Convert the following denary into binary

55

248

13

191

250

Convert the following binary into denary

11001100

00011000

11110001

10100111

Convert the following denary into hex

101

1551

65

168

20

Convert the following hex into denary

15

1AB

E9

2F2

23

FF0021

Convert the following binary into hex

10101100

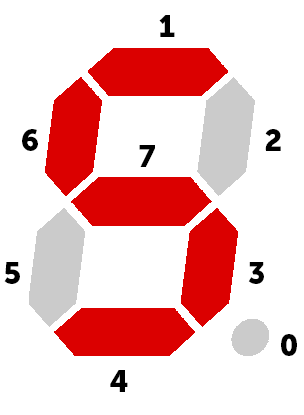
11001010

110110110111

000111110011

100110011000

1. A car park has a digital display sign indicating the number of spaces available. It has a total capacity of 350 cars requiring a three-digit display. Each digit is represented by an 8-bit register corresponding to each segment in the digit displayed.



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **1** | **1** | **0** | **1** | **1** | **0** | **1** | **0** |

The register contents above, would display the digit 5.

What would be the contents of each register to display 239 spaces remaining.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **2** |  |  |  |  |  |  |  |  |
| **3** |  |  |  |  |  |  |  |  |
| **9** |  |  |  |  |  |  |  |  |

Calculate the file size of the following

Sound - calculate the bit rate -

Sample rate of 44100 with 16 bits per sample and it is stereo

What would the size of the file be if the song was 4 minutes long?

Sample rate of 8 with 8 bits per sample and mono

What would would the size of the file be if the song was 4 minutes long

The information from seven sensors is sent to an engine management system in the car. The status of each sensor is stored in an 8-bit register; a value of 1 indicates a fault condition

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parity bit | CO level too high | Temperature too high | Fuel pressure too low | Oil pressure too low | Brake pads too thin | Voltage too low | Airbag fault |

For example, a register showing 0 1 0 1 1 0 0 0 indicates

• temperature too high

• fuel pressure too low

• voltage too low

What is the following fault condition?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |

A car has a fualty airbag and the CO level is too high - what is the register showing?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |

The system uses odd parity

What should the parity bit in the following registers?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 1 | 1 | 0 | 0 | 1 | 0 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0 | 0 | 0 | 1 | 1 | 1 | 0 |

An internet service offers the following specifications

Download speed - 80 megabits per second data transfer rate

Upload speed - 16 megabits per second data transfer rate

Calculate how long in seconds it would take to download a movie that was 650 megabytes

Calculate how long in seconds it would take to upload 30 photographs of 15 megabytes each.

Compression calculations

Each character = 1 byte - ignore spaces - how many bytes of memory would be needed to store the following sentence

‘This shows you how lossless would lose memory’

A file compression system replaces the above with the following -

th=1

is=2

how = 3

ou=4

less=5

Rewrite the sentence using the above numerical values where possible

How many bytes are now needed to store the sentence (when compressed)

A CD contains 12 music tracks which are the following lengths in minutes

3 7 4 3 5 6 4 5 4 7 8 8

Calculate how much memory is used if each minute of music requires 12 megabytes

If the tracks are to be stored in MP3 format, each music track will be reduced in size by 90%. Calculate how much storage the 12 tracks would now require.

An image is 1200 pixels by 1600 pixels

Calculate the number of megabytes used to store this picture