CAIE Computer Science IGCSE
1.1 Number systems

Flashcards

Why must data in computer systems be stored in binary format?

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Because it has only two states, 0 or 1, which map directly to the two states of electronic components like transistors: on (1) or off (0).

How do you convert denary to binary?

How do you convert denary to binary?

1. Write out place value headers, starting with one and increasing in powers of two, placing larger values to the left of smaller values.
2. Starting from the left hand side, you place a one if the value is less than or equal to your number, and a zero otherwise.
3. Once you've placed a one, you must subtract the value of that position from your number and continue as before, until your number becomes 0.

What is the 8-bit binary equivalent of the denary number 13?

What is the 8-bit binary equivalent of the denary number 13?

00001101

How do you convert binary to denary?

How do you convert binary to denary?

1. Write out place value headers, starting with one and increasing in powers of two, placing larger values to the left of smaller values.
2. Align the left of the binary number with the place value headers.
3. Add together all of the place values with a binary 1 beneath them.

What is the denary equivalent of the binary number 1010?

What is the denary equivalent of the binary number 1010?

8 (2^3)	4 (2^2)	2 (2^1)	1 (2^0)
1	0	1	0

$$8 + 0 + 2 + 0 = 10$$

How do you convert binary to hexadecimal?

How do you convert binary to hexadecimal?

- Split the binary value into multiple 4-bit nibbles and convert each to denary.
- Once each nibble has been converted to denary, the denary value can be converted to its hexadecimal equivalent (0-9 remain the same, A=10, B=11, …, F=15)
- Finally, the hexadecimal digits are concatenated to form a hexadecimal representation.

What is the hexadecimal equivalent of the binary number 11011111?

What is the hexadecimal equivalent of the binary number 11011111?

1101 1111 → D F

How do you convert hexadecimal to binary?

How do you convert hexadecimal to binary?

Convert each hexadecimal digit to a denary digit and then to a binary nibble before combining the nibbles to form a single binary number.

What is the binary equivalent of the hexadecimal number A7?

What is the binary equivalent of the hexadecimal number A7?

10100111 (A=1010, 7=0111)

How do you convert denary to hexadecimal?

How do you convert denary to hexadecimal?

1. Convert the denary number into binary
2. Convert this binary number to hexadecimal (as shown previously)

What is the hexadecimal equivalent of the denary number 254?

What is the hexadecimal equivalent of the denary number 254?

FE

How do you convert hexadecimal to denary?

How do you convert hexadecimal to denary?

1. Begin by converting the hexadecimal number into binary (as two nibbles that you then concatenate).
2. Convert this binary number to denary.

What is the denary equivalent of the hexadecimal number 2F?

What is the denary equivalent of the hexadecimal number 2F?

$(2 \times 16) + 15 = 47$

What is the binary value of hex F?

What is the binary value of hex F?

1111

Why is hexadecimal used in computing?

Why is hexadecimal used in computing?

It is more compact and easier for humans to read and work with than binary.

Name two areas within computer science where hexadecimal is used.

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Colour codes and Media Access Control (MAC) addresses.

What is the result of 0 + 0 in binary?

What is the result of 0 + 0 in binary?

0

What is the result of 1 + 0 in binary?

What is the result of 1 + 0 or 0 + 1 in binary?

1 with a carry of 0

What is the result of 1 + 1 in binary?

What is the result of 1 + 1 in binary?

0 with a carry of 1

What is the result of 1 + 1 + 1 in binary?

What is the result of 1 + 1 + 1 in binary?

1 with a carry of 1

When will an overflow error occur?

When will an overflow error occur?

When the result of a binary addition is too large to be represented by the number of bits available.

What is a logical binary shift?

What is a logical binary shift?

Moving the bits of a binary number left or right.

What does a logical left binary shift do?

What does a logical left binary shift do?

Multiplies the number by 2 for each place shifted.

Which side are 0s added to in a logical left binary shift?

Which side are 0s added to in a logical left binary shift?

To the right.

What does a logical right binary shift do?

What does a logical right binary shift do?

Divides the number by 2 for each place shifted.

Which side are 0s added to in a logical right binary shift?

Which side are 0s added to in a logical right binary shift?

To the left.

Logically shift 00101100 left by 1. What is the result?

Logically shift 00101100 left by 1. What is the result?

01011000 (44 → 88)

Define most significant bit.

Define most significant bit.

The bit with the highest value.

How can you identify the most significant bit in a binary number?

How can you identify the most significant bit in a binary number?

The most significant bit is the leftmost 1 in a binary number.

Define least significant bit.

Define least significant bit.

The bit with the lowest value.

How can you identify the least significant bit in a binary number?

How can you identify the least significant bit in a binary number?

The least significant bit is the rightmost bit, whether it is a 0 or 1, in a binary number.

True or false: adding additional 0s to the left of a binary number changes its value.

True or false: adding additional 0s to the left of a binary number changes its value.

False. E.g. 11010 is the same as 00011010.