Echo Generator

Write a function called **echo_gen** that adds an echo effect to an audio recording. The function is to be called like this:

```
output = echo_gen(input, fs, delay, amp);
```

where **input** is a *column* vector with values between -1 and 1 representing a time series of digitized sound data. The input argument **fs** is the sampling rate. The sampling rate specifies how many samples we have in the data each second. For example, an audio CD uses 44,100 samples per second. The input argument **delay** represent the delay of the echo in seconds. That is, the echo should start after **delay** seconds have passed from the start of the audio signal. Finally, **amp** specifies the amplification of the echo which normally should be a value less than 1, since the echo is typically not as loud as the original signal.

The output of the function is a column vector containing the original sound with the echo superimposed. The output vector will be longer than the input vector if the delay is not zero (round to the nearest number of points needed to get the delay, as opposed to floor or ceil). A sound recording has values between -1 and 1, so if the echo causes some values to be outside of this range, you will need to normalize the entire vector, so that all values adhere to this requirement.

MATLAB has several sample audio files included that you can try: `splat`, `gong`, and `handel` are a few examples. Try the following:

```
load gong % loads two variables, y and Fs
sound(y, Fs) % Outputs sound
```

To hear the sound you will need to use desktop MATLAB or MATLAB Online.

(Note that we are assuming mono audiofiles. You can load your own audio files using the audioread function (https://www.mathworks.com/help/matlab/ref/audioread.html) in MATLAB. If the audio data has two columns, it is a stereo file, so use only one column of the data when testing your file.)

Your Function

Save Reset MATLAB Documentation (https://www.mathworks.com/help/)

```
1
```

Code to call your function

Reset

```
% Load splat which adds y and Fs to the workspace
load splat
% Call echo_gen to create the new audio data
output = echo_gen(y, Fs, 0.25, 0.6);

% Create a time axis. The time between points is 1/Fs;
dt = 1/Fs;
t = 0:dt:dt*(length(output)-1);
% Plot the new data to see visualize the echo
plot(t, output)

% sound (newY, Fs) % Uncomment in MATLAB to listen to the new sound data
```

▶ Run Function

Assessment:

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A few simple cases

Using splat sound file