|  |  |  |
| --- | --- | --- |
| S | exp | mantissa |

Value = (-1)S \* 2E \* F

Bias = (2k-1-1)

K = # of bits

Exp = exp 1’s added up

**Normalized Values** – When exp is not all 0 or not all 1

E = exp – (2k-1-1)

F = 1. <mantissa>

**Denormalized Values** – When exp is 0

E = 1 – (2k-1-1)

F = 0. <mantissa>

**Special Values 1** – When all exp is 1 AND mantissa is all 0

+ Infinity OR – Infinity

**Special Values 2** – When all exp is 1 AND mantissa is not all 0

NAN = Not a member

Ex *Normalized*:

1 0110 0111

S = (-1)1 = -1

E = (4 + 2) – (23-1) = 6 – 7 = -1

F = 1.0111

Value = -1 \* 2-1 \* 1.0111 = -1 \* 0.10111 (convert to decimal then add negative)

Ex *Denormalized*:

0 000 1011

S = (-1)0 = 1

E = 1 – (22-1) = 1 – 3 = -2

F = 0.1011

Value = 1 \* 2-2 \* 0.1011 = 1 \* 0.001011 (convert to decimal then add sign)

Ex *Special*:

0 111 0000

S = 1

+ Infinity

Ex *Special 2:*

0 111 0100

S = 0

Nan

**Assembly**

General

D(Rb, Ri, S) Mem[Reg[Rb] + S \* Reg[Ri] + D]

Special cases

(Rb, Ri) Mem[Reg[Rb] + Reg[Ri]]

D(Rb, Ri) Mem[Reg[Rb] + Reg[Ri] + D]

(Rb, Ri, S) Mem[Reg[Rb] + S \* Reg[Ri]]