Lab #1

Contents

1 Command line basics

1.1 The most important windows in Matlab

- Workspace
- Command window
- Script editor

1.2 Changing working directory

Use "Current folder" window or `cd` command (for more information see `https://se.mathworks.com/help/matlab/ref/cd.html`).

1.3 Simple Matlab commands

```
3 + 5
3 * 4
4 ^ 2

sin(pi/2)

disp('Hello, World!')
```

1.4 Semicolons

Semicolon suppresses output of the code line.

Without a semicolon Matlab will print the result of the command execution.

```
>> sin(pi/2)

ans =

     1

>>
```

When we use a semicolon Matlab suppresses the output.

```
>> sin(pi/2);
>>
```

1.5 help function

Shows information about functions. For example: `help sin`

1.6 doc function

The same as help, but looks better. For example `doc sin`

1.7 Creating variables

```
a = 5
b = 10/2

salary = 1200;
taxes = 110;
salary_after_taxes = salary - taxes;

num_employees = 10;
total_salary = salary * num_employees;

disp(total_salary);

text = 'Hello, World!';
disp(text);

room_name = 'TP4403';
courseName = 'TNSL20';
```

Variables can be observed in the Workspace pane.

1.8 Special variable ans

```
5 * 5
disp(ans);
```

1.9 Variables names

Requirements for naming a variable are as follows:

- first character must be a LETTER
- after that, any combination of letters, numbers and _
- CASE SENSITIVE! (var1 is different from Var1)

1.10 Do not use these variables names

- i, j - they can be used for complex numbers

- pi
- ans
- Inf
- NaN

1.11 clear command

Clears the current workspace (i.e., deletes all variables from it)

```
clear;
```

2 Scripts

2.1 Write a script

```
% everything after percent sign until the end of the line is ignored by Matlab
clear; % clears workspace (deletes all variables from it)

profit = 1200; % Profit from selling an item in US dollars
sold = 20; % Number of sold items
owners = 3; % How many people share profit

profit_per_owner = (profit * sold)/owners; % Profit of each owner

disp('The profit per owner is:');
disp(profit_per_owner);
```

Matlab executes all commands line by line from top to bottom each time you run the script.

2.2 Importance of clear

Unlike many other programming languages, Matlab keeps all variables in the workspace even after the end of the script execution, unless `clear` command

is called. If we forget to use `clear`, it may lead to potential mistakes. For example, try to initialize variable `a = 10;` and then try to run the following script several times

```
a = a + 1;
disp(a);
```

You may observe that variable `a` saves the value of the variable between runs and increases it each time.

2.3 Debugging (breakpoints)

You can put breakpoint on a line and Matlab will pause before executing this line. You can check the state of all variables, change them, etc. In order to continue, you can use either "Continue" button or "Step" button. "Continue" button (shortcut F5) allows to run through breakpoints, so Matlab continues execution of code until the next breakpoint. "Step" button (shortcut F10) executes only one line and stops before executing the next line. "Step" button can be used to run the code line by line.

3 Task #1

You own a food delivery company. You have 6 couriers: 4 couriers on cars and 2 couriers on bicycles.

Salary of couriers with a driving license is 1500$/month. Without - 1200$/month. You have to pay 40% of their salary to the tax agency.

Also, the maintenance cost is 400$/month for each car, and 100$/month for each bicycle.

Write a script which computes and prints separately:

- What is the total salary of all employees before taxes?
- What is the total salary of all employees after taxes?
- What is the total maintenance cost?
- What is the total cost of maintenance and salaries after taxes?

Please use as many variables as you can, do not repeat calculations. Write comments in your code. Name variables so that you will be able to open this code after several years and understand what is going on there. Save the script somewhere in your student folder so that you do not loose it.

For the given input, the results should be

```
Total salary before taxes is:
        8400

Total salary after taxes is:
       11760

Total maintenance cost is:
        1800

Total cost is:
       13560
```