2.1 Elements of Computational Thinking: 10-minute Pack

Total Marks

OCR H446 · Calculators not allowed · about 10 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Devon is a software engineer working on an air quality sensor for Marlow Council. Each reading is stored as an 8-bit binary value. To save storage space, repeated identical readings are compressed by recording a value once together with a count of how many times it repeats, an application of pattern recognition in computational thinking.

(a) Convert the denary value 173 to an 8-bit binary number. Show your working. **(2)**

(b) Convert your answer to part (a) into hexadecimal. **(2)**

(c) State the name of the pattern recognition technique described above, in which a repeated value is stored once together with a count of how many times it occurs, and state one benefit of using it. **(2)**

(d) A second sensor reading is recorded as FE in hexadecimal. State this value in binary and in denary. **(2)**

(Total for Question 1 is 8 marks)

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Mark scheme · 2.1 Elements of Computational Thinking: 10-minute Pack

Question 1

(a) correct method, e.g. splitting 173 into place values 128+32+8+4+1 (oe) **M1**

(a) cao 10101101 **A1**

(a) Answer: 10101101

(b) splits the byte into two 4-bit nibbles, 1010 and 1101 (oe) **M1**

(b) cao AD **A1**

(b) Answer: AD

(c) names run-length encoding (RLE) **B1**

(c) states a valid benefit, e.g. reduces the amount of storage space/data volume needed (oe) **B1**

(c) Answer: Run-length encoding (RLE); it reduces the amount of storage space needed to hold the data.

(d) cao binary 11111110 **B1**

(d) cao denary 254 **B1**

(d) Answer: Binary: 11111110, Denary: 254

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