

Computer System Class 11

Computer Science NCERT

Solutions

Step-by-step answers for the 2026-27 NCERT exercise

Chapter 1: Computer System

This PDF solves every exercise question from Class 11 Computer Science Chapter 1 Computer System. It covers operating system services, translators, memory, system bus, microprocessors, data types, input devices, output devices and software categories according to the 2026-27 NCERT book.

Also see: Class 11 Computer Science notes, textbook PDF, and chapter-wise NCERT resources on Collegedunia.

Exercise Solutions

Q 1.1 Name the software required to make a computer functional. Write down its two primary services.

SOLUTION

Concept used. Computer System questions are answered by matching each term with its role in the input, processing, storage, output and software cycle.

Step 1. A computer has hardware, but hardware cannot work usefully without software that controls it.

Step 2. The operating system is the main system software loaded when the computer starts.

Step 3. It manages CPU time, memory, files, input devices, output devices and running programs.

Step 4. It also gives a user interface, such as command based, menu based, graphical, voice based or gesture based access.

Exam tip

Write OS first, then give the two service words: resource management and user interface.

Final Answer: An operating system is the software required to make a computer functional. Its two primary services are managing computer resources and providing an interface for the user and application programs.

EXPERT'S SOLUTION : Ananya Rao, M.Tech Computer Science, IIT Delhi

Scoring angle. The safest answer begins with the exact textbook term, then gives the reason and one example. That order keeps the answer clear for short and long questions.

Step 1. Start with the key term in this question: An operating system is the software required to make a computer functional.

Step 2. Connect the term to the computer system cycle: input, processing, storage, output or software control.

Step 3. A computer has hardware, but hardware cannot work usefully without software that controls it.

Step 4. The operating system is the main system software loaded when the computer starts.

Step 5. It manages CPU time, memory, files, input devices, output devices and running programs.

Step 6. It also gives a user interface, such as command based, menu based, graphical, voice based or gesture based access.

Step 7. Close with the final distinction or ordered list so the examiner can see the answer quickly.

This answer is not just a definition. It also explains why the component is needed inside a working computer system.

Final Answer: An operating system is the software required to make a computer functional. Its two primary services are managing computer resources and providing an interface for the user and application programs.

Q 1.2 How does the computer understand a program written in high level language?

SOLUTION

Concept used. Computer System questions are answered by matching each term with its role in the input, processing, storage, output and software cycle.

Step 1. A high level language is readable for programmers, not directly for the CPU.

Step 2. The CPU works with machine code made of binary instructions.

Step 3. A compiler or interpreter translates high level source code into machine understandable form.

Step 4. The translated object code can then be executed by the computer.

Exam tip

The key chain is source code to translator to object code to execution.

Final Answer: A computer understands a high level language program only after a language translator converts its source code into machine understandable object code.

EXPERT'S SOLUTION : *Raghav Menon, M.C.A., NIT Tiruchirappalli*

Scoring angle. The safest answer begins with the exact textbook term, then gives the reason and one example. That order keeps the answer clear for short and long questions.

Step 1. Start with the key term in this question: A computer understands a high level language program only after a language translator converts its source code into machine understandable object code.

Step 2. Connect the term to the computer system cycle: input, processing, storage, output or software control.

Step 3. A high level language is readable for programmers, not directly for the CPU.

Step 4. The CPU works with machine code made of binary instructions.

Step 5. A compiler or interpreter translates high level source code into machine understandable form.

Step 6. The translated object code can then be executed by the computer.

Step 7. Close with the final distinction or ordered list so the examiner can see the answer quickly.

This answer is not just a definition. It also explains why the component is needed inside a working computer system.

Final Answer: A computer understands a high level language program only after a language translator converts its source code into machine understandable object code.

Q 1.3 Why is the execution time of the machine code less than that of source code?

SOLUTION

Concept used. Computer System questions are answered by matching each term with its role in the input, processing, storage, output and software cycle.

Step 1. Machine code is the direct instruction form for the processor.

Step 2. The CPU can fetch, decode and execute machine code without language conversion.

Step 3. Source code is written for humans and must pass through a translator.

Step 4. That translation step adds extra time, especially when interpretation happens line by line.

 Exam tip

If a question compares time, mention the extra translation step clearly.

Final Answer: Machine code executes faster because it is already in the binary instruction form understood by the CPU. Source code needs translation before or during execution.

EXPERT'S SOLUTION : Priya Sethi, M.Sc Computer Science, University of Delhi

Scoring angle. The safest answer begins with the exact textbook term, then gives the reason and one example. That order keeps the answer clear for short and long questions.

Step 1. Start with the key term in this question: Machine code executes faster because it is already in the binary instruction form understood by the CPU.

Step 2. Connect the term to the computer system cycle: input, processing, storage, output or software control.

Step 3. Machine code is the direct instruction form for the processor.

Step 4. The CPU can fetch, decode and execute machine code without language conversion.

Step 5. Source code is written for humans and must pass through a translator.

Step 6. That translation step adds extra time, especially when interpretation happens line by line.

Step 7. Close with the final distinction or ordered list so the examiner can see the

answer quickly.

This answer is not just a definition. It also explains why the component is needed inside a working computer system.

Final Answer: Machine code executes faster because it is already in the binary instruction form understood by the CPU. Source code needs translation before or during execution.

Q 1.4 What is the need of RAM? How does it differ from ROM?

SOLUTION

Concept used. Computer System questions are answered by matching each term with its role in the input, processing, storage, output and software cycle.

Step 1. The CPU needs fast working memory for the program and data currently in use.

Step 2. RAM provides this temporary primary memory space.

Step 3. RAM loses stored contents when power is switched off.

Step 4. ROM keeps essential instructions even without power and is not normally used as a day-to-day working area.

Exam tip

Use a small table in the exam: RAM means working memory; ROM means permanent startup instructions.

Final Answer: RAM is needed to temporarily hold programs, data and intermediate results while the CPU works. RAM is volatile and writable, while ROM is non-volatile and stores permanent instructions.

EXPERT'S SOLUTION : *Karan Iyer, M.Tech Embedded Systems, VIT Vellore*

Scoring angle. The safest answer begins with the exact textbook term, then gives the reason and one example. That order keeps the answer clear for short and long questions.

Step 1. Start with the key term in this question: RAM is needed to temporarily hold programs, data and intermediate results while the CPU works.

Step 2. Connect the term to the computer system cycle: input, processing, storage, output or software control.

Step 3. The CPU needs fast working memory for the program and data currently in use.

Step 4. RAM provides this temporary primary memory space.

Step 5. RAM loses stored contents when power is switched off.

Step 6. ROM keeps essential instructions even without power and is not normally used as a day-to-day working area.

Step 7. Close with the final distinction or ordered list so the examiner can see the answer quickly.

This answer is not just a definition. It also explains why the component is needed inside a working computer system.

Final Answer: RAM is needed to temporarily hold programs, data and intermediate results while the CPU works. RAM is volatile and writable, while ROM is non-volatile and stores permanent instructions.

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Q 1.5 What is the need for secondary memory?

SOLUTION

Concept used. Computer System questions are answered by matching each term with its role in the input, processing, storage, output and software cycle.

Step 1. RAM is fast but limited in size and volatile.

Step 2. Users need to store files, programs and results for future use.

Step 3. Secondary storage devices such as HDD, SSD, memory card, CD, DVD and pen drive keep data permanently.

Step 4. They also support large storage capacity at lower cost than primary memory.

Exam tip

Permanent storage and large capacity are the two scoring phrases.

Final Answer: Secondary memory is needed for permanent storage of data, instructions and results because primary memory is limited and temporary.

EXPERT'S SOLUTION : Meera Nair, M.C.A., University of Calicut

Scoring angle. The safest answer begins with the exact textbook term, then gives the reason and one example. That order keeps the answer clear for short and long questions.

Step 1. Start with the key term in this question: Secondary memory is needed for permanent storage of data, instructions and results because primary memory is limited and temporary.

Step 2. Connect the term to the computer system cycle: input, processing, storage, output or software control.

Step 3. RAM is fast but limited in size and volatile.

Step 4. Users need to store files, programs and results for future use.

Step 5. Secondary storage devices such as HDD, SSD, memory card, CD, DVD and pen drive keep data permanently.

Step 6. They also support large storage capacity at lower cost than primary memory.

Step 7. Close with the final distinction or ordered list so the examiner can see the answer quickly.

This answer is not just a definition. It also explains why the component is needed inside a working computer system.

Final Answer: Secondary memory is needed for permanent storage of data, instructions and results because primary memory is limited and temporary.

Q 1.6 How do different components of the computer communicate with each other?

SOLUTION

Concept used. Computer System questions are answered by matching each term with its role in the input, processing, storage, output and software cycle.

Step 1. The CPU, main memory and input or output devices must exchange data and signals.

Step 2. A bus is a set of wires that carries information between components.

Step 3. The data bus carries actual data.

Step 4. The address bus carries memory or device addresses, and the control bus carries timing and control signals.

 Exam tip

Remember the bus trio as data, address and control.

Final Answer: Computer components communicate through the system bus, which includes the data bus, address bus and control bus.

EXPERT'S SOLUTION : Kabir Sharma, M.Tech Computer Engineering, DTU

Scoring angle. The safest answer begins with the exact textbook term, then gives the reason and one example. That order keeps the answer clear for short and long questions.

Step 1. Start with the key term in this question: Computer components communicate through the system bus, which includes the data bus, address bus and control bus.

Step 2. Connect the term to the computer system cycle: input, processing, storage, output or software control.

Step 3. The CPU, main memory and input or output devices must exchange data and signals.

Step 4. A bus is a set of wires that carries information between components.

Step 5. The data bus carries actual data.

Step 6. The address bus carries memory or device addresses, and the control bus carries timing and control signals.

Step 7. Close with the final distinction or ordered list so the examiner can see the

answer quickly.

This answer is not just a definition. It also explains why the component is needed inside a working computer system.

Final Answer: Computer components communicate through the system bus, which includes the data bus, address bus and control bus.

Q 1.7 Draw the block diagram of a computer system. Briefly write about the functionality of each component.

SOLUTION

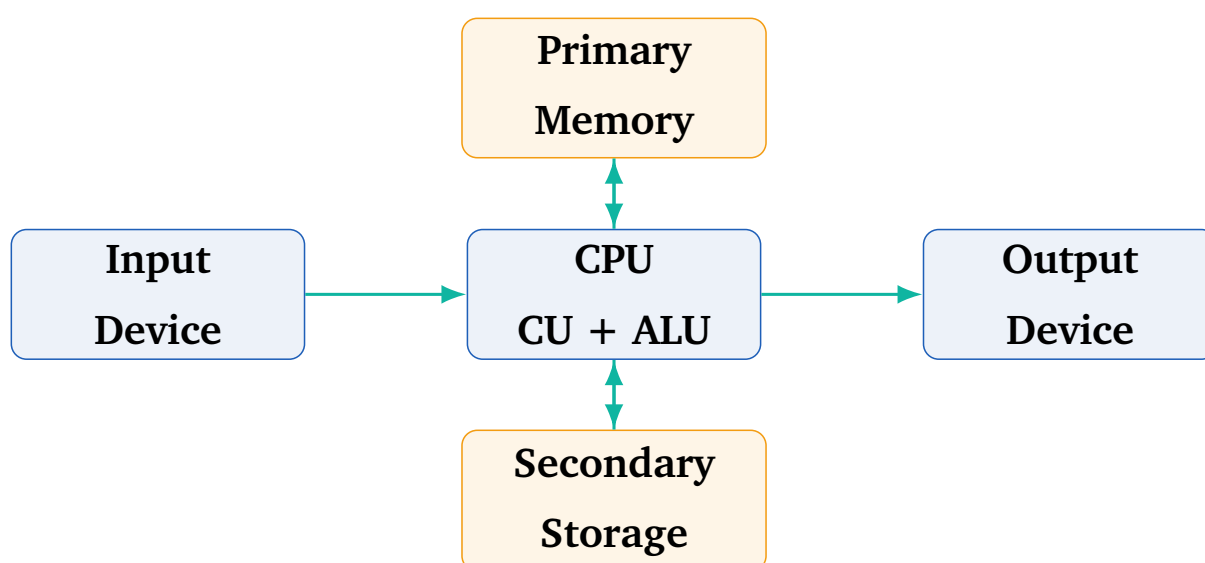
Concept used. Computer System questions are answered by matching each term with its role in the input, processing, storage, output and software cycle.

Step 1. Input devices convert user data and control signals into digital form.

Step 2. The CPU processes instructions. The Control Unit guides instruction execution and data flow.

Step 3. The ALU performs arithmetic and logical operations.

Step 4. Primary memory stores current programs and data, secondary storage keeps data permanently, and output devices present results.



Exam tip

In a diagram answer, label every arrow and every block. Labels carry marks.

Final Answer: The block diagram contains input device, CPU with Control Unit and ALU, primary memory, secondary storage and output device. Together they accept data, process it, store it and present output.

EXPERT'S SOLUTION : Nisha Verma, M.Sc Information Technology, BHU

Scoring angle. The safest answer begins with the exact textbook term, then gives the reason and one example. That order keeps the answer clear for short and long questions.

Step 1. Start with the key term in this question: The block diagram contains input device, CPU with Control Unit and ALU, primary memory, secondary storage and output device.

Step 2. Connect the term to the computer system cycle: input, processing, storage, output or software control.

Step 3. Input devices convert user data and control signals into digital form.

Step 4. The CPU processes instructions. The Control Unit guides instruction execution and data flow.

Step 5. The ALU performs arithmetic and logical operations.

Step 6. Primary memory stores current programs and data, secondary storage keeps data permanently, and output devices present results.

Step 7. Close with the final distinction or ordered list so the examiner can see the answer quickly.

This answer is not just a definition. It also explains why the component is needed inside a working computer system.

Final Answer: The block diagram contains input device, CPU with Control Unit and ALU, primary memory, secondary storage and output device. Together they accept data, process it, store it and present output.

Q 1.8 What is the primary role of system bus? Why is data bus bidirectional while address bus is unidirectional?

SOLUTION

Concept used. Computer System questions are answered by matching each term with its role in the input, processing, storage, output and software cycle.

Step 1. The system bus links the main components of a computer.

Step 2. It carries data, addresses and control signals.

Step 3. The CPU reads data from memory or devices and also writes data to them, so the data bus works both ways.

Step 4. The CPU selects a memory location or device by placing its address on the address bus, so address flow is from CPU to the selected unit.

Exam tip

Data can be read and written. Address is selected by the CPU.

Final Answer: The system bus provides communication paths among CPU, memory and input or output devices. The data bus is bidirectional because data can move to and from the CPU, while the address bus is unidirectional because the CPU sends addresses outward.

EXPERT'S SOLUTION : Arjun Basu, M.Tech Computer Science, Jadavpur University

Scoring angle. The safest answer begins with the exact textbook term, then gives the reason and one example. That order keeps the answer clear for short and long questions.

Step 1. Start with the key term in this question: The system bus provides communication paths among CPU, memory and input or output devices.

Step 2. Connect the term to the computer system cycle: input, processing, storage, output or software control.

Step 3. The system bus links the main components of a computer.

Step 4. It carries data, addresses and control signals.

Step 5. The CPU reads data from memory or devices and also writes data to them, so the data bus works both ways.

Step 6. The CPU selects a memory location or device by placing its address on the address bus, so address flow is from CPU to the selected unit.

Step 7. Close with the final distinction or ordered list so the examiner can see the answer quickly.

This answer is not just a definition. It also explains why the component is needed inside a working computer system.

Final Answer: The system bus provides communication paths among CPU, memory and input or output devices. The data bus is bidirectional because data can move to and from the CPU, while the address bus is unidirectional because the CPU sends addresses outward.

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Q 1.9 Differentiate between proprietary software and freeware software. Name two software for each type.

SOLUTION

Concept used. Computer System questions are answered by matching each term with its role in the input, processing, storage, output and software cycle.

Step 1. Proprietary software is controlled by a company or developer through licence terms.

Step 2. Examples of proprietary software include Microsoft Windows and Adobe Photoshop.

Step 3. Freeware can be used without paying a fee, but the developer may still keep ownership and source code control.

Step 4. Examples of freeware include Google Chrome and Adobe Acrobat Reader.

Exam tip

Do not confuse freeware with free and open source software. Freeware may not give source code.

Final Answer: Proprietary software is owned by its developer and usually restricts copying or modification. Freeware is available for use without payment, but its source code may still be closed.

EXPERT'S SOLUTION : Farah Khan, M.C.A., Jamia Millia Islamia

Scoring angle. The safest answer begins with the exact textbook term, then gives the reason and one example. That order keeps the answer clear for short and long questions.

Step 1. Start with the key term in this question: Proprietary software is owned by its developer and usually restricts copying or modification.

Step 2. Connect the term to the computer system cycle: input, processing, storage, output or software control.

Step 3. Proprietary software is controlled by a company or developer through licence terms.

Step 4. Examples of proprietary software include Microsoft Windows and Adobe Photoshop.

Step 5. Freeware can be used without paying a fee, but the developer may still keep ownership and source code control.

Step 6. Examples of freeware include Google Chrome and Adobe Acrobat Reader.

Step 7. Close with the final distinction or ordered list so the examiner can see the answer quickly.

This answer is not just a definition. It also explains why the component is needed inside a working computer system.

Final Answer: Proprietary software is owned by its developer and usually restricts copying or modification. Freeware is available for use without payment, but its source code may still be closed.

Q 1.10 Write the main difference between microcontroller and microprocessor. Why do smart home appliances have a microcontroller instead of microprocessor embedded in them?

SOLUTION

Concept used. Computer System questions are answered by matching each term with its role in the input, processing, storage, output and software cycle.

Step 1. A microprocessor needs external memory and input or output support for a complete system.

Step 2. A microcontroller places CPU, fixed RAM, ROM and peripherals together on one chip.

Step 3. Smart home appliances usually repeat a specific task, such as sensing, timing, switching and controlling motors.

Step 4. A microcontroller is smaller, cheaper, lower power and suitable for embedded control in such appliances.

 Exam tip

For appliances, write four words: small, cheap, low power, task specific.

Final Answer: A microprocessor mainly contains the CPU on a chip, while a microcontroller contains CPU, RAM, ROM and peripherals on a single chip. Smart appliances use microcontrollers because they perform fixed, repetitive control tasks cheaply and compactly.

EXPERT'S SOLUTION : Devika Pillai, M.Tech VLSI Design, Anna University

Scoring angle. The safest answer begins with the exact textbook term, then gives the reason and one example. That order keeps the answer clear for short and long questions.

Step 1. Start with the key term in this question: A microprocessor mainly contains the CPU on a chip, while a microcontroller contains CPU, RAM, ROM and peripherals on a single chip.

Step 2. Connect the term to the computer system cycle: input, processing, storage, output or software control.

Step 3. A microprocessor needs external memory and input or output support for a complete system.

Step 4. A microcontroller places CPU, fixed RAM, ROM and peripherals together on one chip.

Step 5. Smart home appliances usually repeat a specific task, such as sensing, timing, switching and controlling motors.

Step 6. A microcontroller is smaller, cheaper, lower power and suitable for embedded control in such appliances.

Step 7. Close with the final distinction or ordered list so the examiner can see the answer quickly.

This answer is not just a definition. It also explains why the component is needed inside a working computer system.

Final Answer: A microprocessor mainly contains the CPU on a chip, while a microcontroller contains CPU, RAM, ROM and peripherals on a single chip. Smart appliances use microcontrollers because they perform fixed, repetitive control tasks cheaply and compactly.

Q 1.11 Mention the different types of data that you deal with while browsing the Internet.

SOLUTION

Concept used. Computer System questions are answered by matching each term with its role in the input, processing, storage, output and software cycle.

Step 1. Web pages contain text, images, tables, forms, audio and video.

Step 2. Search engines, shopping sites and portals collect typed queries, clicks and preferences.

Step 3. HTML pages and emails are examples of semi-structured data because they have tags or markers.

Step 4. Posts, images, videos and comments are often unstructured data.

Exam tip

Give examples from actual browsing, not only textbook labels.

Final Answer: While browsing the Internet, students deal with text, numbers, images, audio, video, links, forms, cookies, location data, search history and other structured, semi-structured and unstructured data.

EXPERT'S SOLUTION : Sahil Gupta, M.Sc Data Science, Christ University

Scoring angle. The safest answer begins with the exact textbook term, then gives the reason and one example. That order keeps the answer clear for short and long questions.

Step 1. Start with the key term in this question: While browsing the Internet, students deal with text, numbers, images, audio, video, links, forms, cookies, location data, search history and other structured, semi-structured and unstructured data.

Step 2. Connect the term to the computer system cycle: input, processing, storage, output or software control.

Step 3. Web pages contain text, images, tables, forms, audio and video.

Step 4. Search engines, shopping sites and portals collect typed queries, clicks and preferences.

Step 5. HTML pages and emails are examples of semi-structured data because they have tags or markers.

Step 6. Posts, images, videos and comments are often unstructured data.

Step 7. Close with the final distinction or ordered list so the examiner can see the answer quickly.

This answer is not just a definition. It also explains why the component is needed inside a working computer system.

Final Answer: While browsing the Internet, students deal with text, numbers, images, audio, video, links, forms, cookies, location data, search history and other structured, semi-structured and unstructured data.

Q 1.12 Categorise the following data as structured, semi-structured and unstructured: Newspaper, Cricket Match Score, HTML Page, Patient records in a

hospital.

SOLUTION

Concept used. Computer System questions are answered by matching each term with its role in the input, processing, storage, output and software cycle.

Step 1. Structured data has a fixed format and can usually be stored in rows and columns.

Step 2. Cricket scores and hospital patient records have fields such as name, date, score, diagnosis or medicine.

Step 3. An HTML page has tags that give partial structure, so it is semi-structured.

Step 4. A newspaper mixes headlines, articles, images and layout without one fixed data table, so it is unstructured.

Exam tip

Structured means fields are predictable. Semi-structured means tags help interpretation.

Final Answer: Cricket match score and patient records in a hospital are structured data. An HTML page is semi-structured data. A newspaper is unstructured data.

EXPERT'S SOLUTION : Tara Singh, M.C.A., Panjab University

Scoring angle. The safest answer begins with the exact textbook term, then gives the reason and one example. That order keeps the answer clear for short and long questions.

Step 1. Start with the key term in this question: Cricket match score and patient records in a hospital are structured data.

Step 2. Connect the term to the computer system cycle: input, processing, storage, output or software control.

Step 3. Structured data has a fixed format and can usually be stored in rows and columns.

Step 4. Cricket scores and hospital patient records have fields such as name, date, score, diagnosis or medicine.

Step 5. An HTML page has tags that give partial structure, so it is semi-structured.

Step 6. A newspaper mixes headlines, articles, images and layout without one fixed data table, so it is unstructured.

Step 7. Close with the final distinction or ordered list so the examiner can see the answer quickly.

This answer is not just a definition. It also explains why the component is needed inside a working computer system.

Final Answer: Cricket match score and patient records in a hospital are structured data. An HTML page is semi-structured data. A newspaper is unstructured data.

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Q 1.13 Name the input or output device used to do the following: to output audio, to enter textual data, to make hard copy of a text file, to display the data or information, to enter audio-based command, to build 3D models, and to assist a visually-impaired individual in entering data.

SOLUTION

Concept used. Computer System questions are answered by matching each term with its role in the input, processing, storage, output and software cycle.

Step 1. A speaker or headphone gives audio output.

Step 2. A keyboard is used to enter textual data.

Step 3. A printer makes a hard copy, and a monitor displays data or information.

Step 4. A microphone accepts voice commands, a 3D printer builds 3D models, and a braille keyboard assists visually-impaired users in entering data.

Exam tip

Write answers in the same order as the sub-parts to avoid losing marks.

Final Answer: The devices are speaker, keyboard, printer, monitor, microphone, 3D printer and braille keyboard respectively.

EXPERT'S SOLUTION : *Ishan Mehta, M.Tech Software Systems, BITS Pilani*

Scoring angle. The safest answer begins with the exact textbook term, then gives the reason and one example. That order keeps the answer clear for short and long questions.

Step 1. Start with the key term in this question: The devices are speaker, keyboard, printer, monitor, microphone, 3D printer and braille keyboard respectively.

Step 2. Connect the term to the computer system cycle: input, processing, storage, output or software control.

Step 3. A speaker or headphone gives audio output.

Step 4. A keyboard is used to enter textual data.

Step 5. A printer makes a hard copy, and a monitor displays data or information.

Step 6. A microphone accepts voice commands, a 3D printer builds 3D models, and a braille keyboard assists visually-impaired users in entering data.

Step 7. Close with the final distinction or ordered list so the examiner can see the answer quickly.

This answer is not just a definition. It also explains why the component is needed inside a working computer system.

Final Answer: The devices are speaker, keyboard, printer, monitor, microphone, 3D printer and braille keyboard respectively.

Q 1.14 Identify the category (system, application, programming tool) of the following software: Compiler, Assembler, Ubuntu, Text editor.

SOLUTION

Concept used. Computer System questions are answered by matching each term with its role in the input, processing, storage, output and software cycle.

Step 1. Programming tools help programmers create or translate programs.

Step 2. A compiler translates high level language, and an assembler translates assembly language.

Step 3. Ubuntu is an operating system, so it is system software.

Step 4. A text editor is generally an application program used to create and edit text files.

 Exam tip

Classify by purpose: operate the computer, create programs, or help the user do a task.

Final Answer: Compiler and assembler are programming tools. Ubuntu is system software. A text editor is application software when used for general document editing.

EXPERT'S SOLUTION : *Ritika Das, M.Sc Computer Applications, University of Mumbai*

Scoring angle. The safest answer begins with the exact textbook term, then gives the reason and one example. That order keeps the answer clear for short and long questions.

Step 1. Start with the key term in this question: Compiler and assembler are programming tools.

Step 2. Connect the term to the computer system cycle: input, processing, storage, output or software control.

Step 3. Programming tools help programmers create or translate programs.

Step 4. A compiler translates high level language, and an assembler translates assembly language.

Step 5. Ubuntu is an operating system, so it is system software.

Step 6. A text editor is generally an application program used to create and edit text files.

Step 7. Close with the final distinction or ordered list so the examiner can see the answer quickly.

This answer is not just a definition. It also explains why the component is needed inside a working computer system.

Final Answer: Compiler and assembler are programming tools. Ubuntu is system software. A text editor is application software when used for general document editing.

Key Takeaways

- The operating system is the main software that makes hardware useful.
- RAM is fast working memory, while secondary memory stores data permanently.
- The data bus, address bus and control bus together form the system bus.
- Microcontrollers are preferred in smart appliances because they are compact and task specific.

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