

Week 13

IGCSE Computer Science

Homework bundle for this week

本周作业合集

exercises.lol

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IGCSE Computer Science

Name: _____ Score: _____

1. Which is system software?

- ☐ the operating system
- ☐ a word processor
- ☐ a web browser
- ☐ a spreadsheet

2. A high-level language (like Python):

- ☐ reads like English and runs on different types of computer
- ☐ is written in binary
- ☐ only runs on one CPU
- ☐ is the same as machine code

3. Which is a role of the operating system?

- ☐ managing memory and files
- ☐ spraying ink onto paper
- ☐ storing data magnetically
- ☐ displaying pixels

4. A compiler:

- ☐ translates the whole program at once, then it runs fast without the compiler
- ☐ translates and runs one line at a time
- ☐ stops at the first error
- ☐ must be present every time the program runs

5. An interrupt is:

- ☐ a signal telling the processor something needs attention now
- ☐ a permanent stop of the computer
- ☐ a type of file
- ☐ a network cable

6. A compiler translates the whole program once so it then runs fast without the compiler, whereas an interpreter translates and runs line by line, stopping at the first error — handy while testing.

- ☐ True ☐ False

7. A hardware interrupt comes from a device (e.g. a printer out of paper), while a software interrupt comes from a program (e.g. dividing by zero) — both make the CPU pause and service the event.

☐ True ☐ False

8. Which is a feature of an IDE?

☐ auto-completion and error diagnostics in a code editor

☐ a magnetic hard disk

☐ a network cable

☐ a CPU socket

1. the operating system

The OS (and drivers, utilities) is system software; the others are application software.

2. reads like English and runs on different types of computer

High-level languages are easy to read/write and portable; low-level languages are CPU-specific.

3. managing memory and files

The OS manages files, memory, peripherals, multitasking, interrupts, the UI and security.

4. translates the whole program at once, then it runs fast without the compiler

A compiler translates everything once into a fast stand-alone program; an interpreter goes line by line.

5. a signal telling the processor something needs attention now

An interrupt makes the CPU pause, service the event, then resume — for quick reactions.

6. True

Compiled code is faster and stand-alone; interpreted code is easier to debug because it stops where the error is.

7. True

Interrupts can be hardware, software or user-triggered; in every case the CPU saves state, handles it, then resumes.

8. auto-completion and error diagnostics in a code editor

An IDE bundles an editor, translator, run-time, diagnostics, auto-complete and prettyprinting.

4.1 Types of software and interrupts

Name: _____ Class: _____ Date: _____

Total: 8 marks

KEY WORDS interrupt 中断 • operating system 操作系统 • system software 系统软件 • application software 应用软件
• system vs application software 系统

Objective

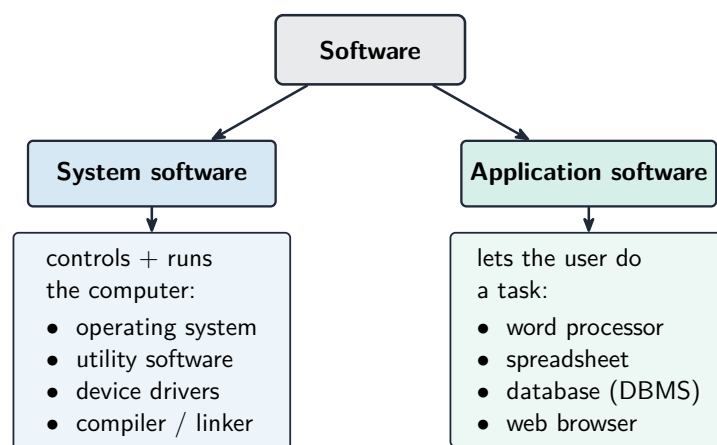
Build the skills to answer exam questions on **software and interrupts** 软件与中断 — **system vs application software** 系统/应用软件, the **operating system** 操作系统, and **interrupts** 中断.

You must be able to:

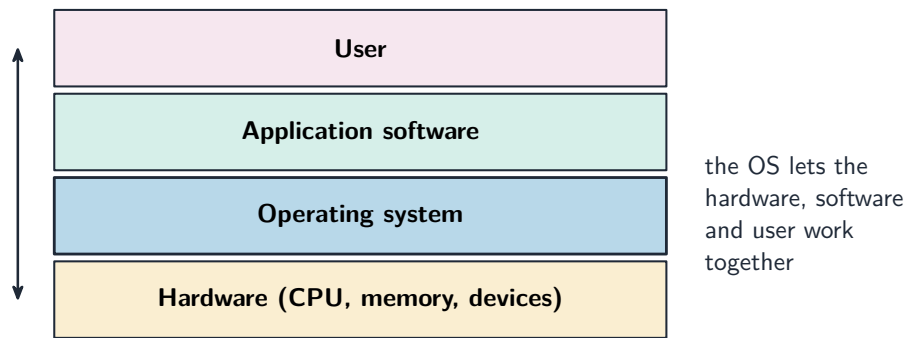
- classify software as system or application
- give the roles of the operating system
- describe an interrupt and how the processor handles it

1 Worked examples

■ Software and the OS



System software runs the computer; application software lets the user do a task



OS roles: manage files, memory, peripherals, multitasking, security; handle interrupts; provide a UI

- an **interrupt** tells the processor something needs attention now.

2 Practice

2.1 State whether a web browser is system or application software. [1]

2.2 State two roles of the operating system. [2]

3 Exam-style questions

3.1 Which is system software? [1]

- **A** spreadsheet
 - **B** device driver
 - **C** word processor
 - **D** web browser
-

3.2 A printer runs out of paper while printing.

(a) State the type of interrupt this is. [1]

(b) Describe what the processor does when an interrupt arrives. [3]

Solutions

2.1 application software.

2.2 any two of: managing files; managing memory; handling interrupts; providing a user interface; managing peripherals; multitasking; security.

3.1 B. A device driver is system software.

3.2 (a) a hardware interrupt.

(b) the processor stops what it is doing and saves its place; it runs the interrupt service routine to deal with it; then restores its place and carries on.

5 A computer system has a mouse.

An interrupt is sent to the CPU every time a button on the mouse is clicked.

(a) Identify the name of this type of interrupt.

..... [1]

(b) The interrupt is placed in a queue.

Explain how the interrupt is serviced after it is placed in the queue.

.....
.....
.....
.....
.....
.....
.....
.....
..... [4]

(c) The mouse is connected using a universal serial bus (USB) connection.

(i) Explain how data is sent using the USB connection.

.....
.....
.....
..... [2]

(ii) Give **two** benefits of using a USB connection for this purpose.

- 1
-
- 2
-
- [2]

(iii) Give **one** drawback of using a USB connection for this purpose.

.....
..... [1]

4 A computer has an operating system.

One function of the operating system is handling interrupts.

(a) Describe the role of the operating system in handling interrupts.

.....

.....

.....

..... [2]

(b) Give **two** other functions of an operating system.

1

2 [2]

(c) Hardware and software interrupts are two types of interrupt.

(i) Give **one** example of a hardware interrupt.

..... [1]

(ii) Give **one** example of a software interrupt.

..... [1]

7 A computer has an operating system.

(a) The operating system provides several functions.

(i) Tick (✓) **one** box to show which of these is **not** a function of the operating system.

A managing files	☐
B providing an interface	☐
C handling interrupts	☐
D loading the bootstrap	☐

[1]

(ii) Identify **one** other function of an operating system.

Describe the purpose of this function.

[2]

(b) Give the name of the set of instructions that are provided to the operating system to allow it to run.

[1]

1 Different types of software can be run on a computer.

(a) State what is meant by software.

[1]

(b) Utility software is one type of software that can be run on a computer.

Tick (✓) **one** box to show which software is an example of utility software.

- A

spreadsheet

☐
- B

anti-virus

☐
- C

web browser

☐
- D

database

☐

[1]

(c) Identify the type of software that manages inputs and outputs for the computer.

[1]

6 A computer needs firmware and system software to operate.

(a) State the purpose of firmware.

.....

..... [1]

(b) Give **one** example of firmware.

..... [1]

(c) Give **two** examples of system software.

1

2 [2]

4 A student uses both system software and application software on their computer.

(a) Give **one** example of system software.

..... [1]

(b) Give **two** examples of application software.

1

2 [2]

(c) Describe the difference between system software and application software.

.....

.....

.....

.....

..... [2]

9 A printer runs out of ink and needs a new ink cartridge. An interrupt is sent and a message is generated to notify the user that the ink cartridge is empty.

(a) Complete the paragraph about the use of an interrupt in this process.

Use the terms from the list.

Some of the terms in the list will **not** be used. You should only use a term once.

- binary
- clock
- computer
- data
- error
- fetch–decode–execute cycle
- hexadecimal
- higher
- interrupt queue
- interrupt service routine (ISR)
- lower
- printer
- priority level
- secondary storage
- sorting
- transmission

The sends an interrupt to the
..... . The interrupt is given a
..... . The processor completes its current
..... and checks the
..... to see if there is an interrupt with
..... priority than the current task. If there is, it stores
the current task and fetches the interrupt. It then calls the
..... , which is a sequence of instructions that
handles the interrupt. The interrupt is handled, which generates a message to the user to
notify them that the ink cartridge is empty.

[7]

(b) Handling interrupts is one function of an operating system.

Give **two** functions of an operating system that relate to memory.

- 1
- 2

[2]

3 A computer has an operating system (OS).

(a) Complete the table by writing each missing OS function name and description.

Function name	Description
managing memory	
	allows application software to run on the computer
managing peripherals	

[3]

(b) The OS handles interrupts.

(i) State the purpose of an interrupt.

[1]

(ii) Identify **one** input device and **one** example of an interrupt that it can generate.

Input device

Interrupt

[1]

- (iii) A processor is currently executing a program. The processor receives an interrupt.

Explain how the processor manages the current program and the interrupt.

[5]

9 An interrupt is a type of signal that is used in a computer.

(a) State the name of the type of software that manages interrupts.

..... [1]

(b) Describe how interrupts are used when a key is pressed on a keyboard.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
..... [5]

(c) Interrupts can be hardware based or software based.

A key press is one example of a hardware interrupt.

(i) Give **two** other examples of a hardware interrupt.

1
.....
2
..... [2]

(ii) Give **two** examples of a software interrupt.

1
.....
2
..... [2]

4 Complete the statements about different types of software.

Use the terms from the list.

Some of the terms in the list will **not** be used. You should only use a term once.

- application assembly language bootloader central processing unit (CPU)
- firmware hardware operating output system user

..... software provides the services that the computer requires; an example is utility software.

..... software is run on the operating system.

The system is run on the firmware, which is run on the

[4]

4.2 Types of programming language, translators and IDEs

Name: _____ Class: _____ Date: _____

Total: 8 marks

KEY WORDS high-level language 高级语言 • machine code 机器码 • interpreter 解释器 • low-level language 低级语言
• compiler vs interpreter 编译器

Objective

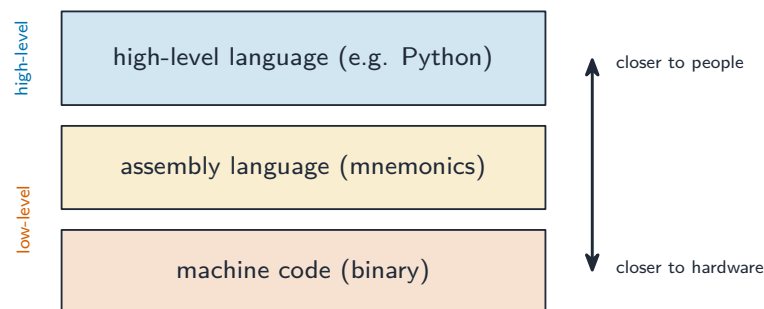
Build the skills to answer exam questions on **programming languages, translators and IDEs** 编程语言、翻译程序与集成开发环境 — **high/low-level** 高级/低级 languages, **compiler vs interpreter** 编译器/解释器, and IDE tools.

You must be able to:

- compare high-level and low-level languages
- compare a compiler and an interpreter
- list the tools in an IDE

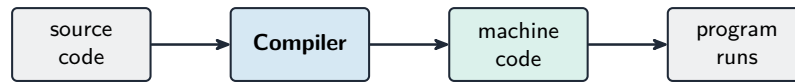
1 Worked examples

■ Translators



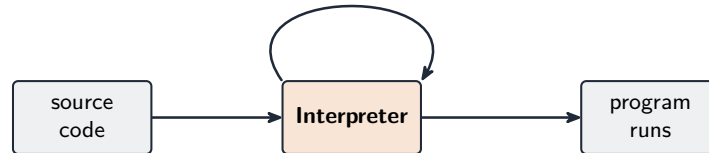
High-level: easy, runs on any computer. Low-level (assembly, machine code): tied to one CPU

Compiler — translate the whole program once



translated once; the machine code then runs many times

Interpreter — one line at a time



reads, translates and runs one line at a time (every run); stops at the first error

Compiler: translates all at once, finished program runs fast. Interpreter: line by line, stops at first error

2 Practice

2.1 State one advantage of a high-level language.

[1]

2.2 State two tools found in an IDE.

[2]

3 Exam-style questions

3.1 A compiler translates:

[1]

- **A** one line at a time
- **B** the whole program at once
- **C** only the errors
- **D** nothing

3.2 A programmer is writing and testing a new program.

(a) State whether a compiler or an interpreter is more useful while testing, and why. [2]

(b) State two differences between a compiler and an interpreter.

[2]

Solutions

2.1 any of: easy to read/write/fix; independent of the computer (runs on any type).

2.2 any two of: code editor; run-time environment; translator; error diagnostics; auto-completion; prettyprinting.

3.1 B. A compiler translates the whole program at once.

3.2 (a) an interpreter; because it stops at the first error, which helps find mistakes while testing.

(b) any two of: compiler translates all at once / interpreter line by line; compiler reports all errors at the end / interpreter stops at the first; the compiled program runs faster; the interpreter is needed each time the program runs.

3 A programmer uses assembly language to create a program for a coffee machine.

(a) Describe what is meant by assembly language.

.....

.....

.....

..... [2]

(b) Identify the translator needed for assembly language.

..... [1]

(c) Tick (✓) **one** box to show which statement is an advantage of using assembly language.

- A

It is close to human language.

☐
- B

It is memory efficient.

☐
- C

It is easy to debug.

☐
- D

It is machine independent.

☐

[1]

7 Programs can be written in a high-level language or a low-level language.

(a) Machine code is one type of low-level language.

Identify **one** other type of low-level language.

Identify the translator that is needed for the type of low-level language you have identified.

Type of low-level language

Translator

[2]

(b) A high-level language can be translated into a low-level language, using a compiler or an interpreter.

Describe the advantages of using an interpreter instead of a compiler during software development.

[4]

(c) Integrated development environments (IDEs) provide translators.

Identify **three** other common functions of an IDE.

1

2

3

[3]

6 A computer programmer uses assembly language to create a computer program for an embedded system in a washing machine.

(a) State what is meant by an embedded system.

.....

..... [1]

(b) Give the name of the translator that will be used for the program.

..... [1]

(c) The washing machine needs to display error codes on a small screen if there is a problem with the washing machine.

The error codes are stored as binary. The binary numbers are too long to be displayed on the washing machine.

State how the error codes could be reduced in length to be displayed on the screen.

..... [1]

(d) Give **one** benefit to the programmer of using assembly language to write the program.

.....

..... [1]

- (e) The programmer uses an integrated development environment (IDE) to write the program.

A built-in translator to convert the program into machine code is one way that the IDE helps the computer programmer.

Describe **three** other ways the IDE can help the programmer.

[6]

- 7 A computer programmer uses an integrated development environment (IDE) when creating a computer program.

Explain the purpose of the IDE.

[4]

7 A programmer uses a low-level language to write a computer program for a vending machine.

(a) Describe what is meant by a low-level language.

[2]

(b) Give **two** reasons why the programmer would choose to write the computer program in a low-level language instead of a high-level language.

1

2

[2]

5 A programmer writes a computer program using a high-level language.

(a) Tick (✓) **one** box to show which statement is correct about writing computer programs in a high-level language.

- A Mnemonics are used to create instructions.

☐
- B The computer program is harder to debug than a low-level language program.

☐
- C The computer program is machine independent.

☐
- D The hardware of the computer can be directly manipulated.

☐

[1]

(b) The programmer uses a compiler to translate the computer program.

(i) Describe how the compiler translates the computer program.

.....

.....

.....

.....

.....

.....

[3]

(ii) Describe how the compiler reports errors.

.....

.....

.....

.....

[2]

(c) The programmer uses an integrated development environment (IDE) to create the computer program.

One function of the IDE is that it has the built-in compiler.

Give **three** other common functions of an IDE.

1

2

3