(a) *A + B = B + A*  
(b) *A B = B A*

(a) *(A + B) + C = A + (B + C)*   
(b) *(A B) C = A (B C)*

(a) *A (B + C) = A B + A C*  
(b) *A + (B C) = (A + B) (A + C)*

(a) *A + A = A*   
(b) *A A = A*

(a) http://www.ee.surrey.ac.uk/Projects/Labview/boolalgebra/graphics/tab2t5a.gif   
(b) http://www.ee.surrey.ac.uk/Projects/Labview/boolalgebra/graphics/tab2t5b.gif

(a) *A + A B = A*   
(b) *A (A + B) = A*

(a) *0 + A = A*   
(b) *0 A = 0* (a) *1 + A = 1*  ( b) *1 A = A*

(a) http://www.ee.surrey.ac.uk/Projects/Labview/boolalgebra/graphics/tab2t9a.gif(b) http://www.ee.surrey.ac.uk/Projects/Labview/boolalgebra/graphics/tab2t9b.gif

(a) http://www.ee.surrey.ac.uk/Projects/Labview/boolalgebra/graphics/tab2t10a.gif (b) http://www.ee.surrey.ac.uk/Projects/Labview/boolalgebra/graphics/tab2t10b.gif (a) http://www.ee.surrey.ac.uk/Projects/Labview/boolalgebra/graphics/tab2t11a.gif (b) http://www.ee.surrey.ac.uk/Projects/Labview/boolalgebra/graphics/tab2t11b.gif

SR LATCH

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S | R | Q | !Q | Action |
| 0 | 0 | Q | !Q | HOLD STATE |
| 1 | 0 | 1 | 0 | SET |
| 0 | 1 | 0 | 1 | RESET |
| 1 | 1 | X | X | NOT ALOWED |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Instruction | RedDst | ALUsrc | MemToReg | RegWrite | MemRead |
| R-Type | 1 | 0 | 0 | 1 | 0 |
| Lw | 0 | 1 | 1 | 1 | 1 |
| sw | Na | 1 | Na | 0 | 0 |
| beq | Na | 0 | Na | 0 | 0 |
| j | Na | Na | Na | Na | na |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Instruction | MemWrite | Branch | ALUOp | Jump |
| R-Type | 0 | 0 | 10 | 0 |
| Lw | 0 | 0 | 00 | 0 |
| sw | 1 | 0 | 00 | 0 |
| beq | 0 | 1 | 01 | 0 |
| j | Na | Na | Na | 1 |

1. What is the value of 14.87510 in binary with binary point?

Solution: 1410 is 11102. 0.875 × 2 = 1.75, 0.75 × 2 = 1.5, and 0.5 × 2 = 1.0. Thus 14.87510

is 1110.1112.

2. What is the value of 1100.10112 in decimal (not in scientific notation)?

Solution: which is equal to 8 + 4 + 0.5 + 0.125 + 0.0625 = 12.6875

3. How to represent the binary number with binary point 1100.10110100101102 in IEEE 754

format (32-bit single precision)?

Solution: 1100.1011010010110 = 1.1001011010010110 × 2

3

. Thus 3 = e − 127 or e = 130

which is 100000102. The above number in IEEE 754 format is

0 10000010 1001011010010110 . . . 0

4. A 32-bit binary (single precision) in IEEE 754 format is shown below:

1 10000000 11100000000000000000000

What is the above floating-point number in decimal?

Solution: From the above number e is 128. Thus the number is

(−1)1 × (1 + 0.111) × 2

128−127 = −1.111 × 2

1 = −11.11

Thus, the number is -3.75

5. Consider the following two floating-point number a and b in IEEE 754 format (single precision):

a = 0 10101010 11001100110011001100110

b = 0 10101011 00110011001100110011001

Which number is larger and why?

Solution: b is larger since the exponent is larger.