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**Guía 2: Sistema Binario**

Ejercicios

2.1)

1. 1010

3210 <-- posiciones

2^3 = 8

2^2 = 4

2^1 = 2

2^0 = 1

8x1 = 8 | 4x0 = 0 | 2x1 = 1 | 1x0 = 0

8 + 0 + 1 + 0 = 9

**1010 binario = 9 decimal**

1. 1101

3210

2^3 = 8

2^2 = 4

2^1 = 2

2^0 = 1

8x1 = 8 | 4x1 = 4 | 2x0 = 0 | 1x1 = 1

8 + 4 + 0 + 1 = 13

**1101 binario = 13 decimal**

1. 100110

543210

2^5 = 32

2^4 = 16

2^3 = 8

2^2 = 4

2^1 = 2

2^0 = 1

32x1= 32 | 16x0 = 0 | 8x0 = 0 | 4x1 = 4 | 2x1 = 2 | 1x0 = 0

32+ 0 + 0 + 4 + 2 + 0 = 38

**100110 binario = 38 decimal**

2.2)

1. 25

25/2 = 12 resto 1

12/2 = 6 resto 0

6/2 = 3 resto 0

3/2 = 1 resto 1

1/2 = 0 resto 1

**25 decimal = 11001 binario**

1. 42

42/2 = 21 resto 0

21/2 = 10 resto 1

10/2 = 5 resto 0

5/2 = 2 resto 1

2/2 = 1 resto 0

1/2 = 0 resto 1

**42 decimal = 101010 binario**

1. 63

63/2 = 31 resto 1

31/2 = 15 resto 1

15/2 = 7 resto 1

7/2 = 3 resto 1

3/2 = 1 resto 1

1/2 = 0 resto 1

**63 decimal = 111111 binario**

2.3)

1. 1101 + 101

1101 +

101

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**10010**

1. 1010 + 111

1010 +

111

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**10001**

2.4)

1. 1001 - 101

1001 = 01001

101 = 00101 = 11010 + 1 = 11011

01001 +

11011

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**100100**

1. 1110 - 110

1110 = 01110

110 = 00110 = 11001 + 1 = 11010

01110 +

11010

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**101000**

2.5)

1. 11101

43210

2^4 = 16

2^3 = 8

2^2 = 4

2^1 = 2

2^0 = 1

16x1 = 16 | 8x1 = 8 | 4x1 = 4 | 2x0 = 0 | 1x1 = 1

16 + 8 + 4 + 0 + 1 = **29**

1. 10010

43210

2^4 = 16

2^3 = 8

2^2 = 4

2^1 = 2

2^0 = 1

16x1 = 16 | 8x0= 0 | 4x0 = 0 | 2x1 = 2 | 1x0 = 0

16 + 0 + 0 + 2 + 0 = **18**

2.6)

1. 18

18/2 = 9 resto 0

9/2 = 4 resto 1

4/2 = 2 resto 0

2/2 = 1 resto 0

1/2 = 0 resto 1

**10010**

1. 37

37/2 = 18 resto 1

18/2 = 9 resto 0

9/2 = 4 resto 1

4/2 = 2 resto 0

2/2 = 1 resto 0

1/2 = 0 resto 1

**100101**

2.7)

|  |  |
| --- | --- |
| Decimal | Binario |
| 0 | 0 |
| 1 | 1 |
| 2 | 10 |
| 3 | 11 |
| 4 | 100 |
| 5 | 101 |
| 6 | 110 |
| 7 | 111 |

2.8)

1. (110 + 11) - 10

**PASO 1:** 110 + 11

110 +

11

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*1001*

**PASO 2**: 1001 -10

1001 = 01001

10 = 00010 = 11101 + 1 = 11110

01001 +

11110

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100111 = (110 + 11) - 10

1. (1011 - 101) + 100

**PASO 1**: 1011 - 101

1011 = 01011

101 = 00101 = 11010 + 1 = 11011

01011 +

11011

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*100110*

**PASO 2**: 100110 + 100

100110 +

100

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101010 = (1011 - 101) + 100

2.9)

1. 101 - 11

101 = 0101

11 = 0011 = 1100 + 1 = 1101

0101 +

1101

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**10010**

1. 1100 - 1010

1100 = 01100

1010 = 01010 = 10101 + 1 = 10110

01100 +

10110

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**100010**

2.10)

1. 10102  → 1210

1010

3210

2^3 = 8

2^2 = 4

2^1 = 2

2^0 = 1

8x1 = 8 | 4x0 = 0 | 2x1 = 2 | 1x0 = 0

8 + 0 + 2 + 0 = 10

**10102  → 1010**

1. 11012 → 1410

1101

3210

2^3 = 8

2^2 = 4

2^1 = 2

2^0 = 1

8x1 = 8 | 4x1= 4 | 2x0 = 0 | 1x1 = 1

8 + 4 + 0 + 1 = 13

11012 → 1310

***PROBLEMAS :***

2.11)

24 = 16

Se necesitan 4 bits.

2.12)

28 = 256 se pueden representar 256 niveles de gris.

2.13)

0 y 1, hay 3 interruptores.

000

001

010

011

100

101

110

111

2.14)

26 = 64

Se necesitan 6 bits.

2.15)

232 = 4,294,967,296

Se pueden generar 4,294,967,296 direcciones únicas.

2.16)

255/2 = 127 resto 1

127/2 = 63 resto 1

63/2 = 31 resto 1

31/2 = 15 resto 1

15/2 = 7 resto 1

7/2 = 3 resto 1

3/2 = 1 resto 1

1/2 = 0 resto 1

25510 = 111111112

255 es el valor máximo que se puede representar con 1 byte (que son 8 bits).

2.17)

1010 +

1101

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**10111**

2.18)

0 1 0 0 0 0 0 1

7 6 5 4 3 2 1 0

2^7 = 128

2^6 = 64

2^5 = 32

2^4 = 16

2^3 = 8

2^2 = 4

2^1 = 2

2^0 = 1

128x0 = 0 | 64x1=64 | 32x0 = 0 | 16x0 = 0 | 8x0 = 0 | 4x0 = 0 | 2x0 = 0 | 1x1 = 1

0 + 64 + 0 + 0 + 0 + 0 + 0 + 1 = 65

ASCII ---> 65 = A mayúscula.

2.19) 10010 - 101

10010 = 010010

101 = 000101 = 111010 + 1 = 111011

010010 +

111011

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**1001101**

2.20)

Hay 8 combinaciones posibles:

000

001

010

011

100

101

110

111