TUPLES, SETS
Final exam dates

January 6, 12:15 – exam
January 20, 12:15 – exam
January 27, 12:15 – retake
Tuples

Tuple is an immutable list.

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

point = (2, -3)
point3d = (-2, 1, 3)
person = ("Eve", "Truu", 1996, "Tartu")
Operations with tuples

- Accessing elements
  \[ \text{tuple}[\text{index}] \]
  ```python
t = ("red", "green", "blue")
print(t[2])
```

- Checking existence
  ```python
  if "green" in t:
    print("yes")
  else:
    print("no")
  ```
Looping through a tuple

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

• Loop over elements
  ```python
  for el in tuple:
      ...
  ```
def funcname(args):
    statements
    return (var1, var2)
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.
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

```python
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