

THEME A: CONCEPTS · A1.4 · HL ONLY

Translation

Original practice questions · 33 marks · about 50 minutes · covers A1.4.1

Instructions. Answer all questions. The maximum mark for this paper is [33 marks]. The marks available are shown in brackets. Parts badged **HL** assess higher level only content; standard level students may leave these out. **A1.4 is a higher level only topic**, so every question in this paper is HL.

1**Total: 5 marks**

A student writes one program in Python, which is interpreted, and a second program in C, which is compiled.

- (a) **HL** Outline what is meant by translation. **[2]**

- (b) **HL** Describe how an interpreter translates and runs the Python program. **[3]**

2**Total: 6 marks**

The student now builds the C program.

- (a) **HL** Describe how a compiler translates the C program before it is run. **[3]**

- (b) **HL** Compare the way a compiler reports errors with the way an interpreter reports them. **[3]**

A software company must ship the same application to customers running Windows, macOS and Linux.

- (a) **HL** Explain why a program written in a compiled language is less portable than one written in an interpreted language. **[3]**

- (b) **HL** Describe how bytecode allows the same program to run on all three operating systems. **[3]**

A banking application is written in Java. Java source code is first turned into bytecode, and a just-in-time (JIT) compiler is used while the application is running.

- (a) **HL** Describe how just-in-time (JIT) compilation works. **[3]**

- (b) **HL** Outline **one** reason why JIT compilation can give better performance than interpreting the bytecode directly. **[2]**

5

Total: 5 marks

Different projects suit different translation approaches.

- (a) **HL** Suggest the more suitable translation approach for a small team building a first working version of a new app, and justify your answer. **[3]**

- (b)** **HL** Suggest the more suitable translation approach for a video game engine that must draw each frame as quickly as possible, and justify your answer. **[2]**

6

Total: 6 marks

A company is building a data analysis tool that its scientists will run on several different operating systems. The scientists change the analysis code frequently, and each run processes a large data set.

- HL Evaluate** the use of an interpreted language rather than a compiled language for this tool. **[6]**

END OF QUESTIONS