## C++ Programming Challenge

Instructions

* Please assume that:
  + All messages are sent and received as a stream of binary data, with each byte containing 8 bits of message content. Bits are sent/received from MSB to LSB.
  + All message fields are in Network Byte Order. The code should be agnostic to endianness.
* Please submit your header and source files only, plus the execution result print-out. Please do not submit your executable, project files, etc.

1. A hypothetical protocol used to communicate with UAVs has the following common fields:

|  |  |
| --- | --- |
| Bits | Field |
| 16 | Message ID |
| 8 | Sender ID |
| 8 | Receiver ID |
| 32 | Payload Length |
| Variable | Payload |

Implement a C++ class that can be used as the base class to develop specific messages later. This class should have the following features:

* Initialization of common fields.
* Access method for each and every common field.
* A virtual Send function that returns a string containing the message to be sent.
* A virtual Receive function that accepts a string containing the message received, and populates the values of the common fields.

1. Implement a C++ class using the base class above to process a message with the following payload:

|  |  |
| --- | --- |
| Bits | Field |
| 1 | Lights |
| 1 | Camera |
| 6 | Action |
| 64 | Name |

This class should have the following features:

* Inherits the base class in Problem #1.
* Initialization of all payload fields.
* Access method for each and every payload field.
* A Send function that returns a string containing the message to be sent.
* A Receive function that accepts a string containing the message received, and populate the values of the payload fields.

1. Write a unit test framework to verify your implementation above. Use your engineering judgment on the scope of your test cases. A text print-out should be produced for the result of each test case.