```
% lab2_2024.m
% Please place lab2.m in your working directory
% Provide the print-out from running this function
% using 'publish lab2'
%
% T. Holton 7 Feb 2024

clear
test_lab2_2024;
```

Real-time Convolution

Real-time convolution #1

```
x = [1 4 2 6 5];
h = [4 -1 3 -5 2];
test_lab2_2024;
test_lab2_2024(x, h);

% Real-time convolution convolution #2
test_lab2_2024(h, x);

% Real-time convolution #3
x = cos(2 * pi * (1:50000) / 16); % nice, big sequence
h = ones(1, 10);
tic;
test_lab2_2024(x, h);
t = toc;
disp(['The long convolution took ' num2str(t) ' secs'])
disp(' ')
```

```
Real-time convolution #1
   Your data are correct

Real-time convolution #2
   Your data are correct

Real-time convolution #3
   Your data are correct

The long convolution took 0.016051 secs
```

Code

```
disp('-----------------------------------------------------')
disp('                      Code')
disp('-----------------------------------------------------')
type convolv_rt
```

```
-----------------------------------------------------
                     Code
```

```
-------------------------------------------------

function y = convolv_rt(x,h)

    lh = length(h);             %get length of h

    h_buffer = h(:)';           %make h into a row vector
    h_buffer = flip(h_buffer);
    x = [x(:); zeros(lh-1,1)];  %pad x vector
    y = zeros(1,length(x));           %pre-allocate output array

    x_buffer = zeros(lh,1);     %make a buffer for x values

    for i=1:length(x)

        x_buff_ptr = mod(i-1, lh) + 1;
        x_buffer(x_buff_ptr) = x(i);

        h_buffer = [h_buffer(end), h_buffer(1:end-1)];
        y(i) = h_buffer*x_buffer;

    end

end
```

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