

# Solutions: Conversions Between Binary, Octal, and Hexadecimal (Example 7)

## Part A — Worked Example

1.  $(11\ 1110\ 1011\ 1100)_2 \rightarrow$  Octal:

$$011\ 111\ 010\ 111\ 100 \Rightarrow 3, 7, 2, 7, 4$$

Answer:  $(37274)_8$ .

2.  $(11\ 1110\ 1011\ 1100)_2 \rightarrow$  Hexadecimal:

$$0011\ 1110\ 1011\ 1100 \Rightarrow 3, E, B, C$$

Answer:  $(3EBC)_{16}$ .

3.  $(765)_8 \rightarrow$  Binary:

$$7 = 111, 6 = 110, 5 = 101$$

Answer:  $(111110101)_2$ .

4.  $(A8D)_{16} \rightarrow$  Binary:

$$A = 1010, 8 = 1000, D = 1101$$

Answer:  $(101010001101)_2$ .

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## Part B — Easier Problems

1.  $(101101)_2$  to octal: Group into 3's:  $101, 101 = 5, 5$ . Answer:  $(55)_8$ .

2.  $(47)_8$  to binary:

$$4 = 100, 7 = 111$$

Answer:  $(100111)_2$ .

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## Part C — Harder Challenge

$(111011110101)_2$ .

- Octal grouping (3's):  $111, 011, 110, 101 = 7, 3, 6, 5$ . Answer:  $(7365)_8$ .

- Hex grouping (4's):  $1110, 1111, 0101 = E, F, 5$ . Answer:  $(EF5)_{16}$ .

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## Teaching Notes

- Remind students: grouping into 3's for octal, 4's for hex is the fastest way.
- Encourage them to pad with leading zeros if needed.
- Cross-check: convert both octal and hex back to binary to confirm.