- CPSC 275: Introduction to Computer Systems

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Fall 2025

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Solution to Homework 4

1.
Data Types	Size (bytes)	Range
byte	1	-128 to 127
short	2	-32,768 to 32,767
int	4	-2,147,483,648 to 2,147,483,647
long	8	-9,223,372,036,854,775,808 to 9,223,372,036,854,775,807
float	4	≈ ±3.4E38
double	8	≈ ±1.8E308
char	2	0 to 65,535 (unsigned 16-bit Unicode)
boolean	1	true or false

2. `!(x ^ y)`

3.
   A. `x & 0xFF`
   B. `x ^ ~0xFF`
   C. `x | 0xFF`

4. For the hexadecimal value `0x3344`, the MSB is `0x33` and the LSB is `0x44`. In the sender's memory (little-endian), this 16-bit word is stored as `[44][33]`, with addresses increasing from left to right. On the network, however, data is transmitted in big-endian format, so the bytes appear on the wire as `0x33 0x44`. A little-endian receiver will swap the bytes to reconstruct the original value, while a big-endian receiver requires no conversion.

- **Welcome: Sean**
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