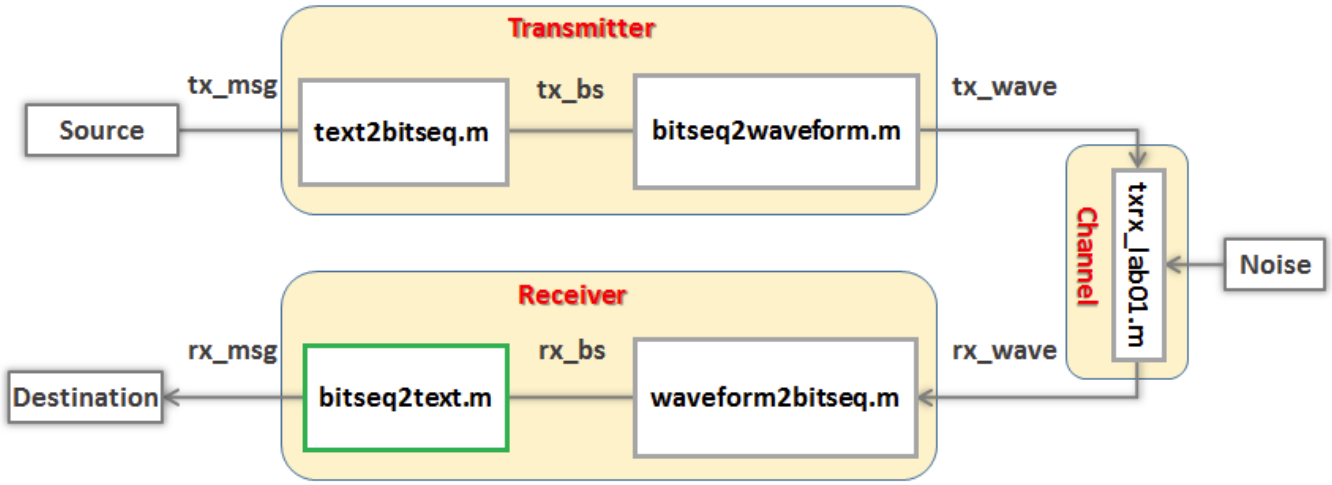
LAB 1 TASK 4 - FROM BIT SEQUENCE TO TEXT (1 point possible)

In this task, you will implement the "Bits to Text" block highlighted in green, which decodes the received bit sequence to the text message.



The code window below contains a MATLAB script similar to that of Task 1. This time the line `rx_msg=bitseq2text(rx_bs)` has been replaced by code written to implement its functionality. However, this code is incorrect. Your task is to correct it.

```
tx_msg = 'Hello';  % message to transmit
SPB = 10;          % bit time in samples per bit

% transmitter %
tx_bs = text2bitseq(tx_msg);           % change text message to bit sequence
tx_wave = bitseq2waveform(tx_bs,SPB);  % change bit sequence to waveform

% channel
rx_wave = txrx_lab01(tx_wave,SPB);  % transmit waveform through channel

% receiver
rx_bs = waveform2bitseq(rx_wave,SPB);  % change waveform to bit sequence
```

```
%------rx_msg=bitseq2text(rx_bs)-------
num_chars = length(tx_msg);       % assume receiver knows length of tx_msg
```

Unanswered

Help

```
%------rx_msg=bitseq2text(rx_bs)-------
num_chars = length(tx_msg);       % assume receiver knows length of tx_msg
rx_msg = [];                      % initialize message
for i=1:num_chars,                % cycle through bit stream
    byte = rx_bs((i-1)*8+[1:8]);  % extract i'th byte
    data=0;                       % convert byte to decimal
    for j=1:8
        data = data + byte(j).*2^(8-j);
    end
    rx_msg(i) = char(data);       % convert decimal data to character
end
%------rx_msg=bitseq2text(rx_bs)-------
```

Undefined function 'text2bitseq' for input arguments of type 'char'.

Run Code

Hide Answer *You have used 0 of 10 submissions*

INSTRUCTIONS

Step 1: Run the code

You will see that the received message `rx_msg` is always a sequence of “e” characters no matter what the `tx_msg` is. This is because there is an error in converting the recieved bit sequence to a text message.

Step 2: Correct the code implementing **bitseq2text.m**

To correct the code, let's first look at code given for **`bitseq2text.m`**.

The **`for`** loop cycles through the received bit sequence and extracts `num_char` characters. For simplicity, we assume here that the receiver knows how many characters were in the transmitted message. This is not a good assumption. Later in the course, we will tell you how communication systems handle this.

Inside the **`for`** loop, we first extract the 8-bits encoding each character as `byte` (a 1 by 8 binary vector of 1's and 0's).

We need to map `byte` to the corresponding ASCII character. The function **`char`** is a standard MATLAB built-in function that converts the decimal number `data` to its corresponding ASCII character. Right now, the value of `data` is set to 101, the decimal value of the ASCII code for the character "e". However, `data` should be set to the decimal value corresponding to the binary number stored in `byte` (where the MSB is the first element `byte(1)` and the LSB is the last element `byte(8)`).

For more about strings of characters, please review the video String Variables (/courses/HKUSTx/ELEC1200.1x/3T2014

/jump_to_id/f05ba6fd846e4469883004f6fb66ba87).

Step 3: Submit your work

After you have completed the correction, click on the **Check** button to submit your answer.

Help