**DEPARTMENT OF COMPUTER & SOFTWARE ENGINEERING**

**COLLEGE OF E&ME, NUST, RAWALPINDI**

**Subject Name**

**Digital Signal Processing**

**Lab Mid**

**SUBMITTED TO:**

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**SUBMITTED BY:**

**Student Name**

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**Objectives:**

Processing in MATLab

**Related Topic/Chapter in theory class:**

Basics Of Digital Signal Processing

**Hardware/Software required:**

Hardware: PC

Software Tool: MATLab

**Task 1:**

**Solution:**

function y= delay(x, delay\_am)

y = zeros(size(x));

for n = delay\_am+1:length(x)

y(n) = x(n);

end

end

function y = echo\_sound(x, alpha, delay\_am)

y = zeros(size(x));

for n=delay\_am+1:length(x)

y(n) = x(n) + alpha \* x(n-delay\_am);

end

end

function y = reverbed\_sound(x, alpha, delay\_am)

y = ones(size(x));

y = upsample(y, 2);

for n = delay\_am+1:length(y)

y(n) = x(n) + alpha \* y(n-delay\_am);

end

y = downsample(y, 2);

end

function y = chorus(x, delay\_am)

delay\_am1 = delay\_am;

delay\_am2 = delay\_am1 + 2000;

delay\_am3 = delay\_am2 + 4000;

delay\_x1 = delay(x, delay\_am1);

delay\_x2 = delay(x, delay\_am2);

delay\_x3 = delay(x, delay\_am3);

y = zeros((size(x)));

for n = 1:length(x)

y(n) = x(n) + delay\_x1(n) + delay\_x2(n) + delay\_x3(n);

end

end

[drum\_sound, fs] = audioread("LabMidAudio.mp3");

delay\_amount = 5000;

%display(drum\_sound)

%display(fs)

delayed\_drum = delay(drum\_sound, delay\_amount);

echoed\_drum = echo\_sound(drum\_sound, 0.5, delay\_amount);

reverb\_drum = reverbed\_sound(drum\_sound, 0.5, delay\_amount);

chorus\_drum = chorus(drum\_sound, delay\_amount);

%sound(delayed\_drum, fs)

%pause(12)

%sound(echoed\_drum, fs)

%pause(12)

%sound(reverb\_drum, fs)

%pause(20)

%sound(chorus\_drum, fs)

subplot(5, 1, 1)

plot(drum\_sound)

title("Original Sound")

subplot(5, 1, 2)

plot(delayed\_drum)

title("Delayed Drum")

subplot(5, 1, 3)

plot(echoed\_drum)

title("Echoed Drum")

subplot(5, 1, 4)

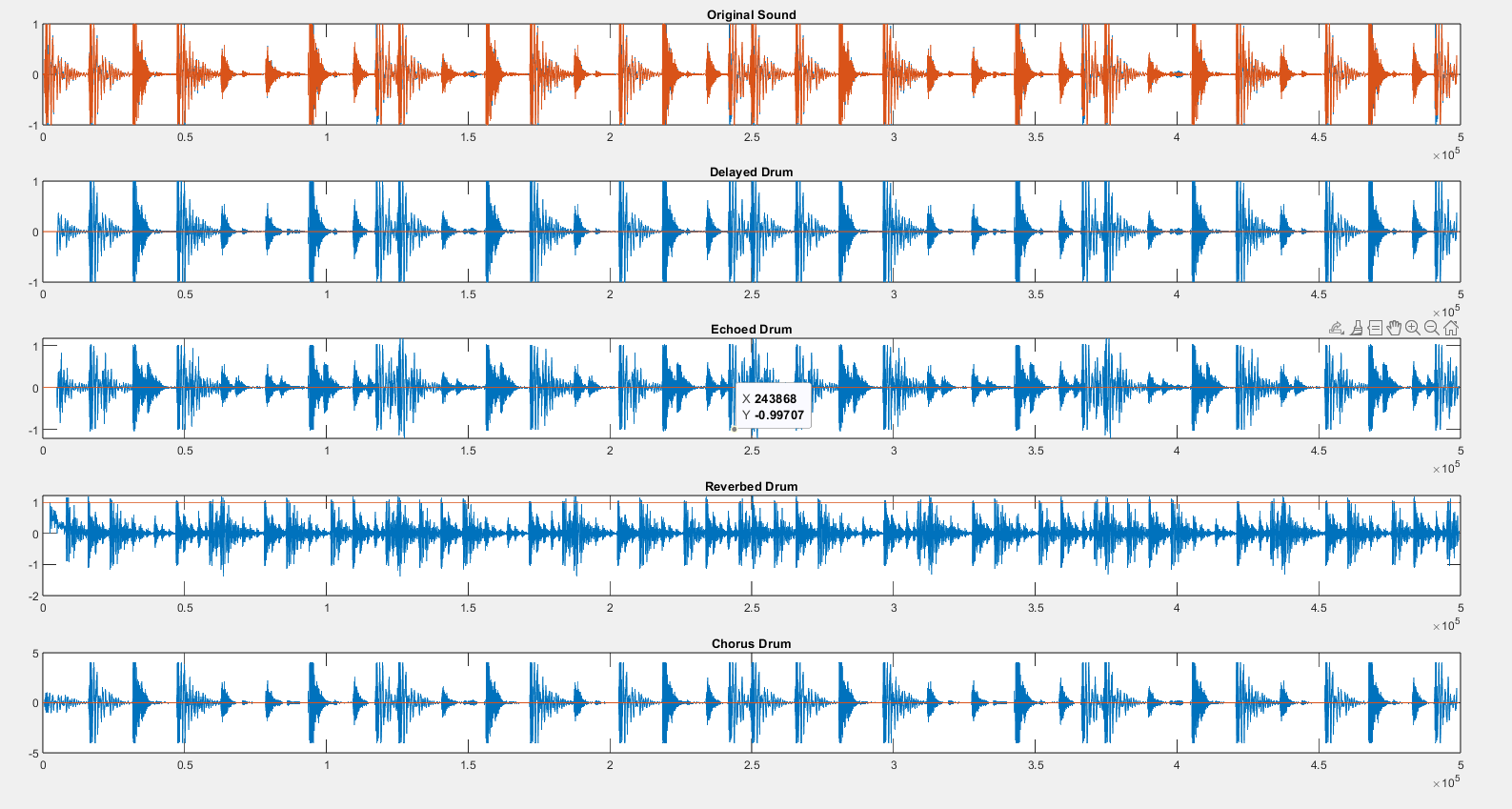
plot(reverb\_drum)

title("Reverbed Drum")

subplot(5, 1, 5)

plot(chorus\_drum)

title("Chorus Drum")

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