

# CS 171

## Lab Assignment 3

### Collection Data Types

This lab assignment uses many elements provided in the main bibliographic reference for these lectures:

Programming in Python 3

A Complete Introduction to the Python Language,  
2nd Edition,  
Mark Summerfield

## 1 Exercises

**Exercise 1** *Write a program that asks a string to the user, and counts the number of time each character occurs in the string.*

*An example of the execution of such program is:*

```
$ Please enter a string: program
[('p', 1), ('r', 2), ('o', 1), ('g', 1), ('a', 1), ('m', 1)]
```

□

**Exercise 2** *Repeat Exercise 1, but in such a way that the program outputs a set (but not using the `set()` function to convert from a list).*

*An example of the execution of such program is:*

```
$ Please enter a string: program
{('p', 1), ('r', 2), ('o', 1), ('g', 1), ('a', 1), ('m', 1)}
```

□

**Exercise 3** Repeat Exercise 1, but in such a way that the program outputs a dictionary (but not using the `dict()` function to convert from a list).

An example of the execution of such program is:

```
$ Please enter a string: program
{'p': 1, 'r': 2, 'o': 1, 'g': 1, 'a': 1, 'm': 1}
```

□

**Exercise 4** Each of the 4 students in a class has taken two exams. Implement a program that registers, in a multiple-subscripted collection, the number of each student and the grades he/she obtained. A possible set of values to store is:

| Number | Grade 1 | Grade 2 |
|--------|---------|---------|
| 10701  | 10      | 12      |
| 09001  | 5       | 15      |
| 10321  | 16      | 17      |
| 10452  | 8       | 11      |

Later, print the contents of the collection, as well as an extra column showing, for each student, the average of his/her two grades.

```
Student 1 number: 10701
Student 10701 grade 1: 10
Student 10701 grade 2: 12
```

```
Student 2 number: 09001
Student 09001 grade 1: 5
Student 09001 grade 2: 15
```

```
Student 3 number: 10321
Student 10321 grade 1: 16
Student 10321 grade 2: 17
```

```
Student 4 number: 10452
Student 10452 grade 1: 8
Student 10452 grade 2: 11
```

| Number | Grade 1 | Grade 2 | Avg  |
|--------|---------|---------|------|
| 10701  | 10      | 12      | 11.0 |
| 09001  | 5       | 15      | 10.0 |
| 10321  | 16      | 17      | 16.5 |
| 10452  | 8       | 11      | 9.5  |

□

**Exercise 5** *Having reached this point, you are strongly encouraged to:*

1. *Study in detail the example programs that are described in Chapter 3, Section Examples, starting on page 148 of the reference book;*
2. *Provide solutions to the exercises in the same Chapter, Section Exercises, which start on page 158.*

□

杨裔

18919801127  
yy@lzu.edu.cn