TUPLES AND SETS
Tuples

Tuple is an immutable list.

tuple = (element1, element2, element3, ...

point = (2, -3)

point3d = (-2, 1, 3)

person = ("Eve", "Truu", 1996, "Tartu")
Immutability

Immutable means that its value cannot be changed.

Tuple is immutable:
• Values of individual elements cannot be changed.
• Elements cannot be added or removed.
• Once created, the tuple remains as it is until the end of the program.
Operations with tuples

• Accessing elements

\textit{t}uple[\textit{index}]  \hspace{1cm} \texttt{t = ("red", "green", "blue")}
\hspace{1cm} \texttt{print(t[2])}

• Checking existence

\texttt{if} \textit{element} \texttt{in} \textit{tuple}:
\hspace{2cm} \texttt{if "green" in t:}
\hspace{3cm} \texttt{print("yes")}
\hspace{2cm} \texttt{else:}
\hspace{3cm} \texttt{print("no")}
Looping through a tuple

• Loop over indices
  
  ```python
  for i in range(len(tuple)):
    ...
  ```

• Loop over elements
  
  ```python
  for el in tuple:
    ...
  ```

  ```python
  for i in range(len(t)):
    print(t[i])
  ```

  ```python
  for el in t:
    print(el)
  ```
Multiple return values

```python
def funcname(args):
    statements
    statements
    return (var1, var2)

def findmin(a):
    val = 1000
    for i in range(len(a)):
        if a[i] < val:
            val = a[i]
            ind = i
    return (val, ind)
```
Sets

Set is an unordered collection of elements.

```python
set = {
    element1,
    element2,
    element3,
    ...
}
```

towns = {
    "Tallinn",
    "Tartu",
    "Narva",
    "Pärnu",
    "Viljandi"
}

Empty set is created with `set()`
Adding and removing elements

```
set.add(element)          towns.add("Rakvere")

set.remove(element)      towns.remove("Pärnu")
```
Checking the elements in a set

```python
if element in set:
    ...

for element in set:
    ...

len(set)
```

```python
if "Tapa" in towns:
    print("yes, found")

for t in towns:
    print(t)

print(len(towns))
```
Set operations

A & B     Intersection of sets A and B
A | B     Union of sets A and B
A - B     Difference of sets A and B
A ^ B     Symmetric difference of sets A and B
A <= B    A is subset of B
A >= B    A is superset of B
Questions
Review exercise

• Click on “Join room” on the new tab
• Open “Review exercise” in Moodle
• To discuss with others, use the chat or switch on your microphone.
• Pay attention to the time limit!
Solutions of the review exercise
Programming tasks