MATLAB See Documentation online , check code in browser

The MATLAB part is more focused on

- Functions
- Types of functions

https://www.mathworks.com/help/matlab/matlab_prog/types-of-functions.html

- Function definition

  http://cse.unl.edu/~sincovec/Matlab/Lesson%2013/CS211%20Lesson%2013%20-%20Function%20Types%20and%20Scope.htm

- function scope

  http://cse.unl.edu/~sincovec/Matlab/Lesson%2014/CS211%20Lesson%2014%20-%20Variable%20Scope%20and%20Lifetime.htm

- nested functions

  https://www.mathworks.com/help/matlab/matlab_prog/nested-functions.html

- Function precedence order

https://www.mathworks.com/help/matlab/matlab_prog/function-precedence-order.html

- @Function handle,

  https://www.mathworks.com/help/matlab/matlab_prog/creating-a-function-handle.html

- Workspace global persistent -> to save variable .MAT before close

  https://www.mathworks.com/help/matlab/matlab_prog/share-data-between-workspaces.html

- Plot (hold on, plotyy, subplot), Grid, plotting,

https://www.mathworks.com/help/matlab/ref/plotyy.html

- TIC TOC

Time Portions of Code

To estimate how long a portion of your program takes to run or to compare the speed of different implementations of portions of your program, use the stopwatch timer functions, `tic` and `toc`. Invoking `tic` starts the timer, and the next `toc` reads the elapsed time.

```
tic
   % The program section to time.
toc
```

Time of funcions

```
f = @() myComputeFunction; % handle to function
timeit(f)

INTERNAL TIMER VALUE CAN BE ANYTHING NOT ZERO ALWAYS
```

- Anonymous function,

  https://www.mathworks.com/help/matlab/matlab_prog/anonymous-functions.html

- How to improve performance of a MATLAB program (prompted me to preallocation, vectorization), .* vs *,

  Ans –

Preallocation: If the matrix size is not defined prior to populating it with data through a FOR loop, memory fragmentation problems may happen since MATLAB is not aware of the final matrix size upon the conclusion of the FOR loop. Zeros(3) => 3x3 matrix

Vectorisation – speedup

- Mex functions in MATLAB

  You can call your own C, C++, or Fortran subroutines from the MATLAB® command line as if they were built-in functions. These programs, called binary *MEX files*, are dynamically linked subroutines that the MATLAB interpreter loads and executes. The MEX file contains only one function or subroutine, and its name is the MEX file name. To call a MEX file, use the name of the file, without the file extension

- Difference between plot () and stem ().

- You have A=3x3 matrix, and you want to multiply each column with diff. number, i.e. A= [1 2 3;4 5 6; 7 8 9] you want [2 6 12;8 15 24;14 24 36]? You can use row vector [2 3 4]

- Ans .*

- Repmat

```
A =

   100     0     0
     0   200     0
     0     0   300
B = repmat(A,2,3)
B =

   100     0     0   100     0     0   100     0     0
     0   200     0     0   200     0     0   200     0
     0     0   300     0     0   300     0     0   300
   100     0     0   100     0     0   100     0     0
     0   200     0     0   200     0     0   200     0
     0     0   300     0     0   300     0     0   300
```

- Logical indexing

```
logInd = X < target              % X = randperm(20) target = 5;
% logind contains all 1 and 0 hence logical indexing
XtargetLogical = X(logInd)      % fetches the values of the 1s in logInd
```

https://blogs.mathworks.com/loren/2013/02/20/logical-indexing-multiple-conditions/

```
iseven = @(x) ~logical(rem(x,2)) % not(xmod2)
iseven(1:5)  % ans     0     1     0     1     0
```

- Cross product
- Can you have a file named “filter.m”?

  Ans - No already has builtin
- What is primary function and subfunction?(C)

  Primary is the main
- What is difference between nested function and subfunction?(C)

```
x = 1
  function t1 = intest(t)
    t1 = t + 10
  end
y = intest(x)
end
```

Here is the same code as a subfunction:

```
function t = test()
x = 1
y = intest(x)

function t1 = intest(t)
t1 = t + 10
```

You must be careful with scope in nested functions as all variables in the parent function are global to the nested function.

- Ans - nested functions-can access variables declared inside main functions.

- What is private function?

Ans - inside private folder

- What is hf=gca; [AXES]

  Ans - gca returns the current axes or chart for the current figure3https://www.mathworks.com/matlabcentral/answers/151633-gca-function-in-matlab

- What is gcf [FIGURE]
  Ans – current function handle

https://www.mathworks.com/help/matlab/ref/gcf.html

"gcf, gca" is for handle for the current figure and axis

- What is event function call back? (DA)

  https://www.mathworks.com/help/matlab/matlab_external/events-and-callbacks.html

- How to access data members of a structure?

  https://www.mathworks.com/help/matlab/matlab_prog/access-multiple-elements-of-a-nonscalar-struct-array.html

- What are cell arrays?

  https://www.mathworks.com/help/matlab/matlab_prog/access-data-in-a-cell-array.html

- C1= {}

- C2= {}
- what is C1()
- Cell indexing -> access small part of cell
- what is C1{}
- Content indexing ->acess values and can change them values _>double

- What is this code doing?

  mystruct =struct('field1',{1,2,3}... 'field2',{4,5,6});

  Creates a structure array with n fields

```
field1 = 'f1';  value1 = zeros(1,10);
field2 = 'f2';  value2 = {'a', 'b'};
field3 = 'f3';  value3 = {pi, pi.^2};
field4 = 'f4';  value4 = {'fourth'};

s = struct(field1,value1,field2,value2,field3,value3,field4,value4)
s = 1x2 struct array with fields:
    f1
    f2
    f3
    f4
```

  1x2 here depends on values not fields

  https://www.mathworks.com/help/matlab/ref/struct.html

- 3. gca and gcf and how to change the different properties listed under these functions.

Ans - Using operator, get, set

- Explain the reason why a script runs slow and give necessary solutions to overcome the issue.
- Matlab loop optimization

- Types of memory

  https://www.mathworks.com/help/matlab/matlab_prog/strategies-for-efficient-use-of-memory.html

7) row Indexing and column indexing - A= [1 2 3 4] ; B= [5;6;7;8]; which is valid A(2) , B(2) ?

Ans - Both are valid and give result 2,6.

8)Does matlab have 0 indexing.?

Ans- No it starts with 1

10 function result=testfunc(a)

```
 reciprocal = 1/a;
 result = 2*reciprocal;
end
```

What will happen when I execute the following statements:

```
>> a=3;
>>testfunc(a)
>>reciprocal
```

Ans) reciprocal wont execute since its not in base-workspace .

Output of A(B>0), A and B both some matrix)

a. Program using element wise multiplication operator.

b. Program using FIND operator.

c. duplicate name of functions,

Ans - separate file or else error

g. Concatenation of arrays,

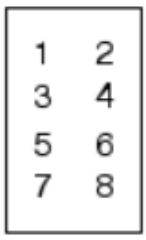
h. horzcat command

Given

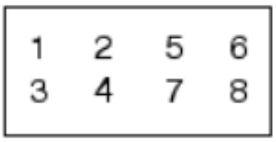
```
A =                 B =

     1     2                 5     6
     3     4                 7     8
```

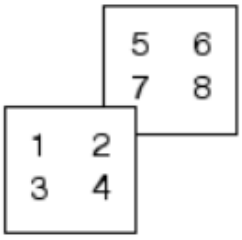
concatenating along different dimensions produces



C = cat(1,A,B)



C = cat(2,A,B)



C = cat(3,A,B)

The commands

```
A = magic(3); B = pascal(3);
C = cat(4, A, B);
```

produce a 3-by-3-by-1-by-2 array.

- `B(1:3:16) = -10`
- `B =`
- `   -10     2     3   -10`
- `     5    11   -10     8`
- `     9   -10     6    12`
- `   -10    14    15   -10`

- Is this matrix invertible? (The interviewer gave me a matrix and I had to tell him if it was invertible or not and explain why)