Tutorial 4.2.1 for Loop

```
a = 0;
for m = 1:10
    m
    a = a + m
    pause
end
```

```
m =

     1

a =

     1

m =

     2

a =

     3

m =

     3

a =

     6

m =

     4

a =

    10

m =
```

```
     5

a =

    15

m =

     6

a =

    21

m =

     7

a =

    28

m =

     8

a =

    36

m =

     9

a =

    45

m =

    10

a =
```

```
55
```

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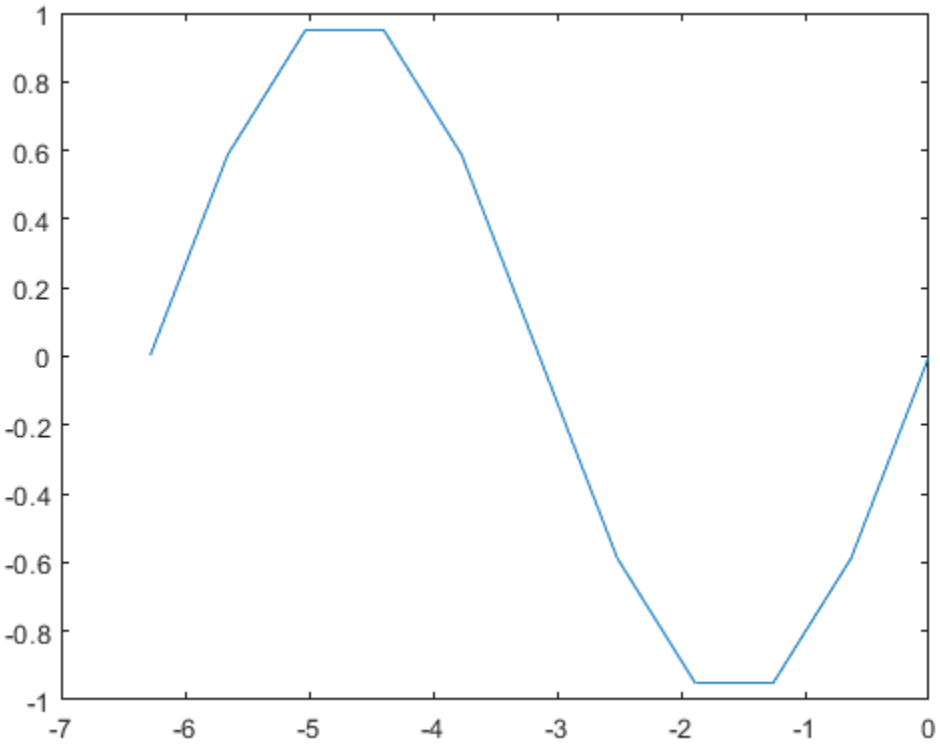
Tutorial 4.2.1 for Loop (sinewave)

```
% Clear out the workspace
clear

% Generate the vectors to be plotted
for i = 1:11
    x(i) = (1 - i)*(2*pi/10);
    y(i) = sin(x(i));
end

plot(x,y)
```



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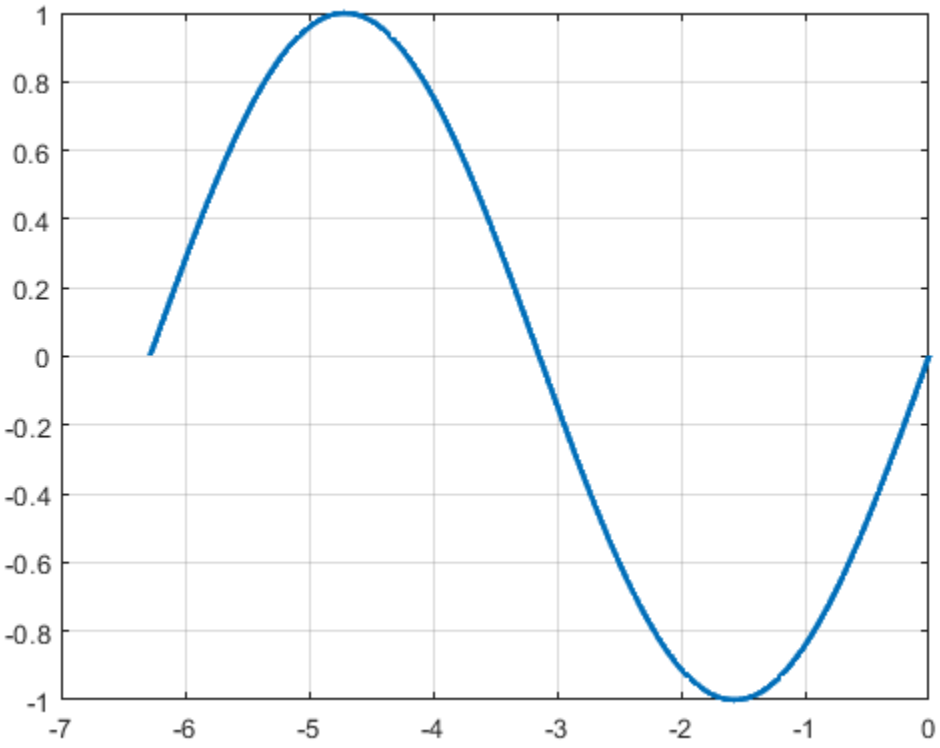
Tutorial 4.2.1 for Loop (sinewave)

```
% Clear out the workspace
clear

% Generate the vectors to be plotted
for i = 1:1001
    x(i) = (1 - i)*(2*pi/1000);
    y(i) = sin(x(i));
end

plot(x,y,'LineWidth',2)
grid on
```



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Tutorial 4.3.1 if Statement

```
% Clear the Command Window
clc

% Get user input
%y = input('Enter a number less than or equal to 10: ');
y = 12; % hard entry to overide "No input" error

% If y is greater than 10, change its value to 10

if y > 10
    fprintf('The number you entered is greater than 10. It will be changed to
 10. \n')
    y = 10;
end

y
```

```
The number you entered is greater than 10. It will be changed to 10.

y =

    10
```

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Tutorial 4.3.1 if Statement.2

```
% Clear the Command Window
clc

% Get user input
%y = input('Enter a number between 1 and 10: ');
y = 12; % hard entry to overide "No input" error

% If y is greater than 10, change its value to 10

if y > 10 | y < 1
    fprintf('The number you entered is outside the range. It will be changed
 to 10. \n')
    y = 10;
end

y
```

```
The number you entered is outside the range. It will be changed to 10.

y =

    10
```

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Tutorial 4.3.1 if Statement. (Input = 0)

```
% Clear the Command Window
clc

% Get user input
%y = input('Enter a number between 1 and 10: ');
y = 0; % hard entry to overide "No input" error

% If y is greater than 10, change its value to 10

if y > 10 | y < 1
    fprintf('The number you entered is outside the range. It will be changed
 to 10. \n')
    y = 10;
end

y
```

```
The number you entered is outside the range. It will be changed to 10.

y =

    10
```

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Tutorial 4.3.1 if Statement. (Input = 4)

```
% Clear the Command Window
clc

% Get user input
%y = input('Enter a number between 1 and 10: ');
y = 4; % hard entry to overide "No input" error

% If y is greater than 10, change its value to 10

if y > 10 | y < 1
    fprintf('The number you entered is outside the range. It will be changed
 to 10. \n')
    y = 10;
end

y
```

```
y =

     4
```

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Tutorial 4.3.1 if Statement. (Input = 11)

```
% Clear the Command Window
clc

% Get user input
%y = input('Enter a number between 1 and 10: ');
y = 11; % hard entry to overide "No input" error

% If y is greater than 10, change its value to 10

if y > 10 | y < 1
    fprintf('The number you entered is outside the range. It will be changed
 to 10. \n')
    y = 10;
end

y
```

```
The number you entered is outside the range. It will be changed to 10.

y =

    10
```

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Tutorial 4.3.1 if Statement. (Input = 0)

```
% Clear the Command Window
clc

% Get user input
%y = input('Enter a number between 1 and 10: ');
y = 0; % hard entry to overide "No input" error

% If y is greater than 10, change its value to 10

if y > 10 | y < 1
    fprintf('The number you entered is outside the range. It will be changed
 to 10. \n')

    if y > 10
        y = 10;
        fprintf('The number has been changed to 10.\n');
    end

    if y < 1
        y = 1;
        fprintf('The number has been changed to 1.\n')
    end

end

y
```

```
The number you entered is outside the range. It will be changed to 10.
The number has been changed to 1.

y =

     1
```

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Tutorial 4.3.1 if Statement. (Input = 4)

```
% Clear the Command Window
clc

% Get user input
%y = input('Enter a number between 1 and 10: ');
y = 4; % hard entry to overide "No input" error

% If y is greater than 10, change its value to 10

if y > 10 | y < 1
    fprintf('The number you entered is outside the range. It will be changed
 to 10. \n')

    if y > 10
        y = 10;
        fprintf('The number has been changed to 10.\n');
    end

    if y < 1
        y = 1;
        fprintf('The number has been changed to 1.\n')
    end

end

y
```

```
y =

     4
```

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Tutorial 4.3.1 if Statement. (Input = 11)

```
% Clear the Command Window
clc

% Get user input
%y = input('Enter a number between 1 and 10: ');
y = 11; % hard entry to overide "No input" error

% If y is greater than 10, change its value to 10

if y > 10 | y < 1
    fprintf('The number you entered is outside the range. It will be changed
 to 10. \n')

    if y > 10
        y = 10;
        fprintf('The number has been changed to 10.\n');
    end

    if y < 1
        y = 1;
        fprintf('The number has been changed to 1.\n')
    end

end

y
```

```
The number you entered is outside the range. It will be changed to 10.
The number has been changed to 10.

y =

    10
```

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Tutorial 4.3.1 if Statement. (Input = 0)

```
% Clear the Command Window
clc

% Get user input
%y = input('Enter a number between 1 and 10: ');
y = 0; % hard entry to overide "No input" error

% If y is outside the range, change its value appropriately

if y > 10 | y < 1
    fprintf('The number you entered is outside the range. It will be changed
 to 10. \n')

    if y > 10
        y = 10;
        fprintf('The number has been changed to 10.\n');
    end

    if y < 1
        y = 1;
        fprintf('The number has been changed to 1.\n')
    end

else
    fprintf('The number is within the range\n')

end

y
```

```
The number you entered is outside the range. It will be changed to 10.
The number has been changed to 1.

y =

     1
```

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Tutorial 4.3.1 if Statement. (Input = 4)

```
% Clear the Command Window
clc

% Get user input
%y = input('Enter a number between 1 and 10: ');
y = 4; % hard entry to overide "No input" error

% If y is outside the range, change its value appropriately

if y > 10 | y < 1
    fprintf('The number you entered is outside the range. It will be changed
 to 10. \n')

    if y > 10
        y = 10;
        fprintf('The number has been changed to 10.\n');
    end

    if y < 1
        y = 1;
        fprintf('The number has been changed to 1.\n')
    end

else
    fprintf('The number is within the range\n')

end

y
```

```
The number is within the range

y =

     4
```

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Tutorial 4.3.1 if Statement. (Input = 11)

```
% Clear the Command Window
clc

% Get user input
%y = input('Enter a number between 1 and 10: ');
y = 11; % hard entry to overide "No input" error

% If y is outside the range, change its value appropriately

if y > 10 | y < 1
    fprintf('The number you entered is outside the range. It will be changed
 to 10. \n')

    if y > 10
        y = 10;
        fprintf('The number has been changed to 10.\n');
    end

    if y < 1
        y = 1;
        fprintf('The number has been changed to 1.\n')
    end

else
    fprintf('The number is within the range\n')

end

y
```

```
The number you entered is outside the range. It will be changed to 10.
The number has been changed to 10.

y =

    10
```

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Tutorial 4.3.1 if Statement. (Input = 0)

```
% Clear the Command Window
clc

% Get user input
%y = input('Enter a number between 1 and 10: ');
y = 0; % hard entry to overide "No input" error

% If y is outside the range, change its value appropriately

if y > 10
    fprintf('The number is too high. It will be changed to 10.\n');
    y = 10;

elseif y < 1
    fprintf('The number is too low. It will be changed to 1.\n');
    y = 1;

else
    fprintf('The number is within the range\n')

end

y
```

```
The number is too low. It will be changed to 1.

y =

     1
```

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Tutorial 4.3.1 if Statement. (Input = 4)

```
% Clear the Command Window
clc

% Get user input
%y = input('Enter a number between 1 and 10: ');
y = 4; % hard entry to overide "No input" error

% If y is outside the range, change its value appropriately

if y > 10
    fprintf('The number is too high. It will be changed to 10.\n');
    y = 10;

elseif y < 1
    fprintf('The number is too low. It will be changed to 1.\n');
    y = 1;

else
    fprintf('The number is within the range\n')

end

y
```

```
The number is within the range

y =

     4
```

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Tutorial 4.3.1 if Statement. (Input = 11)

```
% Clear the Command Window
clc

% Get user input
%y = input('Enter a number between 1 and 10: ');
y = 11; % hard entry to overide "No input" error

% If y is outside the range, change its value appropriately

if y > 10
    fprintf('The number is too high. It will be changed to 10.\n');
    y = 10;

elseif y < 1
    fprintf('The number is too low. It will be changed to 1.\n');
    y = 1;

else
    fprintf('The number is within the range\n')

end

y
```

```
The number is too high. It will be changed to 10.

y =

    10
```

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Tutorial 4.3.1 if Statement. (Input = 0)

```
% Clear the Command Window
clc

% Get user input
%y = input('Enter a number between 1 and 10: ');
y = 0; % hard entry to overide "No input" error

% If y is outside the range, change its value appropriately and output the
% new value.

if y > 15
    fprintf('The number is too high. The program is terminating.\n')

elseif y > 10
    fprintf('The number is slightly too high. It will be changed to 1.\n')
    y = 10

elseif y == 10
    fprintf('The number is at the upper limit.\n')
    y

elseif y < 1
    fprintf('The number is too low. It will be changed to 1.\n');
    y = 1

else
    fprintf('The number is within the range\n')

end
```

```
The number is too low. It will be changed to 1.

y =

     1
```

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Tutorial 4.3.1 if Statement. (Input = 4)

```
% Clear the Command Window
clc

% Get user input
%y = input('Enter a number between 1 and 10: ');
y = 4; % hard entry to overide "No input" error

% If y is outside the range, change its value appropriately and output the
% new value.

if y > 15
    fprintf('The number is too high. The program is terminating.\n')

elseif y > 10
    fprintf('The number is slightly too high. It will be changed to 1.\n')
    y = 10

elseif y == 10
    fprintf('The number is at the upper limit.\n')
    y

elseif y < 1
    fprintf('The number is too low. It will be changed to 1.\n');
    y = 1

else
    fprintf('The number is within the range\n')

end
```

```
The number is within the range
```

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Tutorial 4.3.1 if Statement. (Input = 11)

```
% Clear the Command Window
clc

% Get user input
%y = input('Enter a number between 1 and 10: ');
y = 11; % hard entry to overide "No input" error

% If y is outside the range, change its value appropriately and output the
% new value.

if y > 15
    fprintf('The number is too high. The program is terminating.\n')

elseif y > 10
    fprintf('The number is slightly too high. It will be changed to 1.\n')
    y = 10

elseif y == 10
    fprintf('The number is at the upper limit.\n')
    y

elseif y < 1
    fprintf('The number is too low. It will be changed to 1.\n');
    y = 1

else
    fprintf('The number is within the range\n')

end
```

```
The number is slightly too high. It will be changed to 1.

y =

    10
```

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Tutorial 4.3.1 if Statement. (Input = 16)

```
% Clear the Command Window
clc

% Get user input
%y = input('Enter a number between 1 and 10: ');
y = 16; % hard entry to overide "No input" error

% If y is outside the range, change its value appropriately and output the
% new value.

if y > 15
    fprintf('The number is too high. The program is terminating.\n')

elseif y > 10
    fprintf('The number is slightly too high. It will be changed to 1.\n')
    y = 10

elseif y == 10
    fprintf('The number is at the upper limit.\n')
    y

elseif y < 1
    fprintf('The number is too low. It will be changed to 1.\n');
    y = 1

else
    fprintf('The number is within the range\n')

end
```

```
The number is too high. The program is terminating.
```

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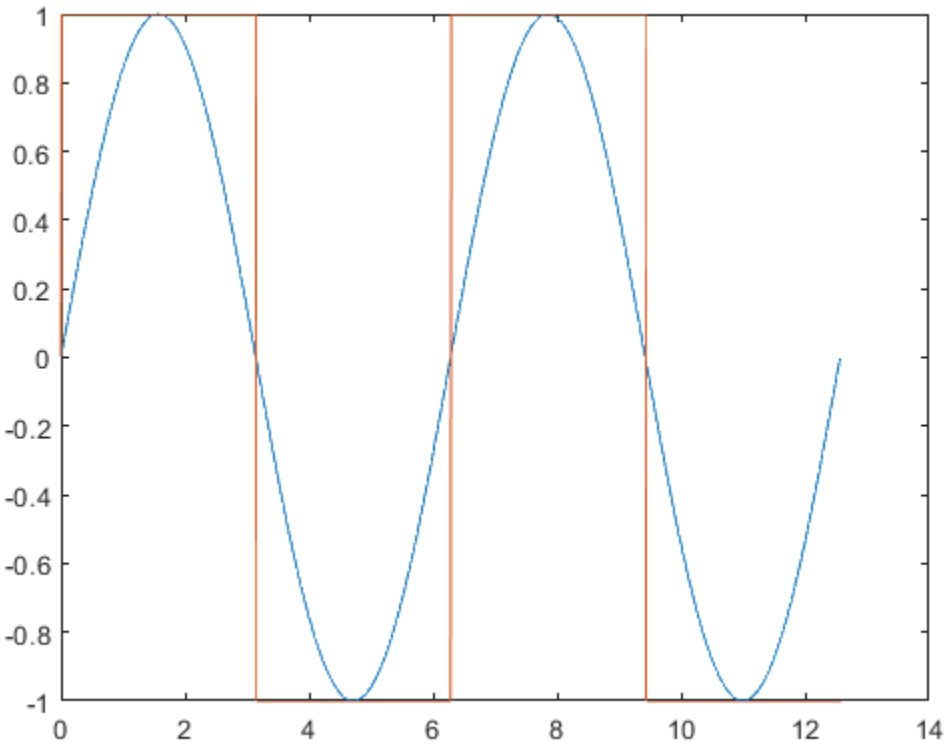
Example 4.1

```
%Creating a sin and square wave from 0 to 4pi

for i=1:1001
    x(i)=(i-1)*(4*pi/1000);
    ysin(i)=sin(x(i));
    if ysin(i)>0
        ysquare(i)=1;
    elseif ysin(i)<0
        ysquare(i)=-1;
    else
        ysquare(i)=0;
    end
end
plot(x,ysin,x,ysquare)
```



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Chapter 4 - Part 1 Flow Charts and Loops PPT Examples

Table of Contents

Slide 14

```
y = 0;
for k = 1:5
    y = y + k;
end
y
```

```
y =

    15
```

Slide 15

```
y = 0;
for k = 2:2:8
    y = y + k;
end
y
```

```
y =

    20
```

Slide 16

```
for k = 1:5
    y(k) = k^2;
end
```

```
y
```

```
y =

     1     4     9    16    25
```

Slide 17

```
for j = 1:3
    for k = 1:3
        T(j,k) = j*k;
    end
end
T
```

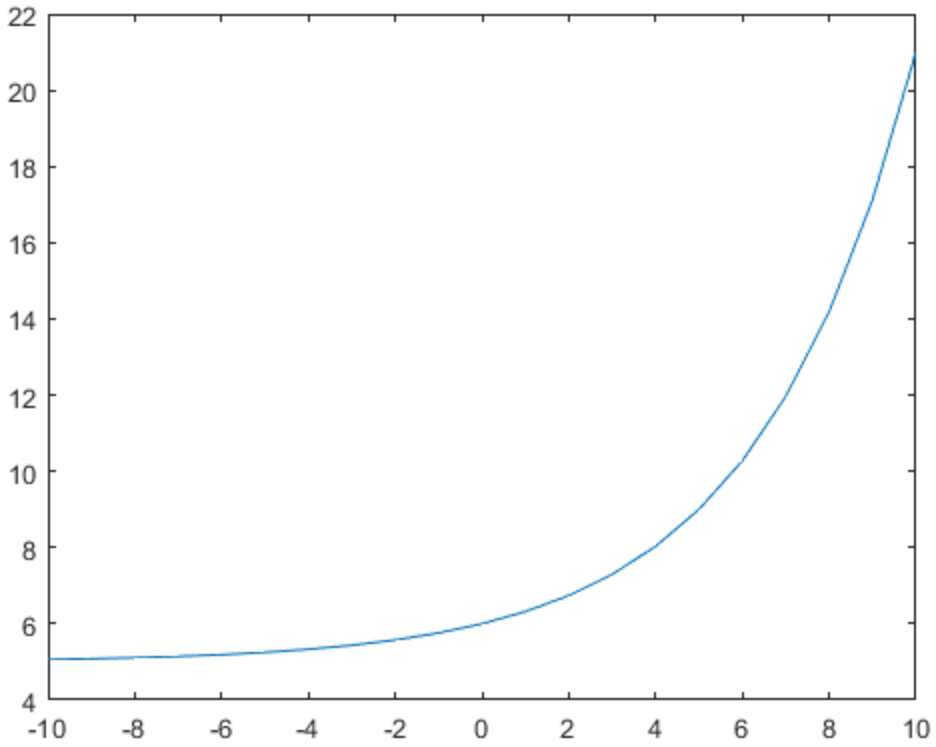
```
T =

     1     2     3
     2     4     6
     3     6     9
```

Slide 18-20

```
clc;clear
for i = 1:21
    x(i) = -10 + (i-1);
    y(i) = 2^(0.4*x(i)) + 5;
end

plot(x,y)
```



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Chapter 4 - Part 1 Flow Chart and Loops Examples

Table of Contents

Slide 33

```
m = 0;
A = 20;
while A <= 50
    A = A + 5;
    m = m + 1;
end
A
m
```

```
A =

    55


m =

     7
```

Slide 34

```
m = 0;
A = 100;
while A > 15
    A = A/2;
    m = m +1;
end
A
m
```

```
A =

   12.5000
```

```
m =

     3
```

Slide 35

```
m = 0;
A = 10;
%while A > 0
    %A = sqrt(A);
    %m = m + 1;
%end
A
m
% this will print an infinite loop. A screenshot will be included.


A =

    10


m =

     0
```

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MATLAB R2022b - academic use

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Refactor — CODE
Profiler Analyze — ANALYZE
Run Section Section Break Run and Advance Run to End — SECTION
Pause Step Stop — RUN

C: ▸ Users ▸ vfmenna ▸ Documents ▸ MATLAB ▸

Current Folder

Name
- html
- fortest.m
- iftest.m
- Problem4_4.m
- Problem4_6.m
- sinewave.m
- slidespg33_35.m
- whiletest.m

Problem4_6.m (Script)

Problem 4.6 - For the account describedf in Problem 4.4, write a MATLAB program with a while loop to determine the number of years required for the amount in the account to reach $5,000.

Problem 4.6 - For the account describedf in Problem 4.4, write a MATL...

Editor - C:\Users\vfmenna\Documents\MATLAB\slidespg33_35.m

slidespg33_35.m

```
5   A = 20;
6   while A <= 50
7       A = A + 5;
8       m = m + 1;
9   end
10  A
11  m
12
13  %% Slide 34
14
15  m = 0;
16  A = 100;
17  while A > 15
18      A = A/2;
19      m = m +1;
20  end
21  A
22  m
23
24  %% Slide 35
25
26  m = 0;
27  A = 10;
28  while A > 0
29      A = sqrt(A);
30      m = m + 1;
31  end
32  A
33  m
34  % this will print an infinite loop. A screenshot will be included.
```

Command Window

New to MATLAB? See resources for Getting Started.

```
     7


A =

   12.5000


m =

     3
```

Workspace

Name	Value
A	10
m	0

Busy

Zoom: 100% UTF-8 CRLF script Ln 31 Col 1

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5:25 PM
9/21/2023

MATLAB R2022b - academic use

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Current Folder

Name
- html
- fortest.m
- iftest.m
- Problem4_4.m
- Problem4_6.m
- sinewave.m
- slidespg33_35.m
- whiletest.m

Problem4_6.m (Script)

Problem 4.6 - For the account describedf in Problem 4.4, write a MATLAB program with a while loop to determine the number of years required for the amount in the account to reach $5,000.

Problem 4.6 - For the account describedf in Problem 4.4, write a MATL...

Editor - C:\Users\vfmenna\Documents\MATLAB\slidespg33_35.m

slidespg33_35.m

```
5   A = 20;
6   while A <= 50
7       A = A + 5;
8       m = m + 1;
9   end
10  A
11  m
12
13  %% Slide 34
14
15  m = 0;
16  A = 100;
17  while A > 15
18      A = A/2;
19      m = m +1;
20  end
21  A
22  m
23
24  %% Slide 35
25
26  m = 0;
27  A = 10;
28  while A > 0
29      A = sqrt(A);
30      m = m + 1;
31  end
32  A
33  m
34  % this will print an infinite loop. A screenshot will be included.
```

Command Window

New to MATLAB? See resources for Getting Started.

```
A =

   12.5000


m =

     3

Operation terminated by user during slidespg33_35

>>
```

Workspace

Name	Value
A	1
m	6.7424e+09

Zoom: 100% UTF-8 CRLF script Ln 31 Col 1

Type here to search

5:25 PM 9/21/2023

Problem 4.4 - Suppose that $1,000 is deposited into an account that pays 5% interest per year. At the end of each year, the amount in the account is 1.05 times the amount at the beginning of the year.

Write a MATLAB program with a for loop to calculate the amount in the account after 10, 20, and 30 years.

```
%N=input("How many Years");
N=10;
N2=20;
N3=30;
Money=1000;
Year=1;

for Year = Year:N
    Money=Money*1.05;
end
display (Money);

Money=1000;
Year=1;

for Year = Year:N2
    Money=Money*1.05;
end
display (Money);

Money=1000;
Year=1;

for Year = Year:N3
    Money=Money*1.05;
end
display (Money);
```

```
Money =

   1.6289e+03


Money =

   2.6533e+03


Money =
```

```
4.3219e+03
```

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Problem 4.6 - For the account describedf in Problem 4.4, write a MATLAB program with a while loop to determine the number of years required for the amount in the account to reach $5,000.

```
%N=input("How much Money");
N=5000;
Money=1000;
Year=1;

while Money < N
    Money=Money*1.05;
    Year=Year+1;
end
display (Year);
```

```
Year =

    34
```

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