NB! The aim of this practice session is experimenting, even if you may not know yet what this or that programming construct does. Absolute correctness of solutions is not necessary.

Also, the set of practice problems will always be somewhat larger, so that those who are quicker or more experienced have something to do. Don’t worry if you don’t reach the end.

0. Start Survey

If you haven’t done so already, please fill the Start survey in Moodle. If you haven’t solved the Preparation quiz, please solve it.

1. Programming Workflow

Let’s start with an overview how to write programs in Thonny. You should have Thonny (https://thonny.org/) installed on your computer.

   a. Start Thonny.
   b. Enter the following program into the main window of Thonny:

```python
s = input("Enter your birth year: ")
x = int(s)
y = 0
while x > 0:
    y += x % 10
    x //= 10
print(y)
```

c. Save the file under the name prog1.py and run it.

Write here what the program prints if you enter your birth year:

Look carefully at the program code. Test the program with different birth years. What do you think, what does this program do? Write below:
2. Greeting the User

The command `input(text)` prints the text and then waits for user input. After the user has entered something, the command produces the value that can be assigned to a variable like in the program above.

The command `print(text)` prints the text. If a variable is written into the parentheses instead of text, the command prints out the value of that variable. The command `print(text1, text2)` prints two texts separated by a space, etc.

Using the commands `input` and `print`, write a program that asks the user for his/her name and then prints a greeting, calling the user by name.

Example

What is your name? Martin
It's been ages since I've seen you, Martin!

Was this problem easy or hard? Write below how much time you needed to solve this problem.

3. Identifying Seasons

When writing a program it often happens that mistakes and errors occur in the program. Python tries to give as much information as it can to help you to correct the mistakes.

Somebody has tried to write a program that asks the user for month number and then prints the name of season where this month belongs to. For example, if the user enters 9, then the program should print autumn. The program is here: https://courses.cs.ut.ee/2019/nkp/fall/uploads/Main/seasons.py.

Correct the errors and complete the program yourself. After you have tested the program thoroughly, submit it for automatic testing in Moodle.

Hints

- Check whether the parentheses are balanced
- Check whether all commands are written correctly
- Try to figure out in what places the colons should be
- Try to understand where quotation marks should be
- ≤ is written as `<=` in Python; ≥ is written as `>=`; equality is written as `==`
4. Python documentation

Open the documentation of the *math* module: [http://docs.python.org/3/library/math.html](http://docs.python.org/3/library/math.html).

Study the functions *floor* and *ceil*. Find some “vivid” arguments to these functions that demonstrate the difference of them from rounding. Write these arguments together with the values of the function in the following table (the first row has already been filled).

Select another two interesting functions from the *math* module and fill the last four rows of the table in a similar way (for example, you can try the constants *tau* and *inf* as arguments: what do they mean?).

<table>
<thead>
<tr>
<th>Function name</th>
<th>Argument</th>
<th>Function value</th>
</tr>
</thead>
<tbody>
<tr>
<td>floor</td>
<td>13.3</td>
<td>13</td>
</tr>
<tr>
<td>floor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ceil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ceil</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. Pizza price

Write a program that prompts the user for the diameter and price of the pizza. The program calculates the price of a square centimeter of the pizza in cents and prints out the result.

What is the diameter of your pizza? 20  
How many euros does it cost? 5  
One square cm of your pizza costs 1.5915494309189533 cents.

Now imagine that somebody asks you to write a program that computes the price of some other unit of area of the pizza that has some other shape than round. Write in your own words what needs to be changed in your program if:

- we need to calculate the price of round pizza per square inch instead of square centimeter
- the shape of the pizza is rectangular instead of round
6. Minesweeper

Download and open the script of the game https://courses.cs.ut.ee/2019/nkp/fall/Main/Minesweeper. Study the code and try to map for yourself what you think you understand and what you should learn more.

Describe in 2-3 sentences the general structure of the program:

Make some changes in the program (increase or decrease the number of mines, change image files etc.).

At the end of session

Please submit your programs in Moodle.