計算機組織 - 作業三

47.

> | 符號 - S | 指數 - E | 尾數 - M |
> | --- | --- | --- |
> | 1-bit | 5-bits | 8-bits |

1. 使用這個浮點格式的計算機會如何表示數字100.0 與 0.25
    1. 100.0

$$100.0_{10} => 1100100_2$$

$$1100100_2 = 1.100100_2 * 2^6$$

$$S = 0,\ E = 15 + 6 = 21,\ M = 100100$$

答案：

0	10101	10010000

2.

$$0.25_{10} => 0.01_2$$

$$0.01_2 = 1.00_2 * 2^{-2}$$

$$S = 0,\ E = 15 - 2 = 13,\ M = 0$$

答案：

0	01101	00000000

51.

> IEEE-754
>
> | 符號 - S | 指數 - E | 尾數 - M |
> | --- | --- | --- |
> | 1-bit | 8-bits | 23-bits |

1. 12.5

$$12.5_{10} => 1100.1_2$$

$$1100.1_2 = 1.1001_2 * 2^3$$

$$S = 0,\ E = 127 + 3 = 131,\ M = 1001$$

答案：

0	10000010	10010000000000000000000

2. -1.5

$$-1.5_{10} => -1.1_2$$

$$-1.1_2 = -1.1_2 * 2^0$$

$$S = 1,\ E = 127 + 0 = 127,\ M = 1$$

答案：

1	01111111	10000000000000000000000

3. 0.75

$$0.75_{10} => 0.11_2$$

$$0.11_2 = 1.1_2 * 2^{-1}$$

$$S = 0,\ E = 127 - 1 = 126,\ M = 1$$

答案：

0	01111110	10000000000000000000000

4. 26.625

$$26.625_{10} => 11010.101_2$$

$$11010.101_2 = 1.1010101_2 * 2^4$$

$$S = 0,\ E = 127 + 4 = 131,\ M = 1010101$$

答案：

0	10000011	10101010000000000000000

53.

符號 - S	指數 - E	尾數 - M
1-bit	4-bits	7-bits

設值為

1	1111	1111111

則

$$S = 1$$

$$E = 0 + 16 = 16$$

$$M = 1111111$$

依題目敘述轉回10進制值

$$Value = -0.1111111_2 * 2^{16+1}$$

$$= -1111111_2 * 2^{10}$$

$$= -127_{10} * 2^{10}$$

$$= -127 * 1024 = -130048$$

55.

1. $$A_{ASCII} = 1000001_2$$

則

$$J_{ASCII} = 1001010_2$$

2. $$A_{EBCDIC} = 11000001_2$$

則

$$J_{EBCDIC} = 11010001_2$$

57.

1. 以二進制儲存
2. $$0011\,0010_2 \quad 0011\,1001_2 \quad 0011\,0101_2 = 2_{10}\ 9_{10}\ 5_{10}$$
3. $$0000\ 0000\ 0000\ 0010\ 1001\ 0101_2 = 000295_{BCD}$$
