1 Question

Q1

Exercise

Convert the following number from Binary to Gray:

1011000

Convert the following number from Gray to Binary:

1110100

Exercise

1.1 Correction

Q1

Solutions

Binary → Gray Conversion

Binary	1	0	1	1	0	0	0
Arrows	↓	↘⊕↓	↘⊕↓	↘⊕↓	↘⊕↓	↘⊕↓	↘⊕↓
Gray	**1**	**1**	**1**	**0**	**1**	**0**	**0**
Steps	Copy first bit	XOR $1 \oplus 0 = 1$	XOR $0 \oplus 1 = 1$	XOR $1 \oplus 1 = 0$	XOR $1 \oplus 0 = 1$	XOR $0 \oplus 0 = 0$	XOR $0 \oplus 0 = 0$

Gray → Binary Conversion

Gray	1	1	1	0	1	0	0
Arrows	↓	↗⊕↓	↗⊕↓	↗⊕↓	↗⊕↓	↗⊕↓	↗⊕↓
Binary	**1**	**0**	**1**	**1**	**0**	**0**	**0**
Steps	Copy first bit	XOR $1 \oplus 1 = 0$	XOR $0 \oplus 1 = 1$	XOR $1 \oplus 0 = 1$	XOR $1 \oplus 1 = 0$	XOR $0 \oplus 0 = 0$	XOR $0 \oplus 0 = 0$

Illustration of Bit Change (Next Gray Code)

Binary Increment Illustration

x: 1110100 → $x + 1$: 1110101

Position	0	1	2	3	4	5	6
x	1	1	1	0	1	0	0
$x + 1$	1	1	1	0	1	0	**1**

Highlighted cell(s) = changed bit(s)

Gray Code Sequence

Gray Code Sequence (Bit Changes)

Step	Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6
x + 0	1	1	1	0	1	0	0
x + 1	1	1	1	0	1	0	**1**
x + 2	1	1	1	0	1	**1**	1
x + 3	1	1	1	0	1	1	**0**

Highlighted cell shows the bit that flipped compared to the previous Gray code.