



CS1800 Discrete Structures

Applications of
Hexadecimal and Octal



Uses of Hexadecimal Numbers

- **Internet Protocol address (IP address)**

- IPv4 uses 32-bit (four-byte) addresses
- Binary: 11000000 00000000 00000011 10111001
- Dotted Decimal: 192.0.3.185
- Dotted Hexadecimal: 0xC0.0x00.0x03.0xB9
- Dotted Octal: 0300.0000.0003.0271
- Hexadecimal: 0xC00003B9
- Decimal: 3221226425
- Octal: 030000001671
- [IPv4 on Wikipedia](#)



Uses of Hexadecimal Numbers

- Bitmap fonts and brush patterns
- [C include file from Chris Eddy for 8x8 charset](#)
- [Bitmaps for fill patterns in MapInfo brushes - collected by Jacques Paris](#)
- **RGB colors** are usually given by **Red**, **Green**, and **Blue** values from decimal 0 to 255 or hex 00 to FF
 - **escape and look at color picker**
- For more about Hex Numbers see [Hexadecimal in Wikipedia](#)



Octal Numbers

- Contemporary machines have word sizes of 16, 32, 64 bits which break up nicely into bytes and nibbles.
- Octal was widely used in computing when systems such as the PDP-8 and IBM mainframes had 12, 24, or 36 bit words.
- These are all multiples of 3.
- For octal, we think of $101\ 110\ 100\ 111_2$ as
$$101_2 \times 8^3 + 110_2 \times 8^2 + 100_2 \times 8^1 + 111_2 = 5647_8$$

See [Octal in Wikipedia](#) for more about octal numbers including,

“The Yuki language in California and the Pamean languages in Mexico have octal systems because the speakers count using the spaces between their fingers rather than the fingers themselves.”