

# Laboratory 14: Comprehension in Action

## A. Using zip

Recall that `zip` is an *aggregator*, its inputs are a number of iterables (such as lists or sets) and it returns an iterator, a list-like element, that consists of tuples, whose components are taken successively from the arguments.

`zip` is really an advanced topic (not to be included extensively on the examinations), but learning about it helps learning about dictionaries, sets, and comprehension in general. This is a part of Python that allows us to write very short programs doing really powerful stuff.

### 1. Create two lists of length 4 and 5 and print out the result of their zip.

Answer:

```
>>> list1 = [1,2,3,4]
>>> list2 = ["a", "b", "c", "d", "e"]
>>> print(zip(list1, list2))
<zip object at 0x1054b8388>
>>> for item in zip(list1, list2):
    print(item)

(1, 'a')
(2, 'b')
(3, 'c')
(4, 'd')
```

The result of the `zip` is an iterator, a “zip object”. We can display its contents using a for-loop or we can make the zip object into a list and display the list. A zip object is really a generator and as such, it creates a single chance to pass through it with a for loop.

### 2. Create two lists of length 4 and 5, save their result in a variable, and then try printing out the result twice.

Answer:

```
>>> list1 = [1,2,3,4]
>>> list2 = ["a", "b", "c", "d", "e"]
>>> zo = zip(list1, list2)
>>> print(zo)
<zip object at 0x1054e94c8>
>>> for item in zo:
    print(item)

(1, 'a')
(2, 'b')
(3, 'c')
(4, 'd')
>>> for item in zo:
    print(item)
```

After using the zip object once, it is no longer generating new “next items”. Now try the same experience, but make the zip into a list by using list:

```
>>> zo = list(zip(list1, list2))
```

- 3. A dictionary uses a stock / ticker symbol (such as “AAPL” for Apple and “MSFT” for Microsoft) as keys and associates the price of the stock as value. Write methods that returns the biggest and the lowest stock price from the dictionary together with its ticker symbol.**

```
stock = {"AAL" : 25.41, "AMD": 29.67, "ADBE": 282.71,  
        "AMAT" : 47.16, "CDNS": 68.14, "CSCO": 46.25,  
        "EBAY": 39.44, "GOOG" : 1167.26}
```

Hint: If we just calculate `min(stock)` we get the smallest element in the keys of the dictionary, namely “AAL”. We can invert the dictionary by zipping the values and the keys of the dictionary, make a dictionary out of the result of the zip, and only then obtain the minimum value of the reversed dictionary. We do the same for the maximum.

- 4. Create a function that takes as input a list of tuples with three coordinates and that returns the three lists of coordinates.**