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function keys = dtmfrun(xx,L,fs)
%DTMFRUN    keys = dtmfrun(xx,L,fs)
%    returns the list of key numbers corresponding
%    to the DTMF waveform, xx.
%    L = filter length
%    fs = sampling freq

freqs = [697;770;852;941;1209;1336;1477;1633]; % list of centre frequencies

hh = dtmfdesign( freqs,L,fs );
% hh = MATRIX of all the filters. Each column contains the impulse
%     response of one BPF (bandpass filter)

dtmf.keys = ...
['1','2','3','A';
'4','5','6','B';
'7','8','9','C';
'*','0','#','D'];
dtmf.colTones = [1209,1336,1477,1633];
dtmf.rowTones = [697;770;852;941];

[nstart,nstop] = dtmfcut(xx,fs); %<--Find the start and end points of each tone

%%% add your lines below to complete the code

k = 1;

[bb, H, W] = dtmfdesign(freqs, L, fs);

% loop through the indexes
for i = 1:size(nstart, 2)

    %get the score of the freqs
    freq_section = xx(nstart(i):nstop(i));
    sc = dtmfscore(freq_section, bb);

    %sum the freqs if the score is valid and match the sum to the key
    switch sum(nonzeros(sc .* freqs))
        case (697 + 1209)
            keys(i) = '1';
        case (697 + 1336)
            keys(i) = '2';
        case (697 + 1477)
            keys(i) = '3';
        case (697 + 1633)
            keys(i) = 'A';
        case (770 + 1209)
            keys(i) = '4';
        case (770 + 1336)
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        keys(i) = '5';
    case (770 + 1477)
        keys(i) = '6';
    case (770 + 1633)
        keys(i) = 'B';
    case (852 + 1209)
        keys(i) = '7';
    case (852 + 1336)
        keys(i) = '8';
    case (852 + 1477)
        keys(i) = '9';
    case (852 + 1633)
        keys(i) = 'C';
    case (941 + 1209)
        keys(i) = '*';
    case (941 + 1336)
        keys(i) = '0';
    case (941 + 1477)
        keys(i) = '#';
    case (941 + 1633)
        keys(i) = 'D';
    otherwise
        keys(i) = 'e';
end
end

end
```