

CSC 3501

Quiz Review

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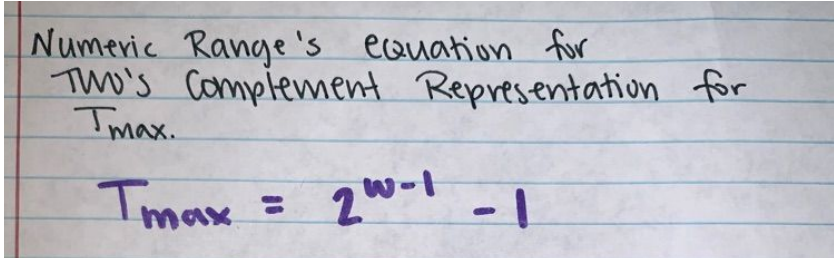
Question Prompt

Consider a 6-bit two's complement representation. Fill in the box with question mark "?" in the following table. You don't need to care about "n/a."

Number	Binary Representation
TMax	?

Please input the binary representation in this format xxxxxx. For example, if the answer is 010010, please input 010010.

Using the numeric range equation for Two's Complement Representation for T_{Max} :



Numeric Ranges

■ Unsigned Values

- $UMin = 0$
000...0

- $UMax = 2^w - 1$
111...1

■ Two's Complement Values

- $TMin = -2^{w-1}$
100...0

- $TMax = 2^{w-1} - 1$
011...1

■ Other Values

- Minus 1
111...1

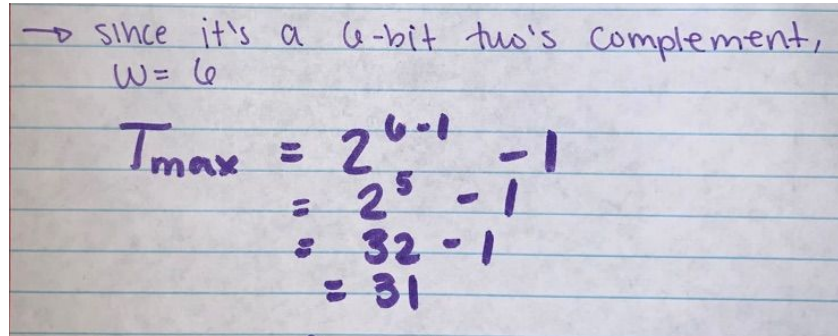
Values for $W = 16$

	Decimal	Hex	Binary
UMax	65535	FF FF	11111111 11111111
TMax	32767	7F FF	01111111 11111111
TMin	-32768	80 00	10000000 00000000
-1	-1	FF FF	11111111 11111111
0	0	00 00	00000000 00000000

Since this is going to be a 6-bit Two's Complement representation, where:

- $w = 6$
- w represents the w th-bit

We can substitute in $w=6$ into the equation and solve



→ since it's a 6-bit two's complement,
 $w = 6$

$$\begin{aligned} T_{max} &= 2^{6-1} - 1 \\ &= 2^5 - 1 \\ &= 32 - 1 \\ &= 31 \end{aligned}$$

Now that we have calculated the value for T_{Max} , which we found is 31, we convert it from decimal (base 10) to binary (base 2)

