OCR GCSE (J277)

Module P: Languages and IDEs

Workbooklet · 3 parts · 61 marks

P2 is IGCSE (Cambridge) only and not on J277.

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MODULE P LANGUAGES AND IDES · P1

High-level and low-level languages

Original practice questions · 20 marks · ~25 minutes · OCR J277 spec 2.5.1

Name _____ Date _____

Instructions. Answer all questions in the spaces provided. The marks for each part are shown in brackets [ ]. The total for this worksheet is **20 marks**.

1

Total: 3 marks

Three extracts of program code, **A**, **B** and **C**, are shown.

Extract A

```
total = price * quantity
if total > 100 then
    print("Free delivery")
endif
```

Extract B

```
LOAD  30
ADD   31
STORE 32
JUMP  14
```

Extract C

```
00011110
01011111
00100000
10001110
```

(a) Identify the extract that is written in a high-level language. **[1]**

(b) Identify the extract that the CPU can execute **without** it being translated first. **[1]**

(c) State what is meant by a **low-level** language. **[1]**

2 **Total: 4 marks**

(a) Tick (✓) **one** box in each row to show whether each statement is true or false. If a statement is false, rewrite it so that it is true. **[4]**

Statement	True	False	Rewritten statement (if false)
Each statement in a high-level language is translated into exactly one machine code instruction.			
Machine code and assembly language are both low-level languages.			
A program written in a low-level language for one type of processor will run on any other type of processor.			
Code written in a high-level language is closer to the CPU's own instructions than code written in a low-level language.			

3 **Total: 6 marks**

A farming company makes small battery-powered sensors that are pushed into the soil in its fields. Each sensor has a simple processor and only a few kilobytes of memory. Every ten minutes the sensor measures how wet the soil is and sends the reading by radio to a base station. The part of the program that reads the measurement and switches the radio on and off is written in a low-level language.

(a) Explain **two** reasons why this part of the program is written in a low-level language. **[4]**

(b) Describe **one** drawback to the company's programmers of writing this part of the program in a low-level language. **[2]**

4 **Total: 5 marks**

A travel company is writing an app that customers use to book hotel rooms. The app will run on smartphones, tablets and laptops. These devices use different types of processor. The programmers write the app in a high-level language.

(a) Explain why writing the app in a high-level language means it can be used on all of these devices. **[2]**

(b) Give **two other** benefits to the programmers of writing the app in a high-level language. **[2]**

1

2

(c) State **one** drawback of using a high-level language instead of a low-level language. **[1]**

5 **Total: 2 marks**

A programmer tests a long program and finds that it gives the wrong result.

(a) Explain why the error would usually be easier to find and fix if the program was written in a high-level language rather than a low-level language. **[2]**

Total for this worksheet: 20 marks

MODULE P LANGUAGES AND IDES · P3

Translators: compilers and interpreters

Original practice questions · 21 marks · ~25 minutes · OCR J277 spec 2.5.1

Name _____ Date _____

Instructions. Answer all questions in the spaces provided. The marks for each part are shown in brackets [ ]. The total for this worksheet is **21 marks**. All organisations and programs on this sheet are made up.

1

Total: 3 marks

(a) State the purpose of a translator. **[1]**

(b) A programmer writes a program in a high-level language. Explain why the program needs a translator before the CPU can execute it. **[2]**

2

Total: 5 marks

(a) Tick (✓) **one** box in each row to show whether each statement describes a compiler, an interpreter, or both. **[5]**

Statement	Compiler	Interpreter	Both
Translates the whole program before any of it is run			
Must be on the computer every time the program is run			
Converts source code written in a high-level language into machine code			
Produces a file that can be run without the original source code			
Runs each line straight after translating it			

3 **Total: 5 marks**

A company makes ticket machines for railway stations. Its programmers have finished writing the program that runs on the machines. The program will be copied onto 400 machines. The company does not want other businesses to see or copy its source code.

(a) Identify the type of translator the company should use to translate the finished program. Justify your choice. **[3]**

Translator:

Justification:

(b) The company uses a compiler. A few months later, a programmer changes one line of the source code to fix a fault. **[2]**

Describe what must happen before the corrected program can run on the ticket machines.

4 **Total: 6 marks**

A warehouse manager has written this program to help with stock checks. The program contains **two** errors: on line 03, `print` is misspelt as `prnit`, and on line 06, the variable `total` is misspelt as `totl`.

```
01 print("Stock check started")
02 boxes = int(input("Enter number of boxes"))
03 prnit("Boxes entered: " + str(boxes))
04 shelf = input("Enter shelf code")
05 total = boxes * 12
06 print("Items on shelf " + shelf + ": " + str(totl))
```

(a) The manager runs the program using an **interpreter**. Describe what happens. **[3]**

(b) The manager instead translates the program using a **compiler**. Describe what happens. **[3]**

5 **Total: 2 marks**

A program run by an interpreter usually runs more slowly than the same program after it has been compiled.

(a) Explain why. **[2]**

Total for this worksheet: 21 marks

MODULE P LANGUAGES AND IDES · P4

IDE tools and how they help a programmer

Original practice questions · 20 marks · ~25 minutes · OCR J277 spec 2.5.2 (with 2.5.1)

Name _____ Date _____

Instructions. Answer all questions in the spaces provided. The marks for each part are shown in brackets [ ]. The total for this worksheet is **20 marks**.

A programmer at a ferry company is writing a program that works out the fare for each passenger. Passengers aged 65 or over pay half the full fare. She writes the program in a high-level language using an Integrated Development Environment (IDE). All the questions on this worksheet are about this program.

1

Total: 5 marks

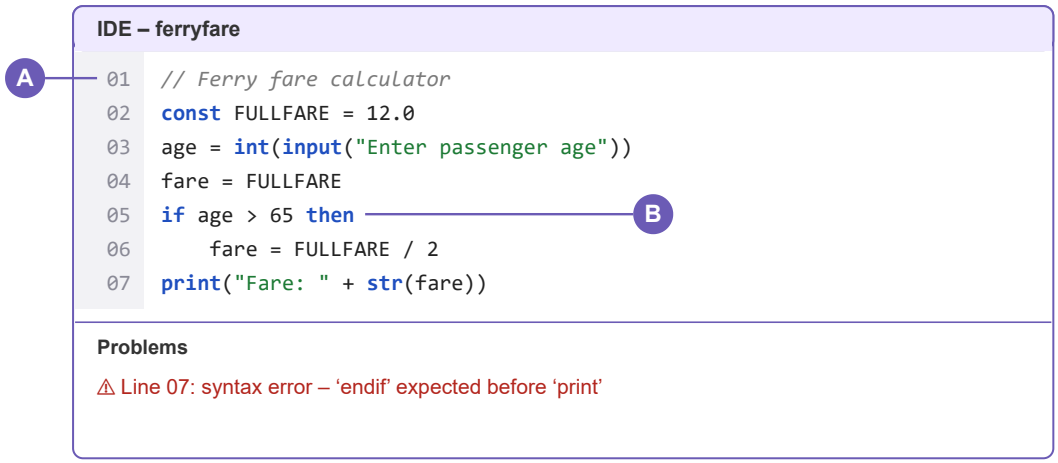
(a) The table describes five things the IDE does while the programmer works on the fare program. Tick (✓) **one** box in each row to show which IDE tool does each thing. **[5]**

What the IDE does	Editor	Error diagnostics	Run-time environment	Translator
Lets the programmer type in the code and change it				
Converts the high-level code into machine code				
Displays the fare that the program outputs while the programmer tests it				
Displays a message giving the line number of a mistake in the code and what the mistake is				
Automatically indents the lines inside an `if` statement				

2

Total: 4 marks

The screenshot shows the IDE while the programmer is writing the fare program. The code is shown in OCR Exam Reference Language. Two features of the editor are labelled **A** and **B**.



Feature **A** is line numbering. Feature **B** is keyword highlighting: keywords are shown in a different colour.

(a) Explain how feature **A** helps the programmer. **[2]**

(b) Explain how feature **B** helps the programmer. **[2]**

3

Total: 2 marks

Look at the Problems panel at the bottom of the screenshot in Question 2. It is part of the IDE's error diagnostics.

(a) Describe how the error diagnostics help the programmer to correct this error. **[2]**

4 **Total: 4 marks**

The programmer adds the missing `endif`. The program now runs with no error messages. She tests it with an age of 65. The output is `Fare: 12.0` but she expected `Fare: 6.0`.

(a) Describe how the programmer could use tools in the IDE to find the cause of this problem. **[4]**

5 **Total: 5 marks**

(a) Describe how the IDE's run-time environment helps the programmer test the fare program. **[2]**

(b) While she is developing the program, the IDE translates it using an interpreter. Explain **one** way the interpreter helps the programmer while she is developing the fare program. **[2]**

(c) When the program is finished, the ferry company wants an executable file that it can run on the ticket office computers. State the type of translator that produces an executable file. **[1]**

Total for this worksheet: 20 marks