



F8.3 Hexadecimal

Data representation · GCSE · OCR J277 1.2.4, AQA 8525 3.3.2, Edexcel
1CP2 2.1.6 · about 15 min

Name _____

Class _____

Date _____

What this lesson is about

Base 16, converting to binary and denary, and the LED's colour codes.

- Sixteen digits
- Binary and hex
- Hex and denary
- Colours in hex
- Why hex?

Questions

6 marks in all

1. Convert 10110110 to hexadecimal. [1 mark]

2. What is hex 3F in denary? [1 mark]

3. Convert 255 to hexadecimal. [1 mark]

4. Why do programmers use hexadecimal? [1 mark]

- ☐ A It is shorter and easier to read than binary, and easy to convert
- ☐ B Computers store data in hexadecimal
- ☐ C It takes less memory
- ☐ D It is more accurate than binary

5. What colour is #00FF00 on the LED? [1 mark]

- ☐ A Green
- ☐ B Red
- ☐ C Blue
- ☐ D White

6. How many bits does one hex digit stand for? [1 mark]

The task: mix a colour

Write `to_hex(n)` yourself (no `hex` or `format`) that turns 0 to 255 into two hex digits. Use it to build the colour code for red 255, green 128, blue 64, print it as `#FF8040`, and show it on the LED by passing your code to `led`.

```
# the two lines every program starts with: the commands, then the robot
from bugbot import *
connect()

DIGITS = "0123456789ABCDEF"

def to_hex(n):
    return ""
```

Plan your program here, then type it in and press Run.



Do it on the robot

www.bugbotlab.com/learn/f8-3-hexadecimal/

The simulator checks it and tells you when it passes. Nothing to install, no account.

Challenges

1. Write `rgb(code)` that turns `"#FF8040"` back into the three numbers.
2. Fade the LED from black to white in 16 steps, printing each hex code.
3. What is the largest number three hex digits can hold? Work it out, then check with `int("FFF", 16)`.