Assignment 2
MEEN 357

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Task 5

Problem i. What is the range of a 9-bit unsigned integer?

The range is from 0 to $2^9 - 1$ or **0 to 511.**

Problem ii. What is the range of a 9-bit signed integer?

The range is from $-2^8 to 2^8 - 1$ or **-256 to 255**

Problem iii. What is the binary representation of decimal 125 as a 9-bit unsigned integer?

I derived this by finding the largest power of 2 less than the original number and then subtracting and repeating. This processes looked like this: $125 - 2^6 = 61$. $61 - 2^5 = 29$. And so on. Then, I filled in each digit appropriately where if I used that power, the digit would be a 1. **001111101**

Problem iv. What is the binary representation of decimal 125 as a 9-bit signed integer?

For a nine-bit signed integer, since the number is less than 2^8 and positive, the answer remains the same: **001111101**

Problem v. What is the binary representation of decimal -125 as a 9-bit signed integer?

To obtain the negative counterpart, I found the 1s complement and then added one. This gave an answer of: **110000011**