USB flash drives; 10. boot up

TOPIC 4. THE FIRST PROGRAMMING LANGUAGES

II. Practicing Vocabulary

Task 1.

a) 2; b) 3; c) 5; d) 11; e) 4; f) 9. g) 12; h) 6; i) 8; j) 7; k) 10; g) 1.

Task 2.

1. assembler; 2. Mnemonic; 3. machine code; 4. Abstraction; 5. high-level language; 6. high-level language; 7. variables; 8. punch tape; 9. veneer with nifty; 10. JUMP; 11. Opcodes; 12. Operands.

IV. Watching a Video

Task 1.

1. T;

2. F (Assemblers convert assembly language to machine code, not high-level languages.);

3. T;

4. T;

5. False (Assembly languages are tied to specific hardware architectures.);

6. T;

7. T;

8. False (High-level languages abstract these details away.)

9. False (FORTRAN was designed for scientific and engineering computations.)

10. T.

Task 2.

1. instructions; 2. Binary; 3. Assembly Language; 4. Mapping; 5. Nightmare; 6. low-level; 7. Formula Translation; 8. IBM; 9. different machines; 10. Powerful.

TOPIC 5. TOP 9 MICROSOFT WORD HACKS

II. Practicing Vocabulary

Task 1.

1. f; 2. d; 3. g; 4. c; 5. a; 6. h; 7. e; 8. i; 9. j; 10. b.

Task 2.

1. adjust the text; 2. caveat; 3. shortcuts; 4. proofing tab; 5. lorem ipsum; 6. browse; 7. drag; 8. generic; 9. serve; 10. designate

IV. Watching a Video

Task 2.

1. False (It generates lorem ipsum text, not random text.);

2. T;

3. False (You can also use the right-click menu.);

4. T;

5. T;

6. False (It can convert PDFs into editable Word documents.);

7. T;

8. False (You can change it back to the system setting.);

9. T;

10. False (You can specify both the number of paragraphs and the number of sentences per paragraph.)

Task 3.

1. grey space; 2. 'account'; 3. caveat; 4. convert; 5. delete the sentence; 6. the formatting; 7. Shortcuts; 8. rectangular group; 9. right parenthesis

TOPIC 6. WHAT CAN YOU DO WITH A SPREADSHEET

II. Practicing Vocabulary

Task 1.

1. C; 2. F; 3. B; 4. G; 5. J; 6. H; 7. I; 8. E; 9. A; 10. D.

Task 2.

1. investments; 2. pie chart; 3. forecasting; 4. Microsoft Excel, liabilities;

5. Google Sheets; 6. Graphs; 7. Apple Numbers; 8. trend lines; 9. Corel Calculate;

10. Microsoft Excel.

IV. Watching a Video

Task 1.

1.F; 2.T; 3.T; 4.F; 5.T; 6.T; 7.F; 8.T; 9.F; 10.F.

Task 2.

1. expenses; 2. trend lines; 3. forecasting; 4. estimates; 5. Gantt; 6. Excel; 7. Google;

8. Apache; 9. iPad; 10. PowerPoint

VIDEO SCRIPTS

VIDEO I. OPTICAL DRIVES

(0:00 - 0:26)

In this video from ITFreeTraining, I will have a look at optical drives. Optical drives don't have the market share they once did. However, you will find that they still get used in some cases, particularly in business, but optical media market share is falling.

To start with, I will have a look at how optical drives work. Inside the optical drive, there is a disc mount in the centre. This holds the disc in place and also allows it to spin.

(0:27 - 1:10)

The next important part is the laser and lens assembly. This holds the laser in place and also allows it to be moved to different parts of the optical disc as required. Let's have a closer look at how the laser works.

Firstly, let's consider an optical disc. A laser is needed to either read or burn to the optical disc. The laser will need to be focused. Thus the assembly contains a lens to do this.

All these parts are manufactured inside a housing. Thus, there are no serviceable parts inside; since the housing is generally encased in plastic. Thus you won't be able to access them. That is the basics of how an optical drive works. So, let's now have a look at the differences between different optical drives.

(1:11 - 1:29)

Shown here, you can see the differences in the size of the pits on the optical disc between different optical technologies. You can see that when you compare CDs with Blu-ray, how much smaller the pits on the disc are. Essentially, this is achieved by changing the frequency of the laser.

(1:29 - 1:47)

Changing the frequency of the laser also changes the colour of the laser. Thus, you can see where the name blue comes from in Blu-ray. Now that we have a basic understanding of how optical drives work, let's have a look at what types are available. Although there have been a lot of optical drives made with different features, they tend to look pretty similar.

(1:48 – 2:16)

One of the common types of optical drives are the internal SATA drives. These optical drives are installed in desktop computers. They are not designed to be portable.

The next type is portable drives, for example, USB. There are also portable drives that support interfaces like Thunderbolt. In this case, the optical drive is USB 3. The optical drive has two plugs, which are the type A and type C connectors.

(2:17 – 2:40)

The second plug, in this case, is only for convenience, as only one is required to operate it. USB 3 provides more power than USB 2, but in the case of this optical drive, only one plug is required, even if it is operating with a USB 2 connection. The next type of portable optical drive that I will look at is USB 2. You will notice in this case there are two USB plugs.

(2:41- 3:14)

One is for power and the other one is for data. If you come across an optical drive like this one, in order for it to operate, it needs both USB plugs plugged in. Keep this in mind if you come across an optical drive with two USB plugs.

Depending on the optical drive, both may be required to be plugged in for the optical drive to operate. The last type of optical drive I will look at is an internal laptop optical drive. These optical drives are used in older style laptops.

(3:15-3:28)

They could be easily installed or removed from the laptop. With the reduced use of optical drives, you don't see them used in laptops anymore. If an optical drive is required for a laptop, they are generally an external USB or are fixed inside the laptop.

(3:29 – 4:00)

Since optical drives have been around for a long time, the technology has matured so much that if you are purchasing a new optical drive, the only real features that you need to worry about is if it is an internal or external and if it supports DVD or Blu-ray. Blu-ray devices are more expensive than DVD drives. If I am purchasing one for home, I will generally purchase a good external Blu-ray drive so I can use it on any computer that I wish.

(4:01 – 4:36)

For business, often a DVD drive will be good enough as Blu-ray did not really take off in the business world. To be honest, DVD drives are slowly disappearing from the business world as well. However, if you are working in IT support and someone requests an optical drive, they all look pretty similar.

I will now have a look at what you need to look at when picking an optical drive. If you pull out an old optical drive, it is not always that easy to tell what the optical drive supports. In some cases, a logo will be on the front of the optical drive indicating what type of optical drive it is.

(4:37 – 5:04)

In the case of this optical burner, there is a Blu-ray logo on the front, so it makes it easy to tell. The optical drive will be backwards compatible. That is, a Blu-ray will also support DVDs and compact discs.

Keep in mind, however, that sometimes an optical drive may not support burning on all media. For example, some Blu-ray optical drives will burn DVDs, but not Blu-ray. These are generally called combo drives.

(5:05-5:31)

In some cases, it may not be so clear by looking at the optical drive what it supports as there will be no logos on the front of the drive. When this occurs, you will need to look at the rest of the drive for clues like the stickers on the drive. In the case of this drive, a small part of the sticker says, Super Multi-DVD Writer, letting us know that this is a DVD optical drive.

(5:32-6:06)

The word multi, unlike combo, means that the drive supports burning for CD and DVD. Combo drives, although rarer nowadays than they used to be, are still sold, so keep this in mind when purchasing an optical drive. A combo drive will be able to read newer media and older media, but will only be able to write to older media.

That concludes this video on optical drives. I hope you have found this video useful and I look forward to seeing you in more videos from us. Until the next video from us, I would like to thank you for watching.

VIDEO 2. SSD vs HARD DRIVE vs HYBRID DRIVE

(0:00 - 0:51)

A computer has basically two types of memory. There's primary memory and secondary memory. Now primary memory is temporary, which is RAM.

But secondary memory is permanent, and this deals with storage drives. Now every computer needs a place to store their data, whether that data is photos, documents, video and audio files, or an operating system. A computer needs a place to store this data internally on a storage drive.
And these drives also need to be non-volatile, which means that they will retain the data even if the power is turned off. And there are different types of internal storage drives that a computer uses. And these drives could be magnetic hard drives, solid state drives, or hybrid drives.

(0:53 - 2:16)
So, let's first talk about magnetic hard drives. Now magnetic hard drives have been around since the beginning of computers. They were introduced by IBM in 1956. And even though they've been around for a long time, they are still used today. The hard disc drive is a sealed case that contains magnetic discs. And these discs is where the actual data is stored on.

(1:17 – 1:55)
These discs rotate at high speeds. And as they do, the actuator arm will either write data to the discs or read data from the discs, depending upon what the user wants to do. These magnetic discs can rotate at high speeds of either 5400, 7200, or 10,000 rpm.

The typical hard drive that's used today in desktop computers operates at the 7200 rpm range. A cheaper desktop hard drive operates at 5400 rpm, which is also the speed of a typical laptop hard drive. Higher end hard drives would operate at 10,000 rpm.

(1:56-2:15)
However, these higher end hard drives are not commonly used anymore because of the advanced speeds of solid state drives, which we'll talk about next. Hard drives

today use the serial ATA interface. Now this is a newer standard that is faster than the outdated parallel ATA interface.

(2:16 – 2:50)
So instead of data travelling in a parallel path, the data travels in a serial path, which means that the data travels one bit at a time. SATA drives have transfer speeds of averaging 6 gigabits per second, which is considerably faster than the old parallel ATA. And hard drives also come in two physical sizes.
They come in 3.5 or 2.5 inches. 3.5 inch drives is what desktop computers and servers will use. And 2.5 inch drives is what laptops will use.

(2:51 – 3:18)
Another type of storage device is called an SSD or solid state drive. Now these drives have no moving parts. So instead of using magnetic discs, these drives use flash memory chips to store data.
So, the data transfer is very fast. And in addition, since they have no moving parts, they are also very quiet and more energy efficient. SSDs also come in different form factors.

(3.19 – 3:58)
They would come in a standard 2.5 inch rectangular form factor, or they would come in the newer M.2 form factor. Now both of these drives store data on flash memory, but they connect to the motherboard using different interfaces. The standard 2.5 inch SSD uses the SATA interface, just like a hard drive.

And the M.2 SSD would plug into an M.2 slot. And if you want to know more about the M.2 SSD, I did a whole video about it and I'll link it at the end of this video.
SSDs are also more resistant to physical shock compared to hard drives.

(3:59 – 4:18)

Whereas if you were to physically shock a hard drive, such as dropping it or jolting your computer, it could crash the drive and your data would be lost. SSDs are also more expensive than hard drives, but you do get what you pay for because they are considerably faster. And you'll see a big difference in the performance of your computer.

(4:19 – 4:51)
And they can also be used on both desktop and laptop computers. Now because of the price difference between SSDs and hard drives, a lot of times if you were to buy a new computer, the computer may come with both an SSD drive and a hard drive. The faster SSD would be a smaller capacity drive that would contain any data that would benefit from speed and that you would access frequently, such as the operating system, programmes, and documents.

(4:52 – 5:23)
And the slower hard drive would be a larger capacity drive that would be used for secondary storage. For example to store data that you would access less frequently. Or the drive would be used to store large files such as videos.
Now you could buy or build a computer with one large SSD for all of your storage. But that would significantly increase the price of the computer. And it's almost pointless to have files that you infrequently access on an SSD.

(5:24 – 6:07)
So, this is why to save money computers will use both an SSD and a hard drive. Now there is also a solution where you can have an SSD and a hard drive as one physical drive instead of two separate drives. And these are called SSHD or solid state hybrid drives.
Now these drives combine the use of magnetic discs and flash memory. Hybrid drives take advantage of the large capacity and the low cost of magnetic discs with

the speed of an SSD. In a hybrid drive the magnetic discs would be used to store data, while the flash memory would be used for the caching of the data.

(6: 08 – 6:34)
And these drives are pretty much automatic. The firmware in the drive will actually learn and decide by itself as to where the data will be stored. The files that are accessed frequently will be cached and stored on the flash memory.
While the infrequently used data will be stored on the discs. So, everyone just remember no matter which drive you use, all drives will crash at one point just because of wear and tear. And you should always back up your data.

(6:35 -7:07)
I personally use iDrive to back up my data and it backs up everything to the cloud. I've tried a few different backup programmes but I think iDrive is the best. And I'll put a link in the description below of this video if you're interested in getting it. iDrive has not contacted me, I'm not getting paid to say this. This is just what I use and recommend and I do get a small percentage of a sale. So thank you for watching this video and please subscribe.

VIDEO 3. NOR vs. NAND Flash Memory
(0:00 - 0:19)
What's more important, fast read times or fast write times? It depends. NOR and NAND flash memory are the two kinds of non-volatile storage technologies. They use different logic gate structures, which describe how their memory cells are organised.

(0:20 - 0:48)
With NOR flash memory, one end of each memory cell connects to the source line, and the other end to a bit line resembling a NOR gate. With NAND flash memory, several memory cells connect in a parallel series, like a NAND gate. So, what does

this mean for these types of flash memory? Because NOR flash architecture addresses the entire memory range, NOR flash memory has access to every byte within it, so it's faster to read than NAND flash memory.

(0:48 - 1:08)
But NOR flash is slower to erase and write new data because of its larger cell size, which also makes it more expensive. NAND flash memory is faster to erase and write but slow to read. It's also much smaller than NOR flash, less expensive, and despite its size, has a higher memory capacity than NOR flash.

(1:08 - 1:29)
They also vary in power consumption. NOR flash memory requires more power than NAND flash memory to first turn on, but then it has a much lower standby power consumption once turned on than NAND. So, NOR flash memory is better suited for random reads for memory, while NAND is more efficient at writes, erases, and sequential reads.

(1:29 - 1:54)
In practice, this means NOR flash is most often used for low-capacity and high-reliability applications, like mobile phones, scientific instruments, and medical devices. NAND is best suited for high-memory-capacity applications that don't require fast read times, like digital cameras, USB flash drives, and other SD card-compatible devices. Some devices will use both NOR and NAND flash memory.

(1:55 - 2:20)
Smartphones and tablets, for instance, might have NOR embedded to boot up the OS and a removable NAND card for other memory or storage requirements. Do you know there are five major NAND flash memory types? Click on the link above or in the description box below to learn more about NAND flash options and where they

work best. What are some other use cases for NOR or NAND flash memory? Share your thoughts in the comments, and be sure to hit that like button too.

VIDEO 4. THE FIRST PROGRAMMING LANGUAGES

(0:03 - 0:17)
This episode is brought to you by CuriosityStream. Hi, I'm Carrie Anne, and welcome to Crash Course Computer Science. So far, for most of this series, we've focused on hardware, the physical components of computing – things like electricity and circuits, registers and RAM, ALUs and CPUs.

(0:18 - 0:40)
But programming at the hardware level is cumbersome and inflexible, so programmers wanted a more versatile way to programme computers – what you might call a softer medium. That's right, we're going to talk about software. In Episode 8, we walked through a simple programme for the CPU we designed.

(0:40 - 1:05)
The very first instruction to be executed, the one at memory address 0, was 00101110. As we discussed, the first four bits of an instruction is the operation code, or opcode for short. On our hypothetical CPU, 0010 indicated a LOAD A instruction, which moves a value from memory into register A. The second set of four bits defines the memory location, in this case 1110, which is 14 in decimal.

(1:06 - 1:18)
So, what these eight numbers really mean is LOAD ADDRESS 14 into register A. We're just using two different languages. You can think of it like English and Morse code. HELLO and BEEP BEEP BEEP BEEP BEEP BEEP mean the same thing.

(1:18 - 1:28)

HELLO! They're just encoded differently. English and Morse code also have different levels of complexity. English has 26 different letters in its alphabet and way more possible sounds.

(1:28 - 1:40)
Morse only has dots and dashes, but they can convey the same information, and computer languages are similar. As we've seen, computer hardware can only handle raw, binary instructions. This is the language computer processors natively speak.

(1:41 - 1:50)
In fact, it's the only language they're able to speak. It's called machine language or machine code. In the early days of computing, people had to write entire programmes in machine code.

(1:50 - 2:00)
More specifically, they'd first write a high-level version of a programme on paper in English. For example, retrieve the next cell from memory. Then add this to the running total for the day, week, and year.

(2:00 - 2:07)
Then calculate any tax to be added. And so on. An informal, high-level description of a programme like this is called pseudocode.

(2:07 - 2:22)
Then, when the programme was all figured out on paper, they'd painstakingly expand and translate it into binary machine code by hand, using things like opcode tables. After the translation was complete, the programme could be fed into the computer and run. As you might imagine, people quickly got fed up with this process.

(2:22 - 2:40)

So, by the late 1940s and into the 50s, programmers had developed slightly higher-level languages that were more human-readable. Opcodes were given simple names called mnemonics, which were followed by operands to form instructions. So instead of having to write instructions as bunches of 1s and 0s, programmers could write something like LOAD A14.

(2:40 - 2:49)
We use this mnemonic in episode 8 because it's so much easier to understand. Of course, a CPU has no idea what LOAD A14 is. It doesn't understand text-based language, only binary.

(2:49 - 3:03)
And so programmers came up with a clever trick. They created reusable helper programmes in binary that read in text-based instructions and assemble them into the corresponding binary instructions automatically. This programme is called, you guessed it, an assembler.

(3:03 - 3:14)
It reads in a programme written in an assembly language and converts it to native machine code. LOAD A14 is one example of an assembly instruction. Over time, assemblers gained new features that made programming even easier.

(3:15 - 3:33)
One nifty feature is automatically figuring out jump addresses. This was an example programme I used in episode 8. Notice how our jump negative instruction jumps to address 5, and our regular jump goes to address 2. The problem is, if we add more code to the beginning of this programme, all of the addresses would change. That's a huge pain if you ever want to update your programme.

(3:33 - 3:51)

And so, an assembler does away with raw jump addresses, and lets you insert little labels that can be jumped to. When this programme is passed into the assembler, it does the work of figuring out all of the jump addresses. Now, the programmer can focus more on programming, and less on the underlying mechanics under the hood, enabling more sophisticated things to be built but hiding unnecessary complexity.

(3:51 - 4:19)
As we've done many times in this series, we're once again moving up another level of abstraction. However, even with nifty assembler features like auto-linking jumps to labels, assembly languages are still a thin veneer over machine code. In general, each assembly language instruction converts directly to a corresponding machine instruction – a one-to-one mapping – so it's inherently tied to the underlying hardware.

(4:19 - 4:30)
And the assembler still forces programmers to think about which registers and memory locations they will use. If you suddenly needed an extra value, you might have to change a lot of code to fit it in. Let's go to the Thought Bubble.

(4:30 - 4:47)
This problem did not escape Dr. Grace Hopper. As a U.S. Naval officer, she was one of the first programmers on the Harvard Mark I computer, which we talked about in Episode 2. This was a colossal electromechanical beast, completed in 1944 as part of the Allied war effort. Programmes were stored and fed into the computer on punched paper tape.

(4:47 - 5:06)
By the way, as you can see, they patched some bugs in this programme by literally putting patches of paper over the holes on the punch tape. The Mark I's instruction set was so primitive, there weren't even jump instructions. To create code that repeated

the same operation multiple times, you'd tape the two ends of the punch tape together, creating a physical loop.

(5:06 - 5:19)
In other words, programming the Mark I was kind of a nightmare. After the war, Hopper continued to work at the forefront of computing. To unleash the potential of computers, she designed a high-level programming language called Arithmetic Language Version 0, or A0 for short.

(5:19 - 5:34)
Assembly languages have direct, one-to-one mapping to machine instructions. But, a single line of a high-level programming language might result in dozens of instructions being executed by the CPU. To perform this complex translation, Hopper built the first compiler in 1952.

(5:34 - 5:54)
This is a specialised programme that transforms source code written in a programming language into a low-level language, like assembly or the binary machine code that the CPU can directly process. Thanks, Thought Bubble! So, despite the promise of easier programming, many people were sceptical of Hopper's idea. She once said, I had a running compiler and nobody would touch it.

(5:54 - 6:05)
They carefully told me, computers could only do arithmetic, they could not do programmes. But the idea was a good one, and soon many efforts were underway to craft new programming languages. Today, there are hundreds.

(6:05 - 6:19)
Sadly, there are no surviving examples of A0 code, so we'll use Python, a modern programming language, as an example. Let's say we want to add two numbers and

save the value. Remember, in assembly code, we had to fetch values from memory, deal with registers, and other low-level details.

(6:20 - 6:30)
But this same programme can be written in Python like so. Notice how there are no registers or memory locations to deal with. The compiler takes care of that stuff, abstracting away a lot of low-level and unnecessary complexity.

(6:30 - 6:48)
The programmer just creates abstractions for needed memory locations, known as variables, and gives them names. So now we can just take our two numbers and store them in variables we give names to. In this case, I picked A and B, but those variables could be anything, and then add those together, saving the result in C, another variable I created.

(6:48 - 7:01)
It might be that the compiler assigns register A under the hood to store the value in A. But I don't need to know about it. Out of sight, out of mind. It was an important historical milestone, but A0 and its later variants weren't widely used.

(7:01 - 7:29)
FORTRAN, derived from formula translation, was released by IBM a few years later in 1957, and came to dominate early computer programming. John Backus, the FORTRAN project director, said, You know, typical lazy person, they're always creating their own programming systems. Anyway, on average, programmes written in FORTRAN were 20 times shorter than equivalent handwritten assembly code.

(7:29 - 7:53)
Then the FORTRAN compiler would translate and expand that into native machine code. The community was sceptical that the performance would be as good as

handwritten code, but the fact that programmers could write more code more quickly made it an easy choice economically, trading a small increase in computation time for a significant decrease in programmer time. Of course, IBM was in the business of selling computers, and so initially, FORTRAN code could only be compiled and run on IBM computers.

(7:53 - 8:15)
And most programming languages and compilers of the 1950s could only run on a single type of computer. So, if you upgraded your computer, you'd often have to rewrite all the code, too. In response, computer experts from industry, academia, and government formed a consortium in 1959, the Committee on Data Systems Languages, advised by our friend Grace Hopper, to guide the development of a common programming language that could be used across different machines.

(8:16 - 8:32)
The result was the high-level, easy-to-use, common business-orientated language, or COBOL for short. To deal with the different underlying hardware, each computing architecture needed its own COBOL compiler. But critically, these compilers could all accept the same COBOL source code, no matter what computer it was run on.

(8:32 - 8:44)
This notion is called write-once, run-anywhere. It's true of most programming languages today, a benefit of moving away from assembly and machine code, which is still CPU-specific. The biggest impact of all of this was reducing computing's barrier to entry.

(8:44 - 9:04)
Before high-level programming languages existed, it was the realm exclusive to computer experts and enthusiasts, and it was often their full-time profession. But now, scientists, engineers, doctors, economists, teachers, and many others could

incorporate computation into their work. Thanks to these languages, computing went from a cumbersome and esoteric discipline to a general-purpose and accessible tool.

(9:04 - 9:25)
At the same time, abstraction in programming allowed those computer experts – now professional programmers – to create increasingly sophisticated programmes, which would have taken millions, tens of millions, or even more lines of assembly code. Now, this history didn't end in 1959. In fact, a golden era in programming language design jump-started, evolving in lockstep with dramatic advances in computer hardware.

(9:25 - 9:34)
In the 1960s, we had languages like ALGO, Lisp, and BASIC. In the 70s, Pascal C and Smalltalk were released. The 80s gave us C++, Objective-C, and Perl.

(9:34 - 9:44)
And the 90s, Python, Ruby, and Java. And the new millennium has seen the rise of Swift, C Sharp, and Go – not to be confused with Let It Go and Pokemon Go. Anyway, some of these might sound familiar.

(9:45 - 9:56)
Many are still around today. It's extremely likely that the web browser you're using right now was written in C++ or Objective-C. That list I gave is just the tip of the iceberg, and languages with fancy new features are proposed all the time.

(9:57 - 10:22)
Each new language attempts to leverage new and clever abstractions to make some aspect of programming easier and more powerful or take advantage of emerging technologies and platforms so that more people can do more amazing things more quickly. Many consider the holy grail of programming to be the use of plain old

English, where you can literally just speak what you want the computer to do, it figures it out and executes it. This kind of intelligent system is science fiction, for now, and fans of 2001 and Space Odyssey may be okay with that.

(10:22 - 10:35)
Now that you know all about programming languages, we're going to deep dive for the next couple of episodes. And we'll continue to build your understanding of how programming languages, and the software they create, are used to do cool and unbelievable things. See you next week.

(10:35 - 10:55)
Hey guys, this week's episode was brought to you by CuriosityStream, which is a streaming service full of documentaries and non-fiction titles from some really great filmmakers, including exclusive originals. I just watched a great series called Digits, hosted by our friend Derek Muller. It's all about the internet, from its origins, to the proliferation of the internet of things, to ethical or white hat hacking.

(10:56 - 11:20)
And it even includes some special guest appearances, like that John Green guy you keep mentioning in the comments. And CuriosityStream offers unlimited access, starting at $2.99 a month, and for you guys, the first two months are free if you sign up at curiositystream.com slash crash course, and use the promo code CRASHCOURSE during the sign up process. CrashCourse Computer Science is produced in association with PBS Digital Studios.

(11:20 - 11:38)
At their channel, you can check out a playlist of shows like Gross Science, ACS Reactions, and The Art Assignment. This episode was filmed at the Chad and Stacey Eligolt Studio in Indianapolis, Indiana, and it was made with the help of all these nice

people and our wonderful graphics team Thought Cafe. Thanks for watching and try turning it off and then back on again.

VIDEO 5. TOP 9 MICROSOFT WORD HACKS

(0:02 – 0:34)

In this video we're going to look at my favourite Microsoft Word hacks or secret tips and tricks that many people don't know about. And here I am in Microsoft Word. It's just a completely blank document.

I need to change that and this is hack number one, really. Anytime you just need some generic text that you can use to demonstrate how to use some feature or option in Microsoft Word, all you have to do is click on the document and type equals and then you have a couple of options. You can type in rand, left parenthesis, and then put in a number.

(0:35-1.09)

Whatever number you put here, that's how many paragraphs will be generated. So, I want 10 paragraphs and then I put a comma and then how many sentences per paragraph. How about four? Right parenthesis, tap enter, and Microsoft Word just puts in some random sentences from their help files.

If you prefer lorem ipsum text, you can do something similar. Just type in equals, left parenthesis, how many paragraphs, how many sentences per paragraph, right parenthesis, tap enter, and you get lorem ipsum text. So, that's Microsoft Word hack number one.

(1:10 -1:34)

Now that I've got some text in my document, I can show you how to select any rectangular group of text in your document. So, for example, let's say I want to bold the word can and the word online and word. Well, if I click and drag to highlight those words, look what it does.

It highlights everything in between as well. But if I hold the alt key on the keyboard and then do the same click and drag, look what happens. I'm just dragging out a rectangle.

(1:35 -1:59)

I'll release the keyboard key. and now I can choose bold either here or up here and those words are bolded. So, if you ever have trouble selecting specific words or phrases without multiple words getting selected that you don't want, just try it again, hold alt and then click and drag, and you can designate exactly what you want to highlight. And notice that it can even be parts of words.

(2:00 -2.32)

So, I could highlight or underline very specific parts of words like part of the document, and the beginning of the word make. I could underline that or whatever. Our next Microsoft Word hack is that you can change or set up autocorrect rules.

So, to do this, you can just go to File, go down to More, Options, go to the Proofing tab and then click Autocorrect Options. Here, you can set up shortcuts. So, for example, if I ever type MSW, I want that to be replaced with Microsoft Word.

(2.33- 3:17)

I'll click Add, and now it's added to my list of autocorrect shortcuts. I could do the same thing with MSE. I could have that replaced with Microsoft Excel.

I'll click Add, and I'll click OK. Click OK again and let's test it out. When I now type MSW and then tap space, it types in Microsoft Word, MSE and tap Enter.

So, Enter or Space and it puts in the shortcut that I had specified. So, if you find yourself typing in the same phrase or word over and over and over, you can set up an autocorrect shortcut phrase or word that will enter that information for you automatically and very quickly. The next Microsoft Word hack is that you can easily and quickly remove formatting that you don't want to keep.

(3:18-3:52)
So, if you recall, I changed up the formatting on this text here and I regret that. All I have to do is select the text, hold Ctrl and tap the spacebar, and it removes the formatting that I wanted to get rid of. Let's combine a couple of the hacks to fix these words here.

I'm holding Alt, I'm clicking and dragging to select a rectangle in my document. With that selected, I hold Ctrl, tap the spacebar and the formatting is fixed. My next favourite Microsoft Word hack is that you can delete words faster than just pressing the Backspace key.

(3:53 – 4.04)
So yes, if I want to delete this sentence, I could just tap Backspace, Backspace, Backspace. I could hold it, and eventually, it would delete that sentence. I'm gonna undo that just to show you a little bit faster way to do the same thing.
(4:05 -4:30)
Instead of just pressing Backspace, I can hold Ctrl on the keyboard and then tap Backspace, and it deletes not one letter at a time but one word at a time. So, you can much more quickly delete words or phrases that you want to get rid of. My next Microsoft Word hack is very simple, but it's very powerful and a lot of people, especially people that have used Word for a long time, are likely not aware of this option and feature.
(4:31 – 5:04)
And that is that Microsoft Word can now easily and very successfully convert PDFs into Word format. So I'm gonna go to File and click Open, and I'm just gonna browse to my Downloads folder where I have a PDF. And I want you to see what that PDF looks like independent of Microsoft Word.

So, I'm gonna open up my Downloads folder. I'll double-click to open up the PDF. So this is just a worksheet for a Spanish class and it is in PDF format.

It can't be changed. I can't add text. I could add a note.
(5:05 -3:34)
But I can't change the text, the information in this worksheet. So, I'm gonna exit out of that. Back in Microsoft Word, I'm going to just open that same PDF.

And Microsoft Word here is trying to convert the PDF into an editable Word document. Now notice there is one caveat to this process. It says it will be optimized to allow you to edit the text but it may not look exactly like the original PDF, especially if there's graphics in the original.
(3:35-5:57)
Now in my experience, nine times out of ten, the conversion works great, looks great, and there isn't much to do to fix anything. So here is that same PDF but now as an editable Microsoft Word document. I could adjust the text, change it up, and then print it out or save it as a PDF again if I want to.

(5:58 -6:20)
This next Microsoft Word hack, what it is, is as you can see above the text of my Word document, I have this gray area and it doesn't really serve much of a purpose. Some people like it being there, others don't. Typically people that don't appreciate that being there are people like me that have a small computer screen and you want to maximize every part of the screen and use it well.
(6:21-6:54)
So, as you can see here, by putting my mouse in that gray area, it says double-click to hide white space and that's the hack that I wanted to share with you. If I double-click here, the white space, it's really gray, is hidden or at least minimized. So now more of the screen is usable.

If I regret that and want it back, just double-click again and it brings back that gray area or white space as they call it. It doesn't look like it did it but if I click here and

drag this back up, you can see that it's back. And just so you know, when you do hide what they call the white space, it also does it at the bottom of the page as well.
(6:55-7:22)
The next Microsoft Word hack is that you can change the theme of Microsoft Word. If you like the way it looks with lots of white and gray and some blue, that's fine, but you could also go to File and then Account and then here it says Office Theme, Use System Setting. I could change that to be dark gray.

I could change it to be black. Now let's say I stick with black. I go back and now the look and feel of Microsoft Word has changed.
(7:23-7:55)
In my case, I want to switch back to Use System Setting. Switching back to my other document, my final Microsoft Word secret tip or hack is that you can double-click anywhere in a Microsoft Word document to add text. So let's say I want to add some text in between these two paragraphs.

That's not very typical, and I also want it to be on the right side here. So, all I really need to do is double-click exactly where I want to type and then start typing. So those are a few of my favourite Microsoft Word hacks or secret tips.

(7:56- 8:12)
I hope you enjoyed the video. If you did, please like, follow, and subscribe and when you do, please click the bell so you'll be notified when I post another video. If you'd like to support my channel, you can do that through my Patreon account or by buying channel merchandise. You'll find more information about those opportunities in the description of the video below.

VIDEO 6. WHAT CAN YOU DO WITH A SPREADSHEET
(0:00 - 0:12)

Hello and welcome to lesson two. Let's talk about what are some of the things that you can do with a spreadsheet. Now, in the previous lesson, I showed you a simple example of how you can keep track of expenses.

(0:13 - 0:26)
Something very similar is you could also use it to keep track of sales or revenue. In both cases, you will probably have categories and you want to do it over time. It could be cash going out or cash coming in.

(0:26 - 0:42)
The structure is really the same. Also, like I showed you in the previous lesson, once you have these numbers, you might want to create a graph. Now, I showed you an example of a pie chart, but you might want to have a column chart or a bar chart or maybe a trend line.

(0:42 - 1:03)
Now, speaking of trend lines, spreadsheets are great not just for keeping track of things that already happened, but maybe forecasting some of the things that may happen in the future. Of course, forecasting dovetails with budgeting. Now, let's say you have a small business, maybe you don't have a large business where you need a fancy billing system.

(1:03 - 1:18)
Well, you could use a spreadsheet just for creating small invoices or estimates. I use Excel for that. A moment ago, I mentioned trend lines and spreadsheets are great for tracking either investments that you have or maybe investments that you're thinking of making.

(1:19 - 1:36)

Just the same way that you could use Excel for keeping track of revenue and expenses, which are opposite sides of the same coin. Well, what's the opposite side of the coin of investing? Well, you could track liabilities. Let's say you take out a loan and you want to know how your loan is progressing, you can do that.

(1:37 - 1:50)
It's not just about dollars and cents. You can use a spreadsheet to track other types of numbers, like how much vacation time your employees have accrued or how much you've accrued. You could use spreadsheets for things that have nothing to do with numbers.

(1:50 - 2:02)
For example, you might want to manage projects like a Gantt chart. You could use a spreadsheet to maintain a mailing list. You could also use it to create a calendar or schedule.

(2:02 - 2:26)
Yes, there are other ways to create calendars and schedules, but spreadsheets are just one of them. Now, I've been talking about spreadsheets just in general terms. What actual programs are there? Well, you know one of them that has the biggest market share, and of course, that's Microsoft Excel, which according to the University of Pennsylvania, maintains 95 percent of the market share.

(2:26 - 2:43)
But that's not 100 percent. Also, Apple Numbers, which not surprisingly works just on the Mac and also on the iPad, maintains a small slice. Google Sheets, which you can use right on the web and it's free, maintains a small slice, and then teeny tiny little slices.

(2:43 - 3:06)

You may find things like open-source programs like LibreOffice and also Apache OpenOffice. LibreOffice and OpenOffice are almost identical, and Corel, which makes CorelDRAW, also has a little spreadsheet called Corel Calculate. You may recall a long, long time ago, there was a program called Quattro Pro, and that's what Corel Calculate is carrying on.

(3:06 - 3:24)
Excel is the most flexible. It'll run on Windows PCs, it'll run on Macintoshes, it'll even run on iPads. There's a free version that will run inside a web browser so that any device, even an Android tablet, for example, any device that can surf the web can use the web version of Excel.

(3:24 - 3:44)
You don't really have to worry about compatibility too much because all of these five per cent of the other spreadsheet programs are mostly compatible with Excel. They're even made to look and feel like Excel. For example, if you can write a formula in one of these programs, you could write a formula in just about any of the others.

(3:44 - 4:13)
Also, these other programs can all open Excel files and they can save in Excel format, and you can even copy and paste between any of them. So, you might wonder, okay, if we've got a bunch of these that are free, why on earth would I want to go and pay for Excel? And the reason is that they're similar to Excel, but they're not identical. And Excel has a number of productivity features and can do some higher-end tasks that none of these other programs can do.

(4:13 - 4:37)
And of course, Excel integrates seamlessly with the other programs in Microsoft Office, like PowerPoint and Word, for example. If you want to do an organization chart, you can type out an organization chart in Excel and import that into Microsoft

Visio, and boom, it'll give you an organization chart. But for simple basic calculations, like what we're going to do in this course, it really doesn't matter.

(4:37 - 4:48)
Any of these programs will suit you just fine. Okay, so now that we've talked about all of this, let's go into the next lesson, and we'll take a look at Excel and some of the other spreadsheet programs.
If you want to do an organization chart, you can type out an organization chart in Excel and import that into Microsoft Visio, and boom, it'll give you an organization chart. But for simple, basic calculations like what we're going to do in this course, it really doesn't matter. Any of these programs will suit you just fine.

OK, so now that we've talked about all of this, let's go into the next lesson, and we'll take a look at Excel and some of the other spreadsheet programs.

Список джерел відео матеріалів

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