

Protocols for **Lab 1**

Part 1

Jacob Conaway and David Jones – Group 1

Total Message Length (bytes)	Sequence Number	Timestamp (ms)	String
2 bytes	4 bytes	8 bytes (long)	Variable (Up To 1024 Bytes)

- Integers will use network byte order
- The sequence number will start at 1 and will wrap around at $2^{32}-1$
- The timestamp is the time in milliseconds since epoch represented as a long (the difference, measured in milliseconds, between the current time and midnight, January 1, 1970 UTC)
- The string will be represented as UTF-8 characters. It can be any length up to 1024 bytes.
- The digits in Part c will be sent as a string and will not include any punctuation.

Part 2(next page)

Part 2

Proposed Protocol

Jacob Conaway and David Jones – Group 1

Request Message

Operation Code	Operand A	Operand B
1 bytes '+' = 0x2b (43) '-' = 0x2d (45) 'x' = 0x78 (120) '/' = 0x2f (47)	4 bytes (unsigned integer)	4 bytes (unsigned integer)

- The total request message length will always be nine bytes.
- Each operand is an unsigned 32-bit integer.
- The standard UTF-8 character values are used to convert the operation code into a hex value (decimal equivalent given in parenthesis).

Response Message

Operation Code	Operand A	Operand B	Answer	Is Answer Valid
1 bytes '+' = 0x2b (43) '-' = 0x2d (45) 'x' = 0x78 (120) '/' = 0x2f (47)	4 bytes (unsigned integer)	4 bytes (unsigned integer)	4 bytes (unsigned integer)	1 byte 1 – Valid 0 – Invalid (NaN result)

- The total response message length will always be nine bytes.
- The result is an unsigned 32-bit integer.
- Is Answer Valid will take care of NaN / divide by zero situations. (If the answer is invalid, the answer field should be set to 0).
- The answer is unsigned, because the operands were specified as unsigned in the specifications for the lab. Please see <http://stackoverflow.com/questions/7221409/is-unsigned-integer-subtraction-defined-behavior> for more information on possible implications of unsigned arithmetic.