Expected basic MATLAB skills - a checklist for MA50174

1. **General Management of a MATLAB session**:
   - Getting familiar with the role and layout of:
     command window, *editor*, *workspace*, and *command history*
   - Managing the *current folder* and *path*
   - The commands `clc`, `clear`, and "selective clening":

     ```
     clear variablename1 variablename2
     ```

   - the command `whos`
   - writing *comments* using `%`
2. **Defining** (1-dimensional, 2-dimensional) **matrices, and performing basic operations with them**:
   - special matrices:

     `eye`, `ones`, `zeros`, `rand`, `randn`
   - isolating notable parts of a matrix:

     `diag` (with variants, e.g., `diag(A, -1)`, `diag(A, 2)`)

     `triu`, `tril` (with variants, e.g., `triu(A, -1)`, `triu(A, 3)`, `tril(A, 1)`)
   - isolating elements, rows, and columns of a matrix:

     `A(i, j)`, `A(i, :)`, `A(:, j)`, `A(2:5, 4)`
   - operations with matrices:

     `A+B`, `A*B`, `A\B`, `A/B`,

     and the functions:

     `sum`, `norm`, `det`, `size`
   - point-wise operations with matrices and vectors (including scalar products of vectors):

     `A.*B`, `A.\B`, `x.*y`, `x'.*y`
   - defining equispaced vectors:

     `linspace(a, b, k)`, `logspace(a, b, k)`, `a : c : b`
3. **loading data and saving data with MATLAB**:
   - the `input` command

- the `load` command to load `.mat` files
- the `save` command to save `.mat` files; "selective save" with:

```
save( 'filename', 'variablename1', 'variablename2' )
```

4. **producing and managing MATLAB files**:
   - getting familiar with MATLAB scripts and MATLAB functions: how to write them, how to run them, understand the basic difference between them.
     Note: a MATLAB function

     ```
     function [output1, output2] = functionname(input1, input2)
     ```

     should be saved as `functionname.m`. Also, be aware that variables in functions are local.
   - executing functions and scripts
5. **displaying and graphing data in MATLAB**:
   - displaying formats for data:

     `format long`, `format short`, `format short e`
   - the use of the semi-column (`;`) to avoid displaying an output
   - generating and managing graphs
     - the commands `plot`, `semilogy`, `semilogx`
     - line specifications: `LineSpec`
     - the `hold on` and `hold off` commands
     - plotting surfaces and/or elements of a matrix: `surf`, `imagesc`
6. **programming with MATLAB**:
   be aware of the use and differences between the following:

   `if-else`, `if-elseif-else`, `while`, `for`
7. **logical instructions**:
   - logical relations and statements: `==`, `~=`, `>=`, `<=`, `>`, `<`
   - relational operators: `&&`, `||`, `~`
   - isolating elements of a matrix satisfying logical conditions, e.g.,

     ```
     if A(i, j)<=5, A(i,j) = 0, end
     ```

     or, in a more advanced way: `A(A <= 5) = 0`
8. **Getting help from MATLAB**:
   - understanding *error* and *warning* messages
   - the command `help`
   - the command `doc`