# Homework 3 Programming language classification

1. (a) State **two** advantages of writing a program in assembly code over writing a program in machine code. [2]

(b) State **two** advantages of writing a program in a high-level language over writing a program assembly code. (Do not repeat any answers from part (a)). [2]

(c) State **two** reasons why a programmer might choose to write a program in assembly code rather than in a high-level language. [2]

2. Some of the assembly language instructions supported by a simple microprocessor are:

|  |  |
| --- | --- |
| **Instruction** | **Meaning** |
| LDA | Load the value stored in memory location specified by the operand into the accumulator |
| STO | Store the value in the accumulator in memory location specified by the operand |
| ADD | Add the value specified in the operand to the value in the accumulator |
| CMP | Compare the contents of the accumulator with the contents of the location specified by the operand |
| BLT | Jump to the address held in the operand if the accumulator held the lesser value in the last comparison |
| BGT | Jump to the address held in the operand if the accumulator held the greater value in the last comparison |
| JMP | Jump to the address held in the operand |
| STOP | Stop |

(a) Write into the table below the opcode and the operand in the following instruction:

STO 8

|  |  |
| --- | --- |
| **Operand** |  |
| **Opcode** |  |

[1]

(b) Write an assembly language program using the instructions given above, equivalent to the high-level language statement below. Halt the program after execution of the statement(s).

Assume that the value 1 is held in memory address 9, ‘a’ in address 10 and ‘b’ in address 11.

Comment each line of code to say what it does.

IF (a >= b) THEN

b = b + 1

ENDIF [5]

[Total 12 marks]