ID: 20-42475-1(AB-CDEFG-H)

a1 = G+2

a2 = G+1

f1 = G+4

f2 = G+6

sig_ct = a1*sin(2*pi*f1*t) + a2*cos(2*pi*f2*t)

1. Apply **uniform quantization** of **8** levels on **sig_ct** using Matlab built in function **quantiz().** The quantized levels must be in the midpoint of each of the quantization ranges. Show approximately one full cycle of both sig_ct and the quantized signal in a single figure window in time domain. In the report, insert the code as text and attach the figure. **Legend, labels**, and **title** are mandatory. Use '*****' marker for **sig_ct** and **'x'** marker for the **quantized signal**. Use such a sampling frequency value so that the points of **sig_ct** and the **quantized signal** are visible clearly and comfortably.

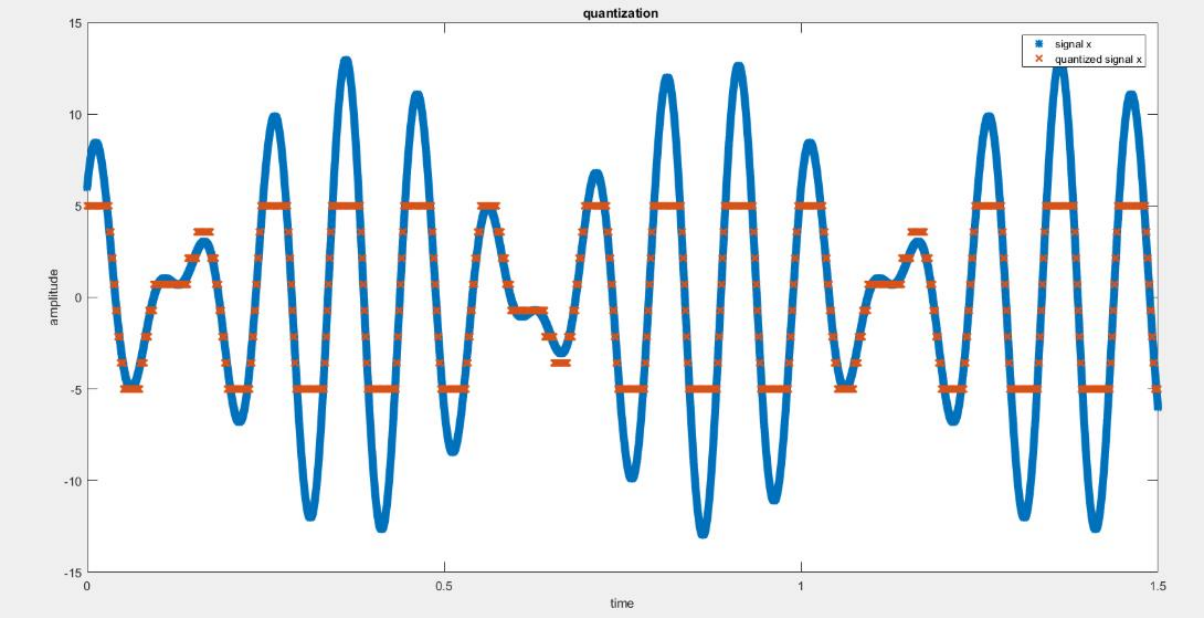
Code:

```
A=2;
B=0;
C=4;
D=2;
E=4;
F=7;
G=5;
H=1;
a1=G+2;
a2=G+1;
f1=G+4;
f2=G+6;
fs = 10000;
t = 0:1/fs:1.5;
sig_ct = a1*sin(2*pi*f1*t) + a2*cos(2*pi*f2*t);
p= [-3.7500 -2.5000 -1.2500 0 1.2500 2.5000 3.7500];
c= [-5.0000 -3.5714 -2.1429 -0.7143 0.7143 2.1429 3.5714 5.0000];
```

```
[i,q]= quantiz(sig_ct,p,c);


plot(t,sig_ct,'*','linewidth',1.5);
hold  on;
plot(t,q,'x','linewidth',1.5);
xlabel('time');
ylabel('amplitude');
title('quantization ');
legend('signal x','quantized signal x');
```

Output:



2. Apply **uniform quantization** of 4 levels on **sig_ct** not using Matlab built in function **quantiz().** The quantized levels must be in the midpoint of each of the quantization ranges. Show approximately one full cycle of both **sig_ct** and the quantized signal in a single figure window in time domain. In the report, insert the code as text and attach the figure. **Legend, labels, and title** are mandatory. Use **'*'** marker for **sig_ct** and **'x'** marker for the quantized signal. Use such a sampling frequency value so that the points of **sig_ct** and the **quantized signal** are visible clearly and comfortably.

Code:

```
A=2;
B=0;
C=4;
D=2;
E=4;
F=7;
G=5;
H=1;
a1=G+2;
a2=G+1;
f1=G+4;
f2=G+6;
fs = 10000;
t = 0:1/fs:2;
sig_ct = a1*sin(2*pi*f1*t) + a2*cos(2*pi*f2*t);
level=4;
delta= (max(sig_ct)-min(sig_ct))/(level-1);
xq=min(sig_ct)+(round((sig_ct-min(sig_ct))/delta)).*delta;
plot(t,sig_ct,'*','linewidth',1.5);
hold  on;
plot(t,xq,'x','linewidth',1.5);
xlabel('time');
ylabel('amplitude');
title('quantization ');
```

legend('signal ','quantized signal ');

Output: