1) How many binary digits does it take to represent the decimal number 2013?

$2013 = 1 \times 2^{10} + 1 \times 2^{9} + 1 \times 2^{8} + 1 \times 2^{7} + 1 \times 2^{6} + 0 \times 2^{5} + 1 \times 2^{4} + 1 \times 2^{3} + 1 \times 2^{2} + 0 \times 2^{1} + 1 \times 2^{0}$

$2013_{10} = 11111011101_{2}$

11 binary digits.

2) How many bytes does it take to store the binary equivalent of the decimal number 1945?

$1945 = 1 \times 2^{10} + 1 \times 2^{9} + 1 \times 2^{8} + 1 \times 2^{7} + 0 \times 2^{6} + 0 \times 2^{5} + 1 \times 2^{4} + 1 \times 2^{3} + 0 \times 2^{2} + 0 \times 2^{1} + 1 \times 2^{0}$

$1945_{10} = 11110011001_{2}$

2 bytes.

3) Convert this binary number 101011010_{2} to Decimal.

$1 \times 2^{8} + 0 \times 2^{7} + 1 \times 2^{6} + 0 \times 2^{5} + 1 \times 2^{4} + 1 \times 2^{3} + 0 \times 2^{2} + 1 \times 2^{1} + 0 \times 2^{0} = 346$

$101011010_{2} = 346_{10}$

4) Convert this binary number 101011010_{2} to Octal.

$101011010_{2} = 532_{8}$

5) Show the decimal number 147 in Binary.

$147 = 1 \times 2^{7} + 0 \times 2^{6} + 0 \times 2^{5} + 1 \times 2^{4} + 0 \times 2^{3} + 0 \times 2^{2} + 1 \times 2^{1} + 1 \times 2^{0}$

$147_{10} = 10010011_{2}$

6) Convert this hexadecimal number $5D3_{16}$ to Binary.

$5D3_{16} = 10111010011_{2}$

7) Convert this octal number 1234_{8} to Decimal.

$1 \times 8^{3} + 2 \times 8^{2} + 3 \times 8^{1} + 4 \times 8^{0} = 668$

$1234_{8} = 668_{10}$