



# **American International University-Bangladesh (AIUB)**

Department of Computer Science

Lab Report

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SECTION : G

COURSE NAME : DATA COMMUNICATION

SEMESTER : 2020-2021, FALL

**Title:** Introduction to MATLAB

**Performance Task:**

My ID = **17-34465-2**

**Here,**

A= 1, B= 7, C= 3, D= 4, E= 4, F= 6, G= 5, H= 2.

$$x_1(t) = A_1 \cos(2\pi(CDEF)t + j_1)$$

$$\text{here, } x_1(t) = A_1 \cos(2\pi(3446)t + j_1)$$

$$x_2(t) = A_2 \cos(2\pi(CDEF)t + j_2)$$

$$\text{here, } x_2(t) = A_2 \cos(2\pi(3446)t + j_2)$$

**(a) Select the value of the amplitudes as follows: let  $A_1 = AB$  and  $A_2 = GH$ . For the phases, use  $j_1 = DG$  (in degrees), and take  $j_2 = GE$  (in degrees). *When doing computations in Matlab, make sure to convert degrees to radians.***

**Ans:**

$$A_1 = AB = 17 \text{ deg}$$

$$A_2 = GH = 52 \text{ deg}$$

$$j_1 = DG = 45 \text{ deg} * \pi/180 = 0.785 \text{ rad}$$

$$j_2 = GE = 54 \text{ deg} * \pi/180 = 0.942 \text{ rad}$$

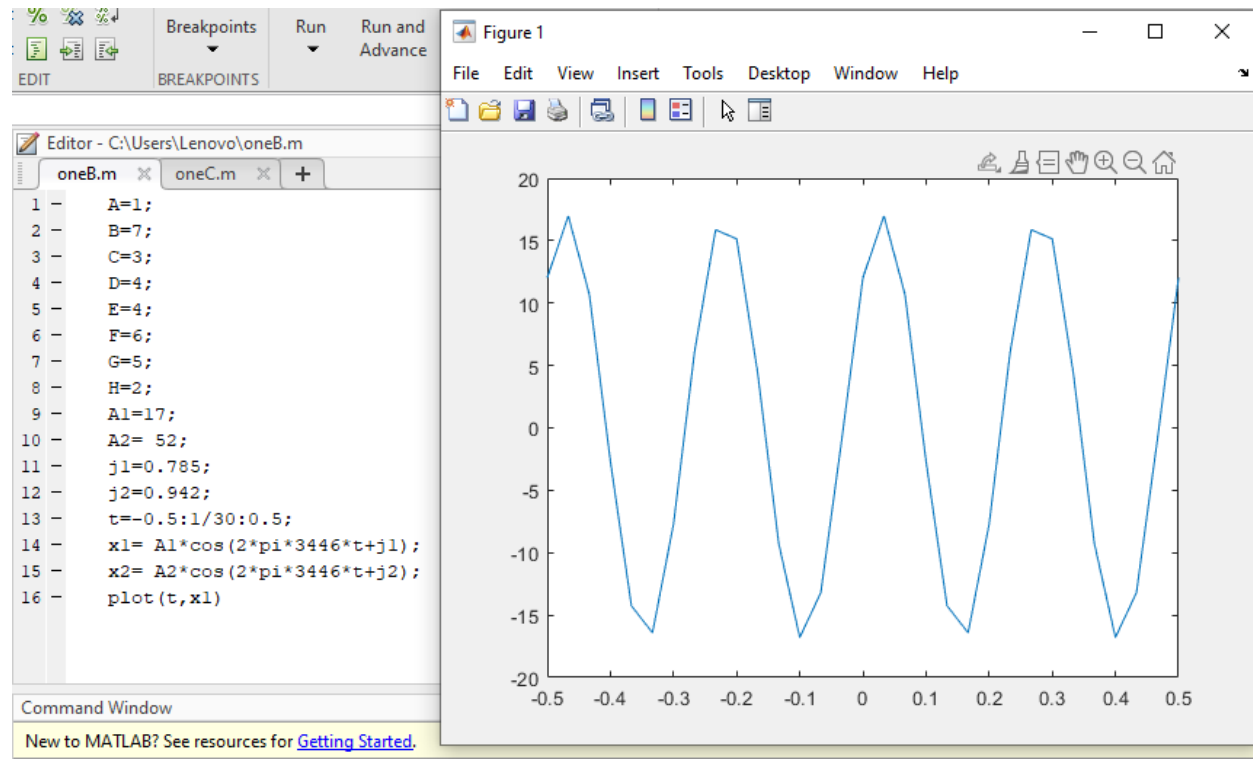
Now,

$$x_1(t) = 17 * \cos(2\pi(3446)t + 0.785)$$

$$x_2(t) = 52 * \cos(2\pi(3446)t + 0.942)$$

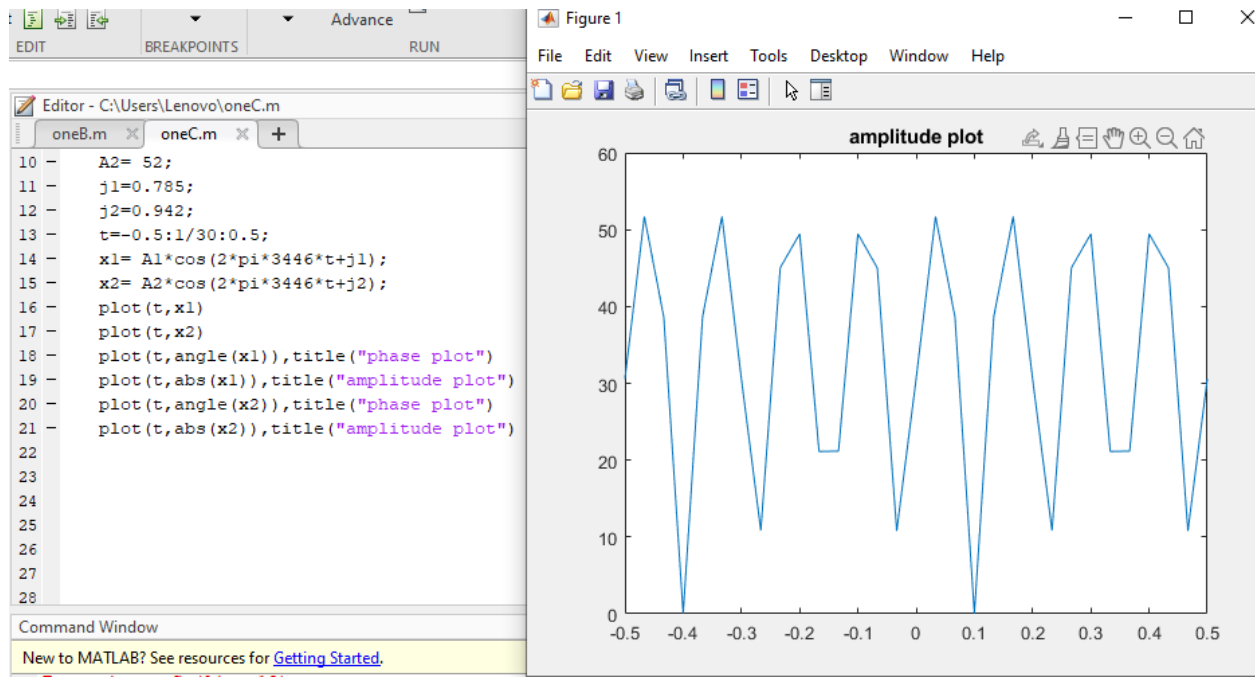
**(b) Make a plot of both signals over a range of  $t$  that will exhibit approximately 3 cycles. Make sure the plot starts at a negative time so that it will include  $t = 0$ , and make sure that you have at least 20 samples per period of the wave.**

**Ans:**



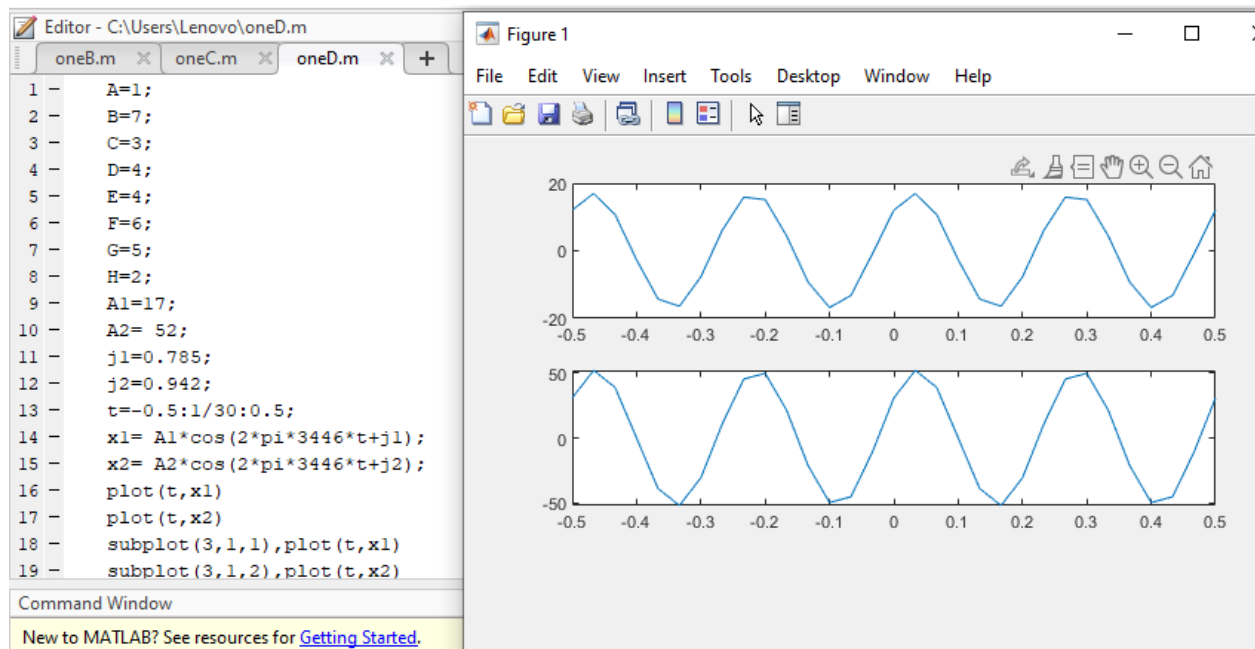
**(c) Verify that the phase of the two signals  $x_1(t)$  and  $x_2(t)$  is correct at  $t = 0$ , and also verify that each one has the correct maximum amplitude.**

**Ans:**



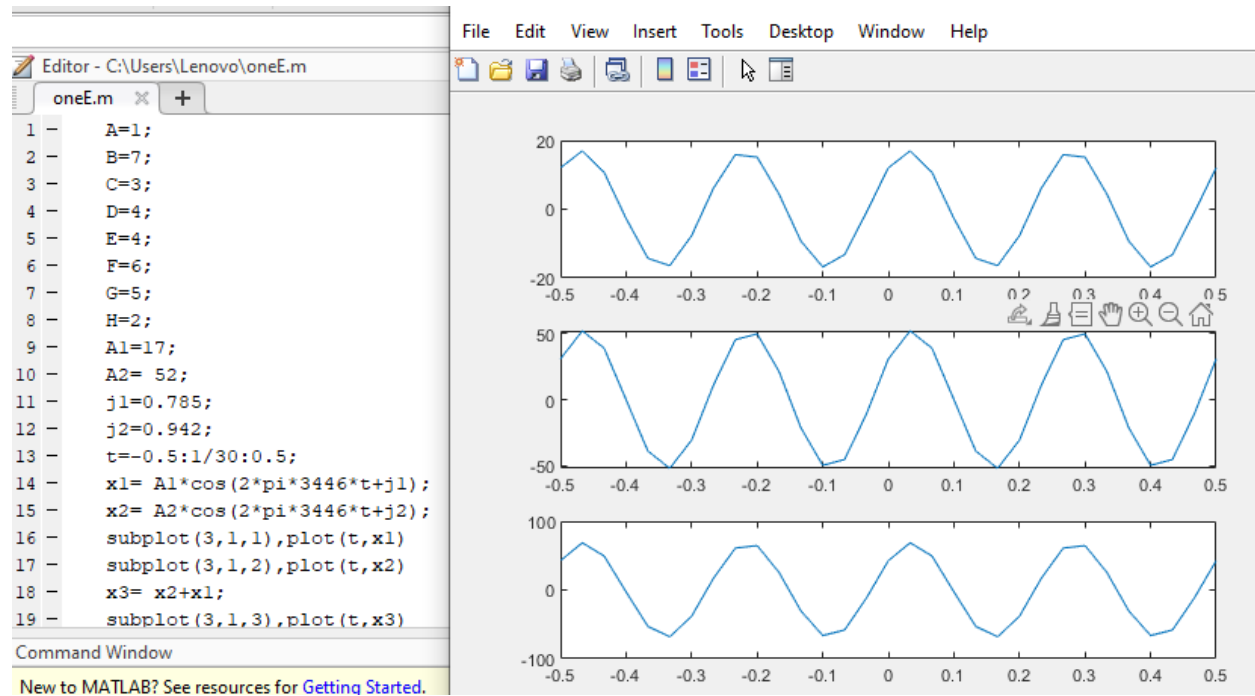
(d) Use `subplot(3,1,1)` and `subplot(3,1,2)` to make a three-panel subplot that puts both of these plots on the same window. See help `subplot`.

Ans:



(e) Create a third sinusoid as the sum:  $x_3(t) = x_1(t) + x_2(t)$ . In Matlab this amounts to summing the vectors that hold the samples of each sinusoid. Make a plot of  $x_3(t)$  over the same range of time as used in the previous two plots. Include this as the third panel in the window by using `subplot(3,1,3)`.

Ans:



(f) Measure the magnitude and phase of  $x_3(t)$  directly from the plot. In your lab report, explain how the magnitude and phase were measured by making annotations on each of the plots.

Ans:

