Acoustic Echoes

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Analog to Digital

```
function [x] = Analog_to_digital(t,fs)

    obj=audiorecorder(fs,16,1);
    recordblocking(obj,t);
    x= getaudiodata(obj);
end
```

Simple echo generation

```
function [y] = simple_echo_generation(x1,fs,alpha,delay)

    N= delay*fs;
    Longitud = length(x1);
    y=zeros(Longitud,1);
    for n=1:Longitud
        if n>N
            y(n)=x1(n) + alpha*x1(n-N);
        else
            y(n)=x1(n);
        end

    end



end
```

Multiple echo generation

```
function [y] = multiple_echo_generation(x1,fs,alpha,delay)


N= delay*fs;
Longitud = length(x1);
y=zeros(Longitud,1);
for n=1:Longitud
    if n>N
        y(n)=x1(n) + alpha*y(n-N);
    else
        y(n)=x1(n);
    end

end


end
```

Simple echo equalization

```
function [y] = multiple_echo_generation(x1,fs,alpha,delay)

    N= delay*fs;
    Longitud = length(x1);
    y=zeros(Longitud,1);
    for n=1:Longitud
        if n>N
            y(n)=x1(n) + alpha*y(n-N);
        else
            y(n)=x1(n);
        end

    end



end
```

Multiple echo equalization

```
function [z] =multiple_echo_equalization(y,fs,alpha,delay)
   N= delay*fs;
    Longitud = length(y);
    z=zeros(Longitud,1);
    for n=1:Longitud
        if n>N
            z(n)=y(n) - alpha*y(n-N);
        else
            z(n)=y(n);
        end

    end

end
```