

# Tuples

- Example (multiple elements):  $T = (1, 2, 3)$
- Example (single element):  $T = (1,)$
- Like lists, but **immutable** - cannot be modified once they are created
- Tuples are immutable, but elements can be pointers to mutable data
  - Example:  $T = ([1, 2], 3)$
  - Therefore, not guaranteed to be hashable

# Dictionaries

- Have already seen these:  $D = \{ 'a' : 1, 'b' : 2, 'c' : 3 \}$
- Similar to sets, but instead of just storing an element in the hash table, store two elements
- First element is used for lookups (key), second is the associated data (value)
- $O(1)$  lookup,  $O(1)$  insert/delete
- Same restrictions on hashing as sets