

NAME: Chris Parmar

PRN.NO: 20220802034

SUB.: DSPExperiment No.1

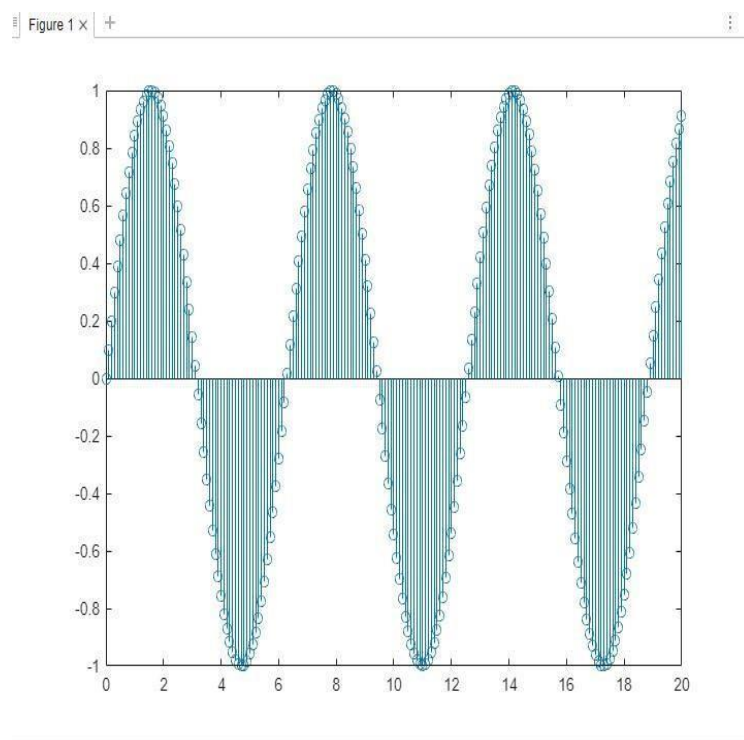
Part1.WriteyourfirstMatlabprogram

Question(1)

/MATLAB Drive/lab1.m

```
1 % Making a quick Plot
2 x=[0:0.1:20];
3 y=sin(x);
4 stem(x,y)
5 |
```

Output:



Question (2)

```
/MATLAB Drive/sum.m
1      %First Matlab Program
2
3      % Sum of two numbers
4
5      a=5;
6      b=3;
7      c=a+b;
8      fprintf(" Sum of a and b = %d", c)
```

Output:

```
>> sum
Sum of a and b = 8
>>
```

Question (3)

```
%Example 6 Formatted Output
```

```
a=3;
b=a*a;
c=a*a*a;
d=sqrt(a);
fprintf("Sqare of %d is = %d ", a,b);
fprintf("\n Cube of %d is = %d", a,c);
fprintf("\n Sqarroot of %d is = %d ", a,d);
```

Output:

```
>> basic
Sqare of 3 is = 9
Cube of 3 is = 27
Sqarroot of 3 is = 1.732051e+00
>>
```

Question(4)

```
1 a=[5 3 6];  
2 b=[4 6 9];  
3 c= a+b;  
4 fprintf("%d \t", c)
```

Output:

```
>> basicarraysum  
9      9      15  
>>
```

Question(5)

```
% Ex. 14 Loop Using For Command  
b=3;  
for k= 1:5  
    fprintf("%d\n", b);  
end
```

Output:

```
>> forloop  
3  
3  
3  
3  
3  
>>
```

Question(6)

```
/MATLAB Drive/loop.m
1 % Ex 15 For Loop : Utility of the dummy index
2 b=3;
3 for k=1:10
4     fprintf(" %d^%d=%d\n",b,k,b^k)
5 end
6
```

Output:

```
>> loop
3^1=3
3^2=9
3^3=27
3^4=81
3^5=243
3^6=729
3^7=2187
3^8=6561
3^9=19683
3^10=59049
>>
```

Question(7)

```
/MATLAB Drive/ex2.m
1 % Ex. 2 The meaning of "a =b"
2
3 a=3;
4 b=a;
5 b
```

Output:

```
>> ex2

b =

     3
```

Question(8)

```

/MATLAB Drive/Ex3.m
1      % Ex 3. Basic math oprations
2
3      a=3;
4      b=9;
5      c=2*a+b^2-a*b+b/a-10
6      fprintf("C=%d",c)
7

```

Output:

```

C=53
>>

```

Question(9)

```

/MATLAB Drive/Ex4.m
1      % Ex.4 The meaning of "a=b:", continued
2      a=3;
3      a=a+1;
4      fprintf("a=%d",a)

```

Output:

```

>> Ex4
a=4
>>

```

Question(10)

```

1      %Ex. 8 Extracting a idndividual element of an array
2      a=[3 6 7];
3      b=[1 9 4 5];
4      c=a(2) + b(4)
5      fprintf("C=%d",c)

```

Output:

Question(11)

```

C=11
>>

```

```
% This Program demonstrates hoe to "comment out"
% a segment of code
A=3;
B=A*A;
%
%B=2*B
%
c=A+B
fprintf("C= %d",c)
```

Output:

```
C= 12
>>
```

Question (12)

```
%Ex. 10 Continuation to next line

summation1 = 1+3+5+7.
+9+11
% Note : The three periods(...)allow continuation to the next line of
% commonds. The two lines in the above example are essentially one line of
%"summation1 =1+3+5+7+9+11";.
```

Question (13)

/MATLAB Drive/Ex11.m

```
1 %Ex. 11 "Clear" a variable
2 c1 = 3;
3 c2 = c1 + 5;
4 clear c1
5 fprintf("%d",c1)
```

Output:

```
>> Ex11
Unrecognized function or variable 'c1'.
```

Part 2. Basic looping

Question(14)

/MATLAB Drive/Ex11b.m

```
1 % Ex.11 Instrinsic math Functions and constants
2 x=pi;
3 y=sin(pi/2)
4 z=exp(-sin(pi/2))
5 fprintf("y=%d\n",y)
6 fprintf("z=%d",z)
```

Output:

```
y =  
  
1  
  
z =  
  
0.3679
```

Question(15)

/MATLAB Drive/Ex16.m

```
1 %Ex.16 For loop: More on the dummy index  
2 sum1 = 0;  
3 for k = 1:9  
4     sum1 = sum1+k;  
5 end  
6 fprintf("Sum1 =%d",sum1)
```

Output:

```
Sum1 =45  
>>
```

Question(16)

/MATLAB Drive/Ex17.m

```
1 %Ex.17 For loop: More on the dummy index  
2 sum1 = 0;  
3 for k = 1:2:9  
4     sum1 = sum1+k;  
5 end  
6 fprintf("Sum1 =%d",sum1)
```

Output:**Question(17)**

```
Sum1 =25  
>>
```

```
%Ex.18 Treatment of array within loop  
b=[3 8 9 4 7 5];  
sum1 = 0;  
for k = 1:4  
    sum1 = sum1+b(k);  
end  
fprintf("Sum 1= %d", sum1)
```

Output:

```
Sum 1= 24
>>
```

Question(18)

/MATLAB Drive/Ex19.m

```
1 %Ex.18 Treatment of array within loop
2 b=[3 8 9 4 7 5];
3 sum1 = 0;
4 for k = 1:2:5
5     sum1 = sum1+b(k);
6 end
7 fprintf("Sum 1= %d", sum1)
```

Output:

```
Sum 1= 19
>>
```

Question(19)

```
1 %EX. 19 Treatment of array within a loop
2 b = [3 8 9 4 7 5];
3 sum1 = 0;
4 for k = 1:2:5
5     sum1 = sum1+b(k);
6 end
7 sum1
```

Output:

```
sum1 =
    19
>>
```

Question(20)

```
1 %Ex. 20 Double loop
2 sum1 = 0;
3 for n = 1:2
4     for m = 1:3
5         sum1 = sum1+n*m;
6     end
7 end
8 sum1
```

Output:

```
sum1 =
    18
```

Question(21)


```

1 %Ex. 21 Double loop
2 for n = 1:2
3   for m = 1:3
4     fprintf('n = %3u m = %3u \r', n, m)
5   end
6 end

```

Output:

```

n = 1 m = 1
n = 1 m = 2
n = 1 m = 3
n = 2 m = 1
n = 2 m = 2
n = 2 m = 3
>>

```

Question(22)

```

1 %Ex. 22 More complicated use of loop and index
2 b = [2 5 7 4 9 8 3];
3 c = [2 3 5 7];
4 sum1 = 0;
5 for k = 1:4
6   sum1 = sum1+b(c(k));
7 end
8 sum1

```

Output:

```

sum1 =

    24

```

Part 3. Basic branching

Question(23)

```

1 %Ex. 23 The if command
2 num1 = 7;
3 if (num1 > 5)
4   fprintf('%4u is greater than 5 \r', num1)
5 else
6   fprintf('%4u is less than or equal to 5 \r', num1)
7 end

```

Output:

```

 7 is greater than 5
>>

```

Question(24)

```

/MATLAB Drive/EX24.m
1 %Ex 24 if - elseif - else (This example is self-explanatory.
2 % Try to change the given value of num1 and observe the outcome.)
3 num1 = 4;
4 if (num1 >= 5)
5     fprintf('%4i is greater than or equal to 5 \r', num1)
6 elseif (num1 > 1)
7     fprintf('%4i is less than 5 but greater than 1 \r', num1)
8 elseif (num1 == 1)
9     fprintf('%4i equals 1 \r', num1)
10 elseif (num1 > -3)
11     fprintf('%4i is less than 1 but greater than -3 \r', num1)
12 else
13     fprintf('%4i is less than or equal to -3 \r', num1)
14 end

```

Output:

```

4 is less than 5 but greater than 1

```

Question(25)

```

/MATLAB Drive/EX25.m
1 %Ex 25 An application - determine whether a given year is a leap year
2 % (try to change the given value of nyear and observe the outcome)
3 nyear = 1975;
4 if (mod(nyear, 400) == 0)
5     fprintf('%6u is a leap year', nyear)
6 elseif (mod(nyear,4) == 0) & (mod(nyear,100) ~= 0)
7     fprintf('%6u is a leap year', nyear)
8 else
9     fprintf('%6u is not a leap year', nyear)
10 end

```

Output:

```

1975 is not a leap year
>>

```

Question(26)

```

1 % Ex 26 Combine looping and branching
2 sum1 = 0;
3 sum2 = 0;
4 N = 9
5 for k = 1:N
6     sum1 = sum1+k;
7     if (mod(k,3) == 0)
8         sum2 = sum2+k;
9     end
10 end
11 fprintf("Sum1=%d \n",sum1)
12 fprintf("Sum2=%d\n",sum2)

```

Output:

```

Sum1=45
Sum2=18

```

Question(27)

```

1 %Ex 27 The while loop
2 x = 3;
3 while (x < 100)
4     x = x*3;
5 end
6 x

```

Output:

```
x =  
  
243  
  
>>
```

Part 4. Array and Matrix

1. Assign the content of an array/matrix; Basic operations Question(28)

```
1 % Ex. 28 Assign the content of a (one-dimensional) array; Addition of two arrays  
2 a = [2 12 25];  
3 b = [3 7 4];  
4 c = a+b
```

Output:

Question(29)

```
/MATLAB Drive/ex29.m  
1 %Ex. 29 Assign the content of a matrix; Addition of two matrices  
2 a = [3 4; 1 6];  
3 b = [5 2; 11 7];  
4 c = a+b
```

Output:

```
c =  
  
8     6  
12    13  
  
>>
```

Question(30)

```
c =  
  
5     19     29
```

```
/MATLAB Drive/EX30.m  
1 % Ex. 30 Multiplication involving a scalar and an array (or a matrix)  
2 a = [3 5; 1 4];  
3 b = 2*a
```

Output:

```
b =  
  
6     10  
2      8
```

Question(31)

```

/MATLAB Drive/EX31.m
1 %Ex. 31 Element-by-element multiplication involving two 1-D
2 % arrays or two matrices of the same dimension
3 a = [2 3 5];
4 b = [2 4 9];
5 c = a.*b

```

Output:

```

c =
    4    12    45
>>

```

Question(32)

```

/MATLAB Drive/EX32.m
1 %Ex. 32 Element-by-element multiplication of two matrices
2 a = [2 3; 1 4];
3 b = [5 1; 7 2];
4 c = a.*b

```

Output:

Question(33)

```

/MATLAB Drive/EX33.m
1 %Ex. 33 Direct (not element-by-element) multiplication of two matrices
2 a = [2 3; 1 4];
3 b = [5 1; 7 2];
4 c = a*b

```

Output:

```

c =
    31     8
    33     9

```

Question(34)

```

/MATLAB Drive/EX34.m
1 %Ex. 34 Elementary functions with a vectorial variable
2 a = [2 3 5];
3 b = sin(a)

```

```

c =
    10     3
     7     8

```

Output:

```

b =
    0.9093    0.1411   -0.9589

```

Question(35)

```

/MATLAB Drive/EX35.m
1 % Ex. 35 Another example of elementary functions with a vectorial variable
2 a = [2 3 5];
3 b = 2*a.^2+3*a+4

```

Output:

```

b =
    18    31    69

```

Question(36)

```

/MATLAB Drive/EX36.m
1 %Ex. 36 An efficient way to assign the content of an array
2 a = [0:0.5:4];
3 a

```

Output:

```

a =
    0    0.5000    1.0000    1.5000    2.0000    2.5000    3.0000    3.5000    4.0000

```

Question(37)

```

/MATLAB Drive/EX37.m
1 %Ex 37. Extracting the individual element(s) of a matrix
2 A = [3 5; 2 4];
3 c = A(2,2)+A(1,2)

```

```
c = 9
```

Output:

Question(38)

```

/MATLAB Drive/EX38.m
1 % Ex. 38 Another example for the usage of index for a matrix
2 A = [3 5; 2 4];
3 norm1 = 0;
4 for m = 1:2
5     for n = 1:2
6         norm1 = norm1+A(m,n)^2;
7     end
8 end
9 norm1 = sqrt(norm1)

```

Output:

```

norm1 =
    7.3485

```

Question(39)

```

/MATLAB Drive/EX39.m
1 % Ex. 39 Solving a system of linear equation
2 A = [4 1 2; 0 3 1; 0 1 2];
3 b = [17 ; 19 ; 13];
4 x = inv(A)*b

```

Output:

```

x =
    1
    5
    4

```

Question(40)

```

/MATLAB Drive/EX40.m
1 %Ex. 40 An alternative to Ex. 39
2 A = [4 1 2; 0 3 1; 0 1 2];
3 b = [17 ; 19 ; 13];
4 x = A\b

```

Output:

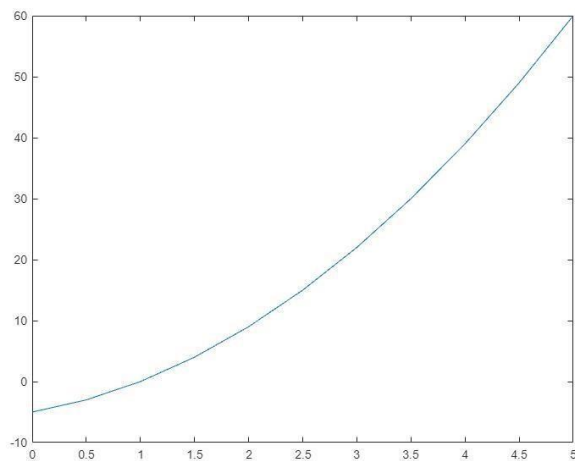
```
x =  
  
1  
5  
4
```

Part 5. Basic graphic applications

Question(41)

```
/MATLAB Drive/EX41.m  
1 % Ex. 41 A quick example of plot command: Draw a curve  
2 a = [0:0.5:5];  
3 b = 2*a.^2 + 3*a -5;  
4 plot(a,b)
```

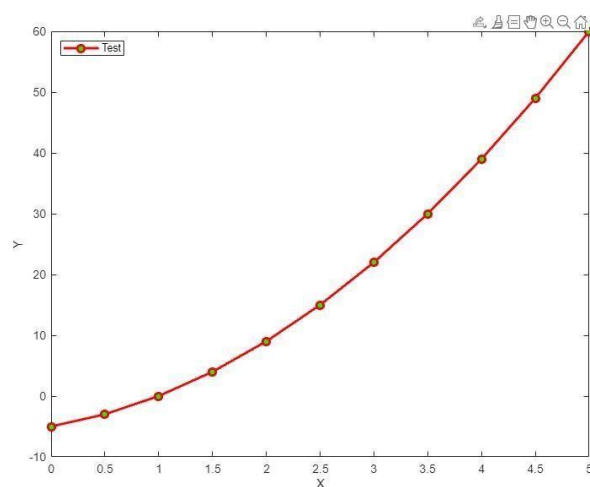
Output:



Question(42)

```
/MATLAB Drive/EX42.m  
1 %Ex. 42 Refine the plot: Line pattern, color, and thickness  
2 a = [0:0.5:5];  
3 b = 2*a.^2 + 3*a -5;  
4 plot(a,b,'-or','MarkerFaceColor','g','LineWidth',2)  
5 xlabel('X'); ylabel('Y'); legend('Test','Location','NorthWest')
```

Ouput:



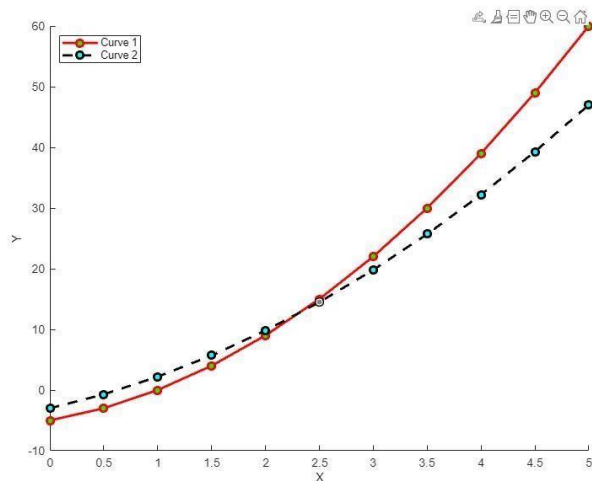
Question(43)

```

/MATLAB Drive/EX43.m
1 %Ex. 43 Draw multiple curves
2 a = [0:0.5:5];
3 b = 2*a.^2 + 3*a -5;
4 c = 1.2*a.^2+4*a-3;
5 hold on
6 plot(a,b,'-or','MarkerFaceColor','g','LineWidth',2)
7 plot(a,c,'--ok','MarkerFaceColor','c','LineWidth',2)
8 xlabel('X'); ylabel('Y'); legend('Curve 1','Curve 2','Location','NorthWest')

```

Ouput:



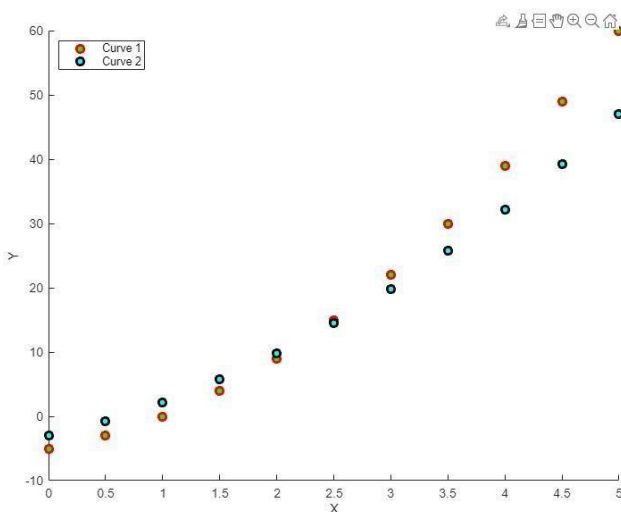
Question(44)

```

/MATLAB Drive/EX44.m
1 %Ex. 44 Draw symbols
2 a = [0:0.5:5];
3 b = 2*a.^2 + 3*a -5;
4 c = 1.2*a.^2+4*a-3;
5 hold on
6 plot(a,b,'or','MarkerFaceColor','g','LineWidth',2)
7 plot(a,c,'ok','MarkerFaceColor','c','LineWidth',2)
8 xlabel('X'); ylabel('Y'); legend('Curve 1','Curve 2','Location','NorthWest')

```

Ouput:



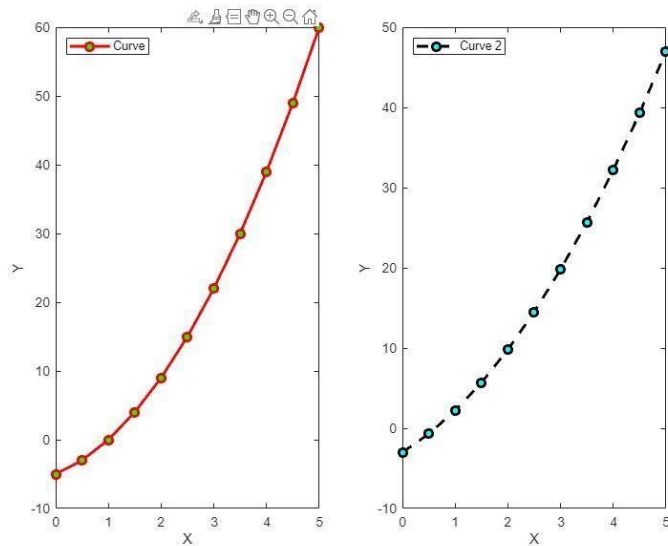
Question(45)

```

/MATLAB Drive/EX45.m
1 %Ex. 45 Plot with multiple panels
2 a = [0:0.5:5];
3 b = 2*a.^2 + 3*a -5;
4 c = 1.2*a.^2+4*a-3;
5 subplot(1,2,1)
6 plot(a,b,'-or','MarkerFaceColor','g','LineWidth',2)
7 xlabel('X'); ylabel('Y'); legend('Curve ', 'Location','NorthWest')
8 subplot(1,2,2)
9 plot(a,c,'--ok','MarkerFaceColor','c','LineWidth',2)
10 xlabel('X'); ylabel('Y'); legend('Curve 2', 'Location','NorthWest')

```

Ouput:



Part 7 Use external files and prompt for input and output

Question(48)

```

/MATLAB Drive/EX48.m
1 % Ex 48 Open a file and write the output to the file
2 fID1 = fopen('myoutput1.txt','w');
3 for n = 1:4
4     b1 = n ; b2 = n^2 ; b3 = n^3;
5     fprintf(fID1,'%7u %7u %7u \r',b1,b2,b3);
6 end

```

Ouput:

```

1 1 1
2 4 8
3 9 27
4 16 64

```

Question(49)


```

1 %Ex 49 Read data from an existing file
2 fID1 = fopen('myoutput1.txt','r');
3 for n = 1:4
4     b = fscanf(fID1,'%7u %7u %7u \r',3);
5     btotal = b(1)+b(2)+b(3);
6     fprintf('%7u + %7u + %7u = %7u \r', b(1), b(2), b(3), btotal)
7 end

```

Output:

```

1 + 1 = 3
2 + 4 = 14
3 + 9 = 39
4 + 16 = 84

```

Question(50)

```

1 %Ex 50 Create a prompt to request user input
2 num1 = input('Enter your age');
3 if (num1 > 17)
4     fprintf('You are eligible to vote')
5 else
6     fprintf('You are not eligible to vote')
7 end

```

Output:

```

Enter your age
19
You are eligible to vote
>> |

```

