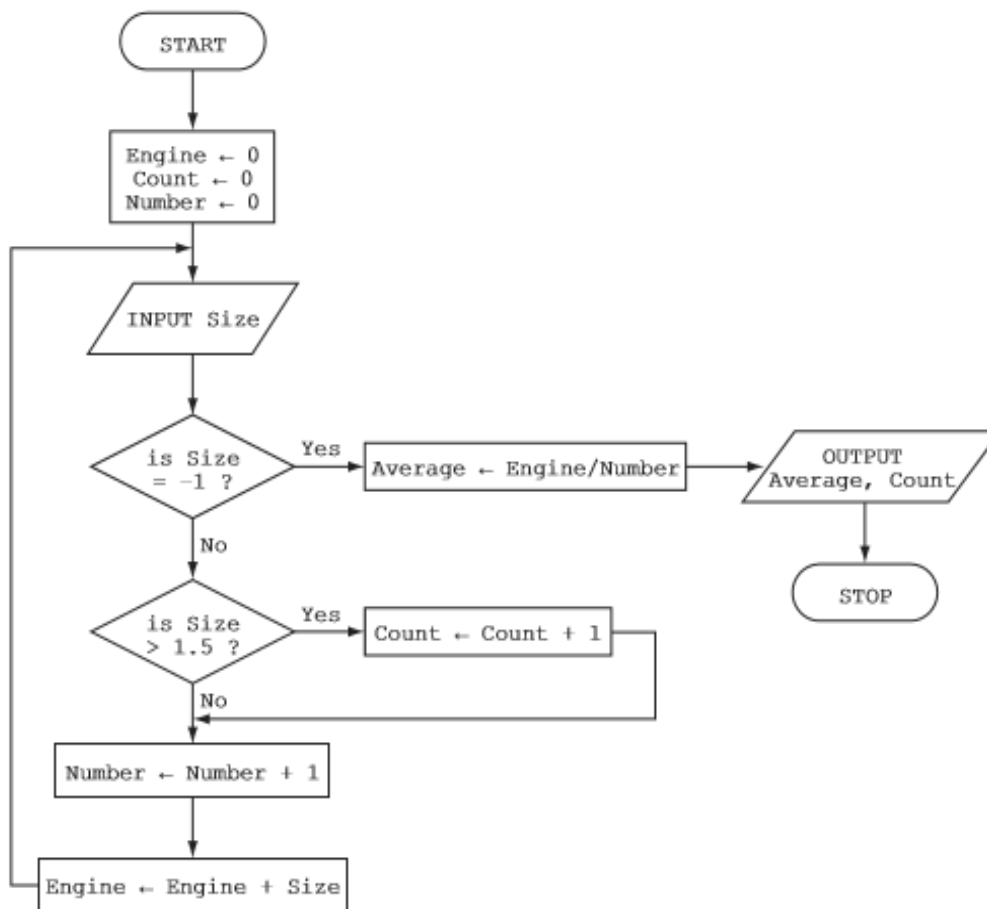# Sixth Form Entrance Examination: Computer Science

## Summary

The Computer Science entrance exam will be 45 minutes long. It will test candidate's knowledge of the hardware and software used in Computing Systems, their knowledge of binary and hexadecimal number bases, their ability to trace an algorithm expressed in pseudo code or as a flowchart, their ability to construct simple algorithms in pseudo code and their ability to trace and draw logical circuits containing the following logic gates OR, AND, NAND, NOR, XOR and NOT.

## Sample questions

3   The flowchart inputs the size of a number of car engines; a value of −1 stops the input.

This information is output: *average engine size* and *number of engines with size > 1.5*

Complete the trace table for the input data.

1.8,  2.0,  1.0,  1.3,  1.0,  2.5,  2.0,  1.3,  1.8,  1.3,  −1

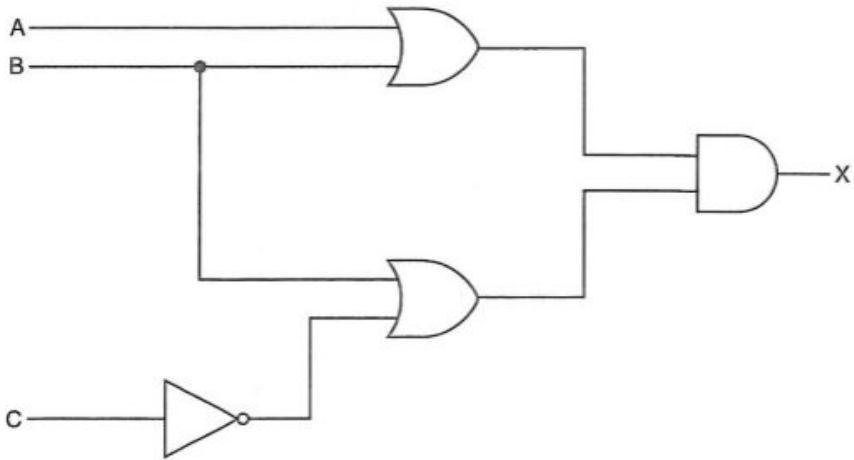| Engine | Count | Number | Size | Average | OUTPUT |
|--------|-------|--------|------|---------|--------|
|        |       |        |      |         |        |
|        |       |        |      |         |        |
|        |       |        |      |         |        |
|        |       |        |      |         |        |
|        |       |        |      |         |        |
|        |       |        |      |         |        |
|        |       |        |      |         |        |
|        |       |        |      |         |        |
|        |       |        |      |         |        |
|        |       |        |      |         |        |
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|        |       |        |      |         |        |
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|        |       |        |      |         |        |
|        |       |        |      |         |        |
|        |       |        |      |         |        |

[6]

Answer-

| Engine | Count | Number | Size | Average | OUTPUT |
|--------|-------|--------|------|---------|--------|
| 0 | 0 | 0 | 1.8 | | |
| 1.8 | 1 | 1 | 2.0 | | |
| 3.8 | 2 | 2 | 1.0 | | |
| 4.8 | | 3 | 1.3 | | |
| 6.1 | | 4 | 1.0 | | |
| 7.1 | | 5 | 2.5 | | |
| 9.6 | 3 | 6 | 2.0 | | |
| 11.6 | 4 | 7 | 1.3 | | |
| 12.9 | | 8 | 1.8 | | |
| 14.7 | 5 | 9 | 1.3 | | |
| 16.0 | | 10 | −1 | | |
| | | | | 1.6 | |
| | | | | | |
| | | | | | 1.6, 5 |
| (1 mark) | (1 mark) | (1 mark) | (1 mark) | (1 mark) | (1 mark) |

**(c)** Write a logic statement which corresponds to the following logic circuit:



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[3]

Answer

X = (A OR B) AND (B OR NOT C)