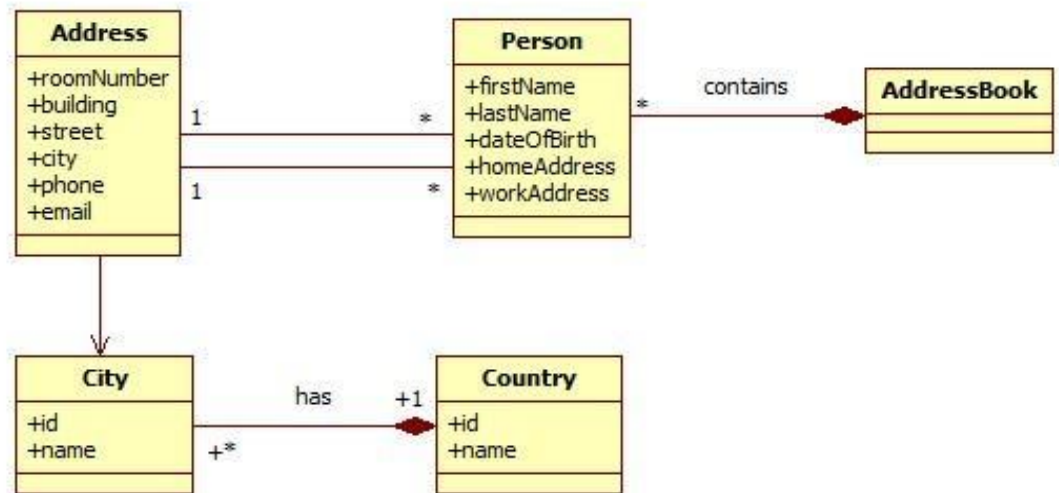# Exercise #4

Collections

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Introduction

This document is a specification for the exercise problems for the topic, C sharp Collections and Generics. It tests the student's level of knowledge and understanding of the topic.

This document consists of a set of problems that the student needs to solve and submit to the trainer, in the format specified in the Deliverable section of this document.

This exercise is to be performed only after the theory and workshop sessions of the topic; hence the student would have enough knowledge and confidence on the topic. Ideally, the student should be able to solve the problems himself; however, he can seek the assistance of the trainer or lab assistant in case he is stuck with a specific problem.

Objectives

The objectives of this exercise are to test the student's understanding and knowledge on the topic, and to allow him to re-iterate his understanding by applying that knowledge in a software problem, so that he can use it in the further C Sharp Programming endeavors.

Problem: Address Book

Develop an Address Book C sharp Program that contains the following domain objects and relationships.

Features to be developed

The program should have the following features.

The address book should contain minimum 25 persons and their addresses.
It should have a method to add new addresses.
It should have the following listing of addresses (home address)
City wise listing (Grouped by City)
Country-wise listing (Grouped by Country)
Country-wise listing with further order by city
Country-wise listing with further order by city, further order by firstName
Country-wise listing with further order by city, further order by age descending
A method that returns all persons who are older than 25 yrs.
A method that returns all persons working in the given city.
A method that returns all persons working in the given city, not older than 20 yrs.
Create a new address book that stores addresses grouped by country. (Hint: Map<Country, List<Person>>).
List the addresses for each country in the address book
Provide a method that accepts a set of addresses that belongs to different countries, and add to the address book.
Create another address book that does not allow two Persons with the same first-name and last-name in the same city (Hint: Set, with appropriate equal's method).
List the addresses in that address book.
Test and report what happens when a duplicate address is added(Persons with the same first-name and last-name in the same city)
List the addresses order by age.
The program can be an interactive one that lists the above functions and performs the appropriate function based on the user selection, or just a set of different classes that can be executed separately.

Deliverable

The entire program should be developed in a single Java Project and delivered as a zip archive.
The zip archive should be accompanied by a summary document in Microsoft Word format, with the following sections
List each feature specified in this document, and explains how it is implemented, with the class name and relevant method names
How to execute the program(s).

Demo

The student should demonstrate the program to the instructor on a PC, by explaining the features one by one.

Conclusion

The completion of this exercise should re-iterate the student's confidence on C sharp Collections Framework by testing each of the main classes and interfaces in the API. Please make sure you have gained enough confidence to move on.