Matlab Lecture 1

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Clean up

```
close all, clear, clc
```

Absolute Basics

To get used to the MATLAB Command Window please type in the follwing and understand the output:

```
a
```

```
Undefined function or variable 'a'.
```

Error message: You have not defined any variable `'a'` by now.

Type in:

hello

```
Undefined function or variable 'hello'.
```

The same for the variable `'hello'`.

Type in:

hello world

```
Undefined function 'hello' for input arguments of type 'char'.
```

```
1
```

```
ans =

     1
```

```
2
```

```
ans =

     2
```

```
ans
```

```
ans =

     2
```

First commands

- `clc`: clears the screen
- `ans` has the value of the last result (ans = 2)
- `clear`: deletes the workspace
- `clear ans` only deletes this item

```
ans
```

```
ans =

     2
```

```
1 + 2
```

```
ans =

     3
```

```
ans + 10
```

```
ans =

    13
```

```
ans + ans
```

```
ans =

    26
```

```
ans - ans
```

```
ans =

     0
```

```
1 + 2 + 3 + 4 + 5
```

```
ans =

    15
```

Two key bindings

- press up : last input
- press up again: back in history

Try to play with it. Use the examples that are given to you during the lecture or invent your own.

Vector operations

```
a = [1 2 3]
```

```
a =

     1     2     3
```

```
b = [4 5 6]
```

```
b =

     4     5     6
```

```
a + b
```

```
ans =

     5     7     9
```

```
a - b
```

```
ans =

    -3    -3    -3
```

```
a * b
```

```
Error using *
Inner matrix dimensions must agree.
```

```
c = [4;5;6]
```

```
c =

     4
     5
     6
```

```
d = b'  % Transposes the matrix
```

```
d =

     4
     5
     6
```

```
a * c
```

```
ans =

    32
```

```
a * b'
```

```
ans =

    32
```

```
a .* b  % elementwise multiplication
```

```
ans =

     4    10    18
```

Matrix Multiplication, Elementwise Multiplication

```
A = [1 2; 3 4; 5 6]
```

```
A =

     1     2
     3     4
     5     6
```

```
B = [7 8 9; 10 11 12]
```

```
B =

     7     8     9
    10    11    12
```

```
C = [7 8; 9 10; 11 12]
```

```
C =

     7     8
     9    10
    11    12
```

```
A * B
```

```
ans =

    27    30    33
    61    68    75
    95   106   117
```

```
A * C
```

```
Error using *
```

```
Inner matrix dimensions must agree.
```

There is an error because auf the definition of multiplication of matrices

```
A .* C  % elementwise multiplication
```

```
ans =
```

```
     7    16
    27    40
    55    72
```

Adressing of Elements

```
A = [1 2; 3 4; 5 6]
```

```
A =

     1     2
     3     4
     5     6
```

```
B = [7 8 9; 10 11 12]
```

```
B =

     7     8     9
    10    11    12
```

```
A * B
```

```
ans =

    27    30    33
    61    68    75
    95   106   117
```

```
ans(1)
```

```
ans =

    27
```

wrong input

Try: `ans(2)`

```
ans(2)
```

```
Index exceeds matrix dimensions.
```

What happened? `ans` has changed!

correct input

```
result = A * B
```

```
result =

    27    30    33
    61    68    75
    95   106   117
```

```
result(1)
```

```
ans =

    27
```

```
result(2)
```

```
ans =

    61
```

```
result(3)
```

```
ans =

    95
```

```
result(4)
```

```
ans =

    30
```

```
result(9)
```

```
ans =

   117
```

wrong input

```
result(10)
```

```
Index exceeds matrix dimensions.
```

correct input

```
result(1,1)

        ans =

            27

result(1,2)

        ans =

            30

result(2,1)

        ans =

            61

result(3,3)

        ans =

           117
```

wrong input

```
result(4,3)
Index exceeds matrix dimensions.
```

correct input

```
result(1:3)

        ans =

            27    61    95

result(1:4)
```

```
ans =

    27    61    95    30
```

```
result(1,1:3)
```

```
ans =

    27    30    33
```

```
result(1:3,1)
```

```
ans =

    27
    61
    95
```

Saving data/variables/constants

```
save    % will save "matlab.mat" to the current folder
```

```
Saving to: C:\Schellenberg\HS\Lehre\EP\Programmieren\Matlab_Lecture\2016\L
```

```
clear   % will delete the workspace
load    % loads all saved data back in the workspace
```

```
Loading from: matlab.mat
```

```
save matlab_lecture_1.mat       % will do the same with a filename of your
                                % choise
clear                           % will clear all variables
load matlab_lecture_1           % will load the variables
                                % inside |matlab_lecture_1|
save('A_and_B.mat', 'A', 'B')   % saves the only the matrices A and B
clear
load A_and_B                    % loads only matrices A and B
```

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