NESTED LOOPS
Second test

- On May 2, 2016, during practice session
- Duration is 90 minutes
- Covers topics from Weeks 7 to 11
- First part is small quiz consisting of questions similar to those in weekly quizzes
- Second part consists of programming tasks similar to those in homeworks and practice sessions
- Materials are not allowed in the first part but are allowed in the second part
- Programming tasks must be solved in Thonny
Retake of the second test

- Format is the same as in the main test
- Best attempt counts
- Two possibilities: at 14:15 and at 16:15
- Date not fixed yet: either May 9, 2019 or May 16, 2019
Nested loops

for variable1 in list1:
    statements1
    for variable2 in list2:
        statements2
        statements3

for i in [1, 2, 3]:
    for j in [4, 5, 6]:
        print(i*j)
    print()
Nested lists

• Nested list is a list of lists:
  \[ m = [[1, 2, 3], [4, 5, 6], [7, 8, 9]] \]

• Getting the row:
  >>> m[1]
  [4, 5, 6]

• Getting the element:
  >>> m[1, 2]
  6
Data structures

• Primitive types: values cannot be decomposed into smaller units. For example: int, float, bool.
• Non-primitive types (data structures): contain other values in a structured way. For example: list, str.
• Possibilities to construct new data structures are endless. For example: list of lists of lists etc.
Other common data structures

• **Tuple.** Like an array but nonmutable.
  \[ t = (6, -2, 3) \]

• **Set.** Collection of unique elements where order is unimportant.
  \[ s = \{ 2, 4, 6 \} \]

• **Dictionary.** Set of key-value pairs.
  \[ d = \{ 'day': 25, 'month': 4, 'year': 2019 \} \]
Algorithms and data structures

• Data structures represent „passive part“ of programming. They describe how data are organized.
• Algorithms represent „active part“ of programming. They describe what needs to be done with the data.
• Good program has both parts implemented in an efficient way.