MODULE P LANGUAGES AND IDES · P2

Assembly language and assemblers

Original practice questions · 20 marks · ~25 minutes · Cambridge 0478 syllabus 4.2.2 (with 4.2.1 and 3.1.4)

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: 5 marks

A heating controller in an office building is programmed by an engineer. Three short pieces of code, **A**, **B** and **C**, from the engineer's work are shown. Each one is written in a different type of language.

Program	Code

A	`if temperature < 18 then`
	`  heaterLevel = 3`
	`endif`

B	`0001 0000 0110`
	`0110 0000 0111`
	`0011 0000 1000`

C	`LDA 6`
	`ADD 7`
	`STO 8`

(a) Tick (✓) **one** box in each row to show the type of language each program is written in. **[3]**

Program	High-level language	Assembly language	Machine code
A			
B			
C			

(b) State what is meant by a **mnemonic**. Give **one** example of a mnemonic from the programs shown. **[2]**

Meaning

Example

2 Total: 4 marks

(a) Tick (✓) **one** box in each row to show whether each statement is true or false. **[4]**

Statement	True	False
Assembly language is a form of low-level language.		
A compiler is used to translate an assembly language program into machine code.		
Assembly language allows a programmer to directly manipulate the hardware.		
An assembly language program written for one type of processor will run on any other type of processor without being changed.		

3 Total: 2 marks

(a) Describe **two** differences between assembly language and machine code. **[2]**

1

2

4 Total: 3 marks

The engineer finishes a program for the heating controller in assembly language. The CPU in the controller cannot run the program as it is written.

(a) Explain why the program must be translated before the CPU can run it. Identify the translator that is needed in your answer. **[3]**

5 **Total: 6 marks**

A different engineer is writing a device driver for a new label printer. The design notes say the driver must:

- fit into a very small amount of memory
- control the printer's print head hardware directly
- respond quickly to signals from the printer.

The engineer decides to write the driver in assembly language instead of a high-level language.

(a) Explain how writing the driver in assembly language helps it to meet **two** of these requirements. **[4]**

Requirement 1

Requirement 2

(b) Give **two** drawbacks, for the engineer, of writing the driver in assembly language instead of a high-level language. **[2]**

1

2

Total for this worksheet: 20 marks