

Develop a program that assists real estate agents. The program deals with listings of available houses. The information about a house includes its kind, the number of rooms, the asking price, and its address. An address consists of a house number, a street name, and a city.

Ranch, 7 rooms, \$375,000, 23 Maple Street, Brookline

Colonial, 9 rooms, \$450,000, 5 Joye Road, Newton

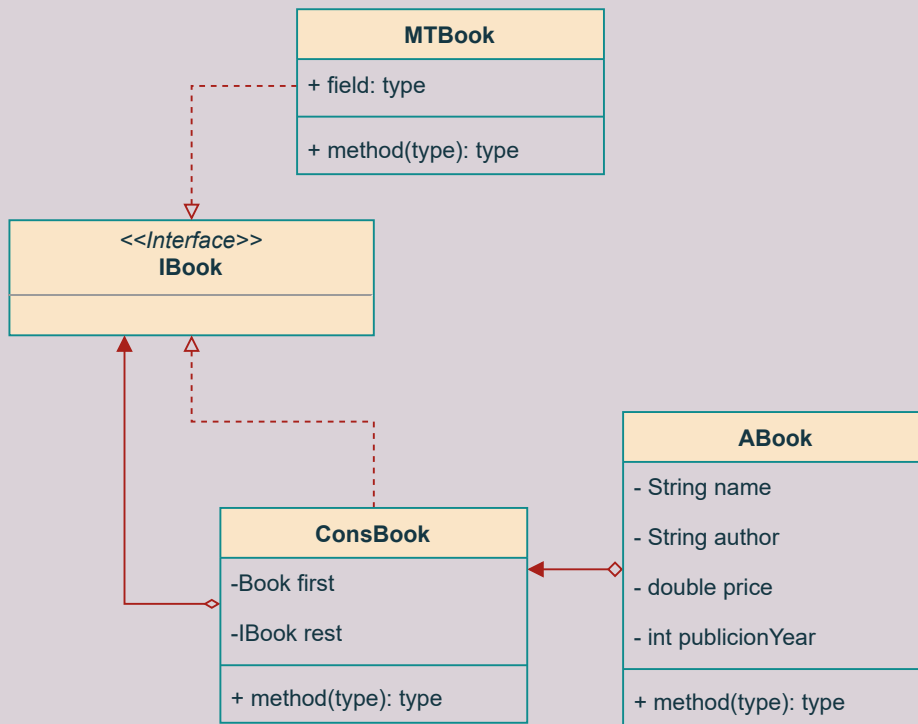
Cape, 6 rooms, \$235,000, 83 Winslow Road, Waltham

Make examples of listings.

Develop a data definition for listings of houses.

Implement the definition with classes.

Translate the examples into objects



Design a program that assists a bookstore manager with reading lists for local schools. . . For each book, the program should track the book's title, its price, its year of publication, and the author's name, ...

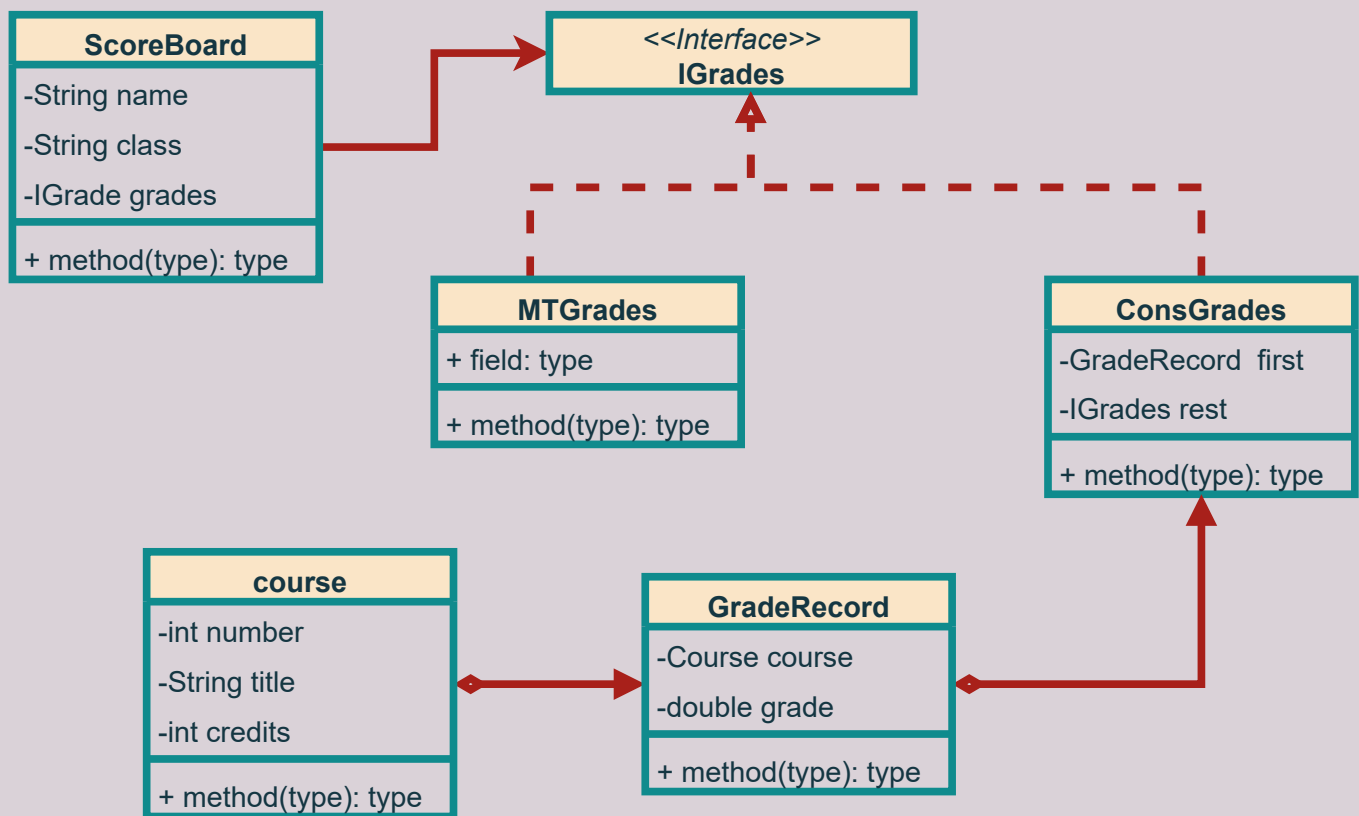
Daniel Defoe, Robinson Crusoe, \$15.50, 1719;

Joseph Conrad, Heart of Darkness, \$12.80, 1902;

Pat Conroy, Beach Music, \$9.50, 1996.

Develop a class diagram for a list of books (by hand).
Translate the diagram into classes.

Create two lists of books that contain one or more of your favorite books



Thông tin về điểm số của mỗi sinh viên được cho trong một bảng điểm. Mỗi bảng điểm (ScoreBoard) bao gồm tên sinh viên (name), khóa học (class), và một danh sách điểm số các môn học của sinh viên. Thông tin về điểm số (GradeRecord) của sinh viên bao gồm mã số môn học (number), tên môn học (title), số tín chỉ (credits) và điểm số (grade).

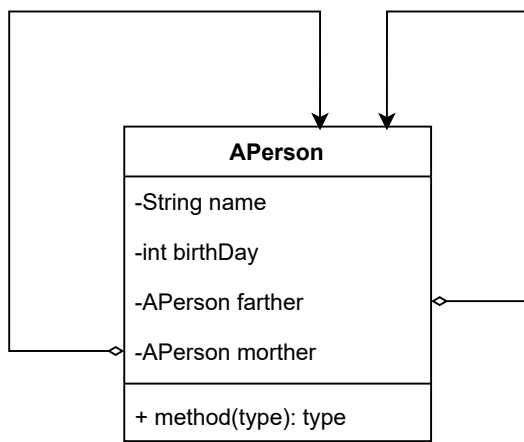
Ví dụ: một bảng điểm của sinh viên Tran Van Hoa, khóa 2009 gồm các mục điểm số:

211, "Database Fundamentals", 3, 7.5

220, "Basic Programming", 2, 5.0

690, "Algorithms", 4, 7.0

721, "Data Structure", 4, 8.0

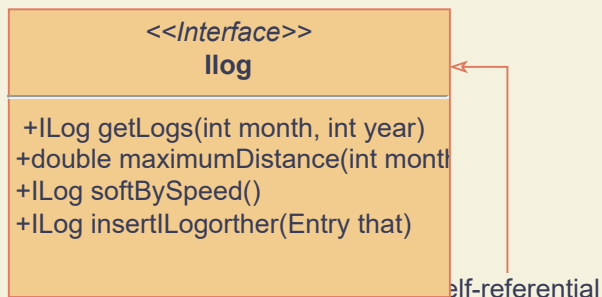


Develop a program that helps with recording a person's ancestor tree. Specifically, for each person we wish to remember the person's name and year of birth, in addition to the ancestry on the father's and the mother's side, if it is available.

The tree on the left is an example; the nodes with "???" indicate where the genealogist couldn't find any information.

Develop the class diagram and the class definitions to represent ancestor family trees.

Also draw your family's ancestor tree as far as known and represent it as an object.



5.5.1 Suppose the requirements for the program that tracks a runner's log includes this request: ... The runner wants to know the total distance run in a given month...

Design the method that computes this number

5.5.2 Suppose the requirements for the program that tracks a runner's log includes this request: ... A runner wishes to know the maximum distance ever run ...

Design the method that computes this number. Assume that the method produces 0 if the log is empty.

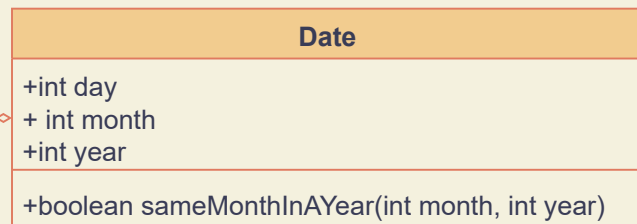
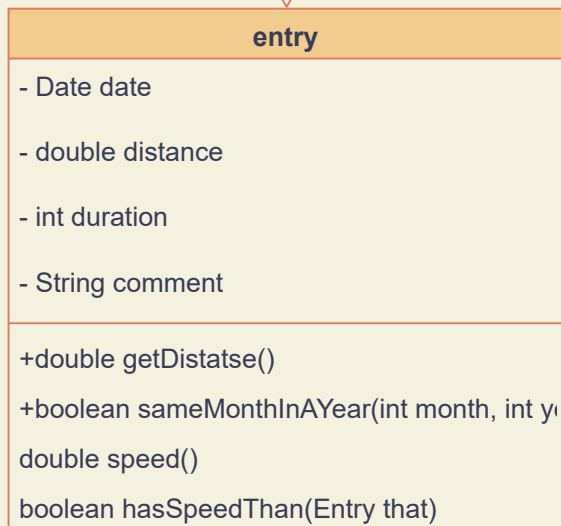
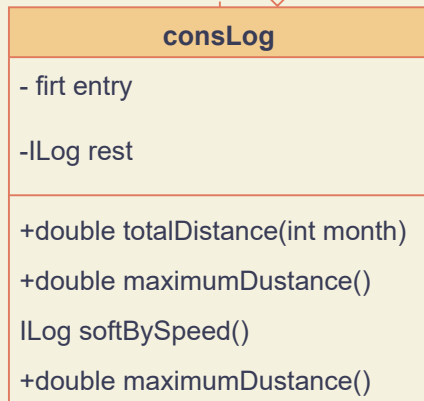
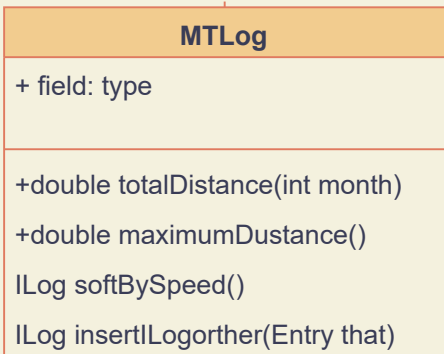
Exercise 5.5 (cont)

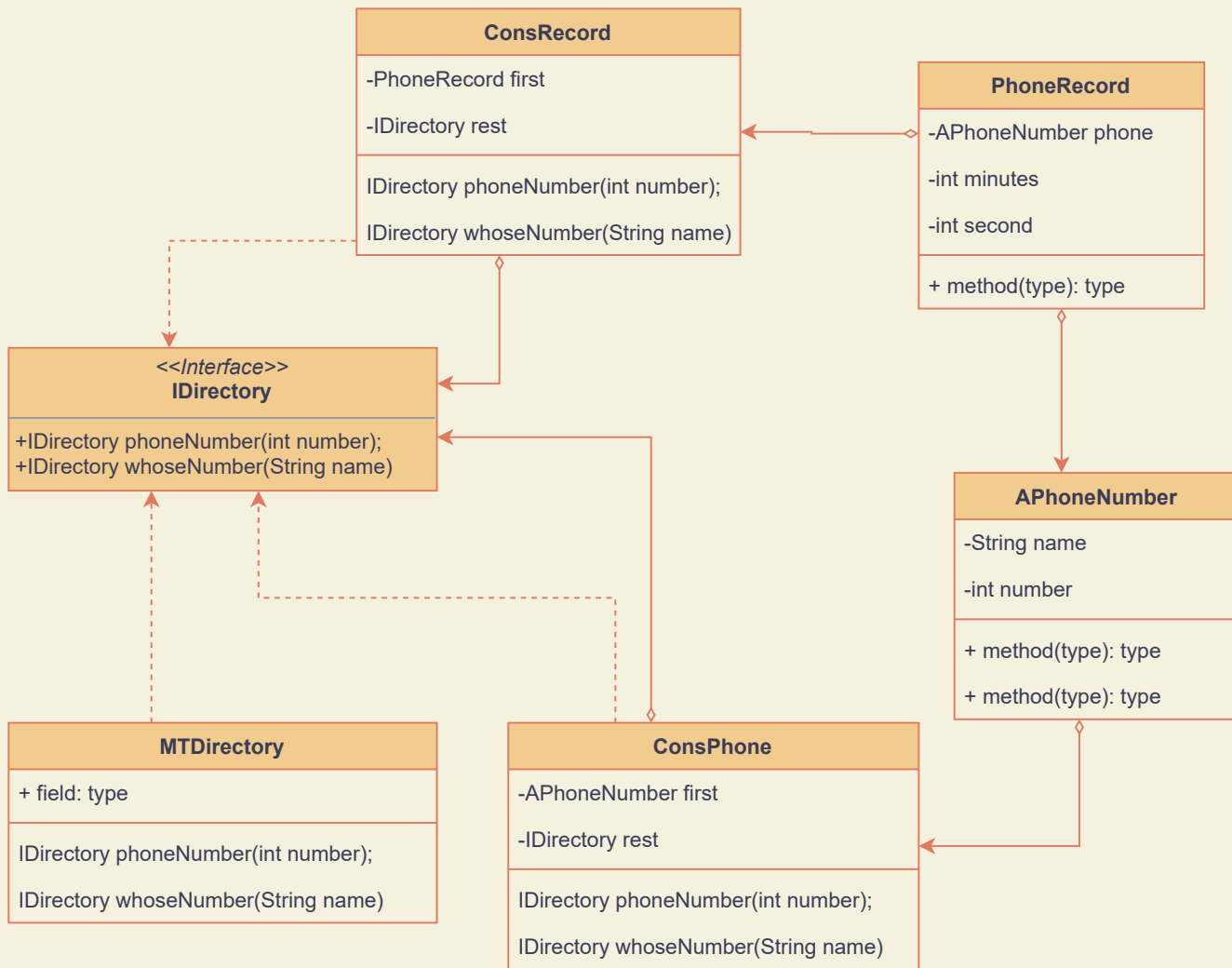
5.5.3 Suppose the requirements for the program that tracks a runner's log includes this request:

... The runner would like to see the log with entries ordered according to the pace computed in minutes per mile in each run, from the fastest to the slowest ...

Design this sorting method.

Hint: Don't forget to design methods for auxiliary tasks.

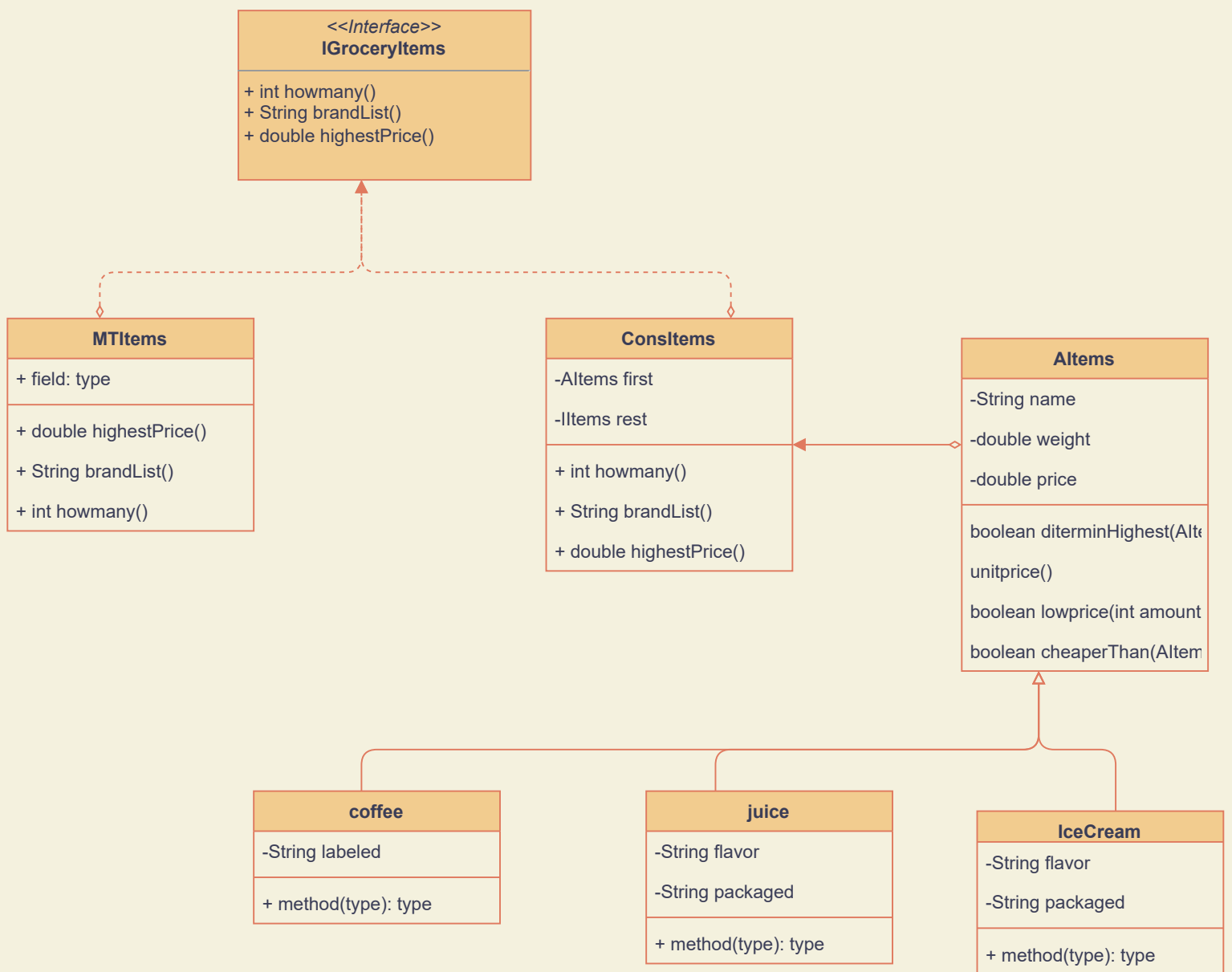




A phone directory combines names with phone numbers. Develop a data definition for phone records and directories.
Develop the methods:

`whoseNumber`, which determines the name that goes with some given phone number and phone directory.

`phoneNumber`, which determines the phone number that goes with some given name and phone directory



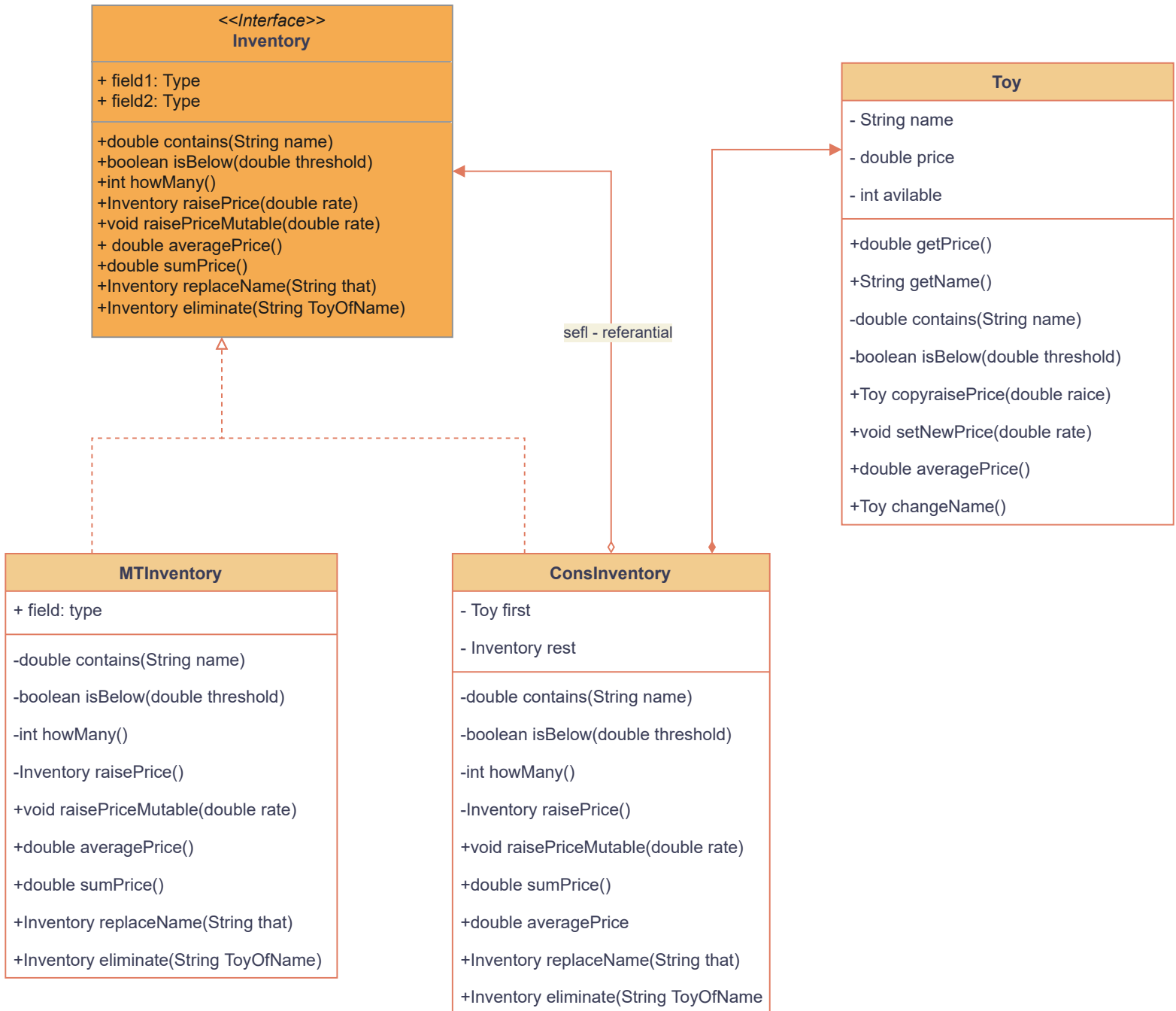
Design a data representation for shopping lists.

Start from the class of grocery items developed in exercise 4.6. Add the following methods:

howMany, which computes the number of items on the shopping list;

brandList, which produces the list of all brand names; and

highestPrice, which determines the highest unit price among all items in the shopping list.

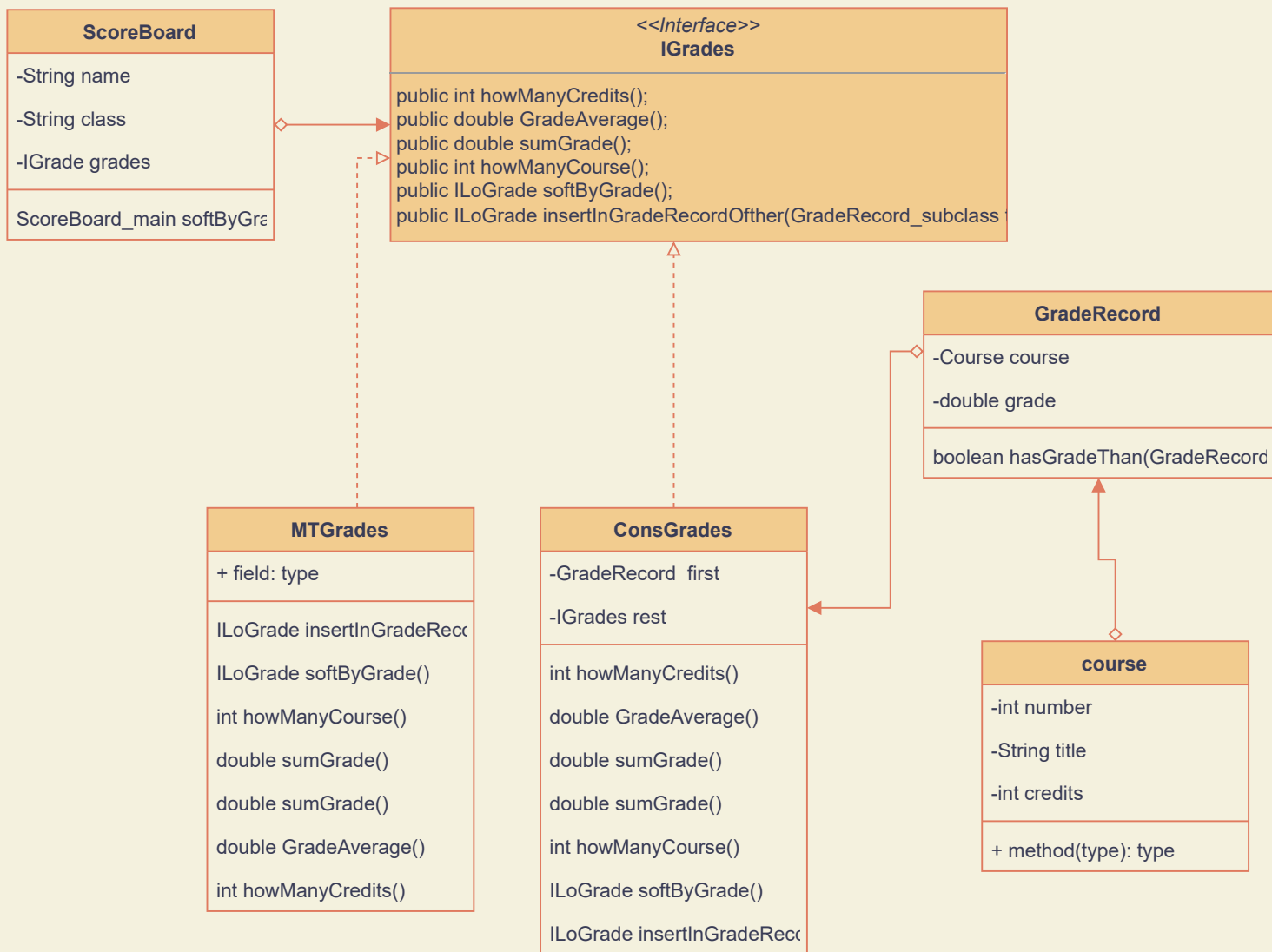


Add methods to Inventory use case

5.5.1 Define the method averagePrice. It computes the average price of toys in Inventory. The average is the total of all prices divided by the number of toys

5.5.2 Develop the method replaceName, which consumes a list of toy and replaces all occurrences of "robot" with "r2d2" and otherwise retains the toy descriptions in the same order.

5.5.3 Develop the method eliminate. The method consumes a string, called toyOfName and produces a list of toys that contains all components of list with the exception of the toy whose name matches toyOfName.



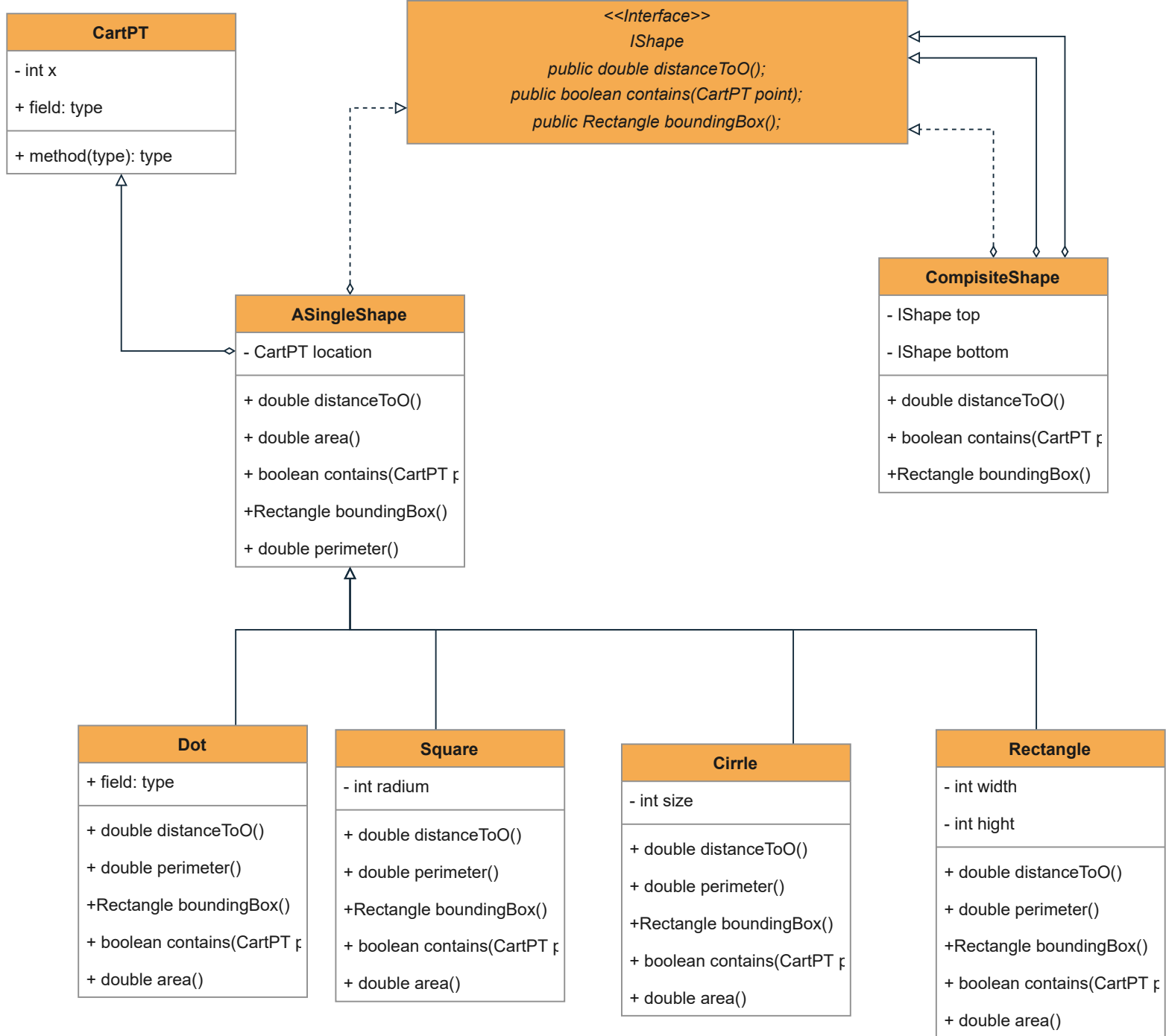
Lấy lại bài tập 5.3 biểu diễn bảng điểm và điểm số của sinh viên trong và thiết kế các phương thức sau:

Viết phương thức howManyCredits để tính tổng số tín chỉ trong bảng điểm mà sinh viên đã đạt được.

Viết phương thức gradeAverage để tính điểm trung bình của sinh viên bằng tổng của tích điểm số từng môn với số tín chỉ chia cho tổng số tín chỉ.

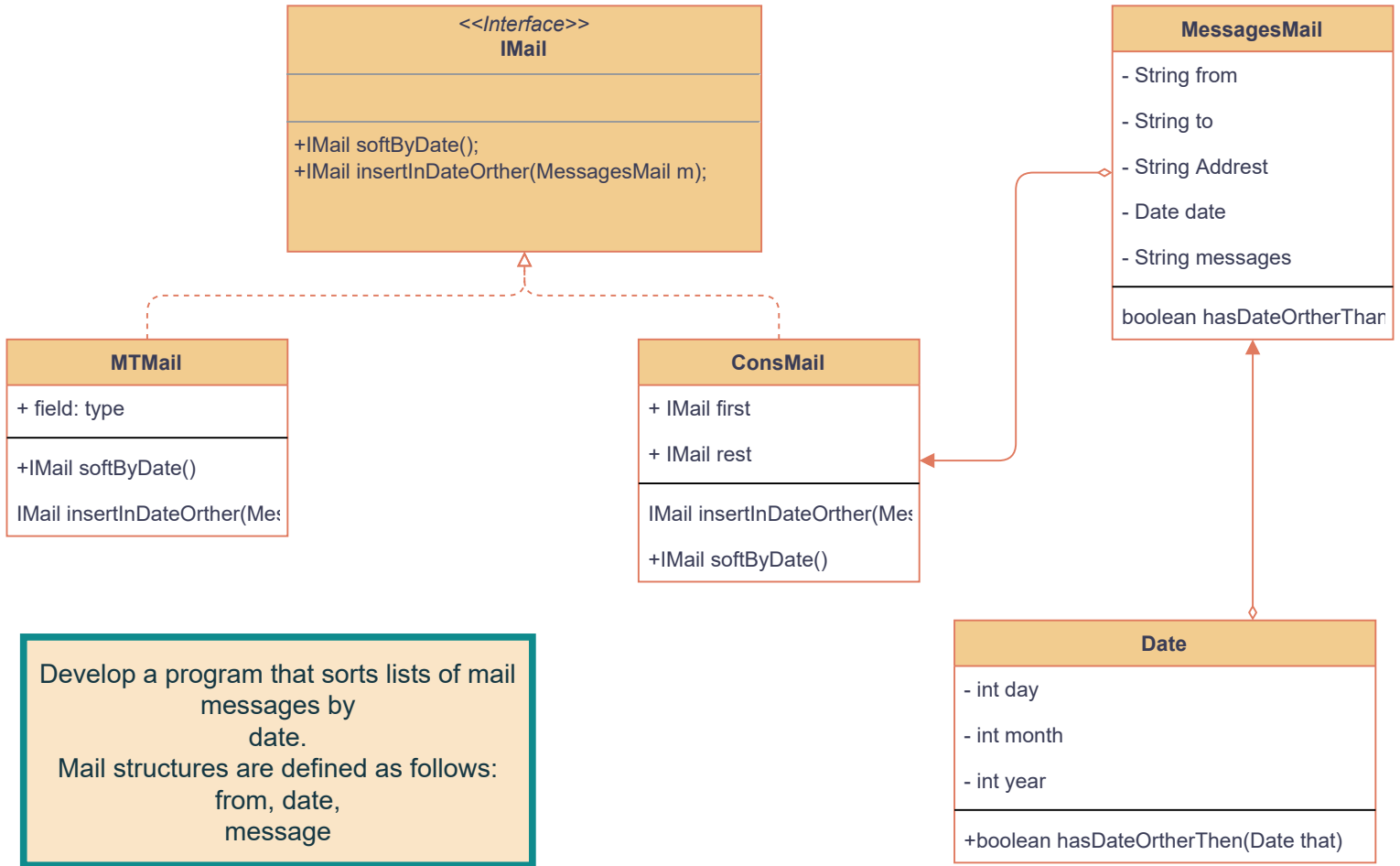
Viết phương thức sortByGradeDec để sắp xếp bảng điểm số của sinh viên theo thứ tự điểm giảm dần.

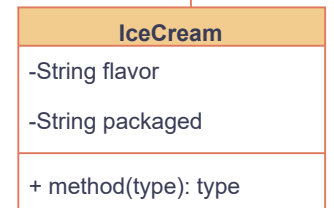
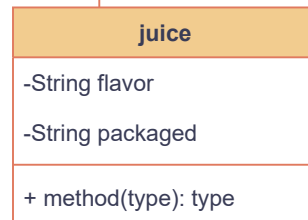
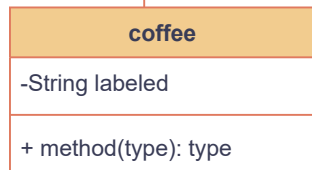
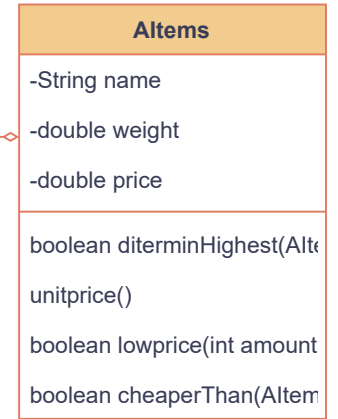
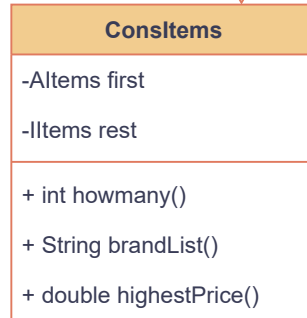
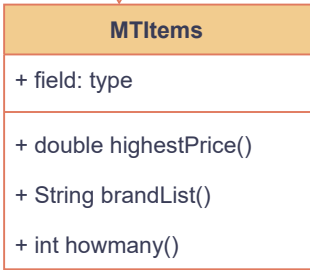
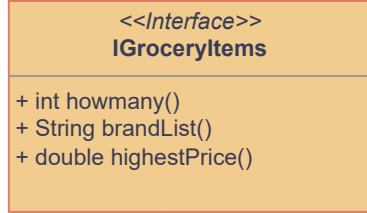
Viết phương thức greaterThanList để trả về danh sách mục điểm số của sinh viên có điểm lớn hơn một giá trị cho trước.



Develop a drawing program that deals with at least three kinds of shapes: dots, squares, and circles. ...In addition, the program should also deal with overlaying shapes on each other. In the following figure, for example, we have superimposed a circle on the right side of a square:

We could now also superimpose(thêm vào) this compounded shape on another shape and so on. The user wishes to know how close a combination of shapes is to the origin ... Add a method that determines whether some point in the Cartesian space falls within the boundaries of some shape. ... A graphics program must compute the bounding box for a shape. ...





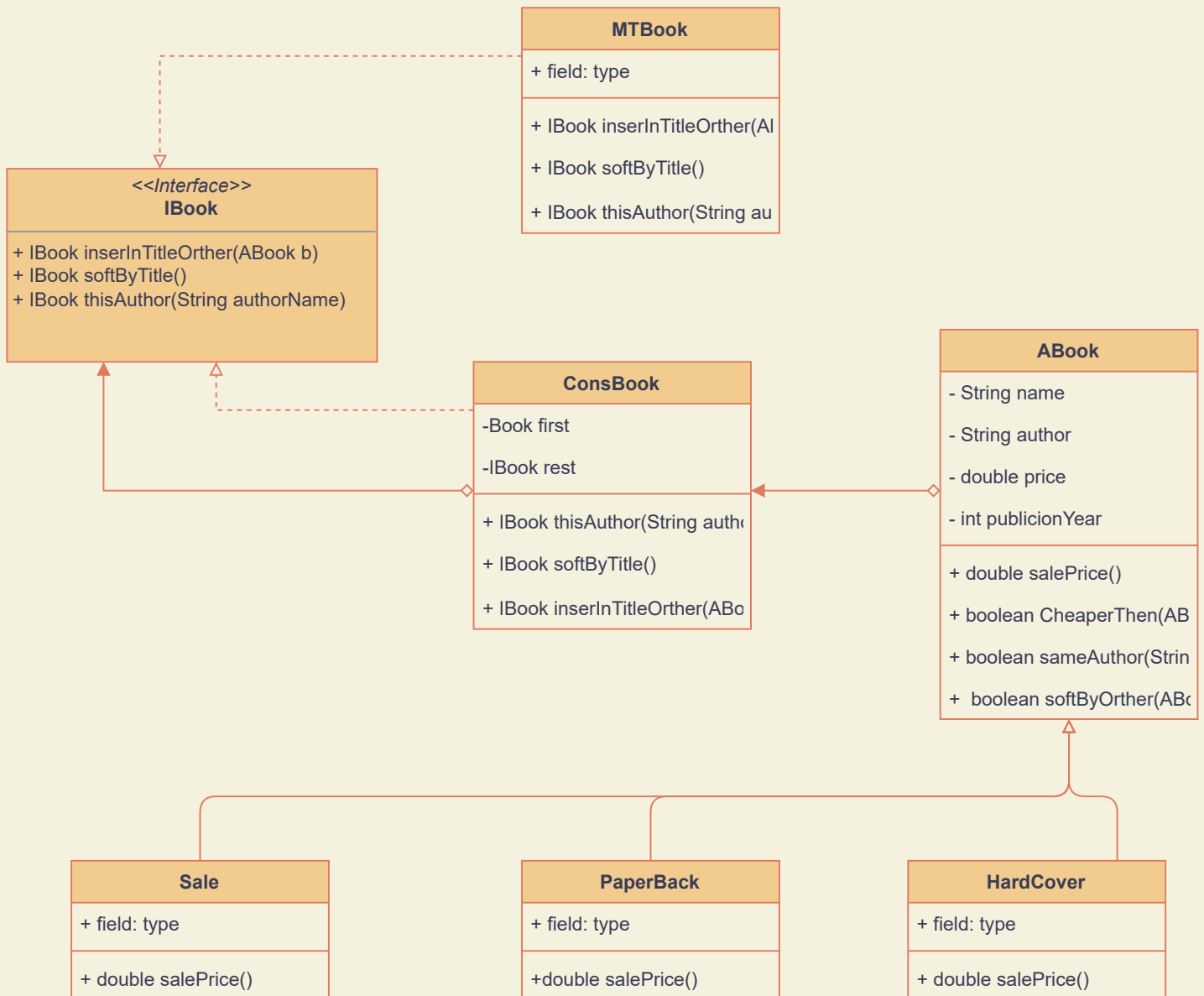
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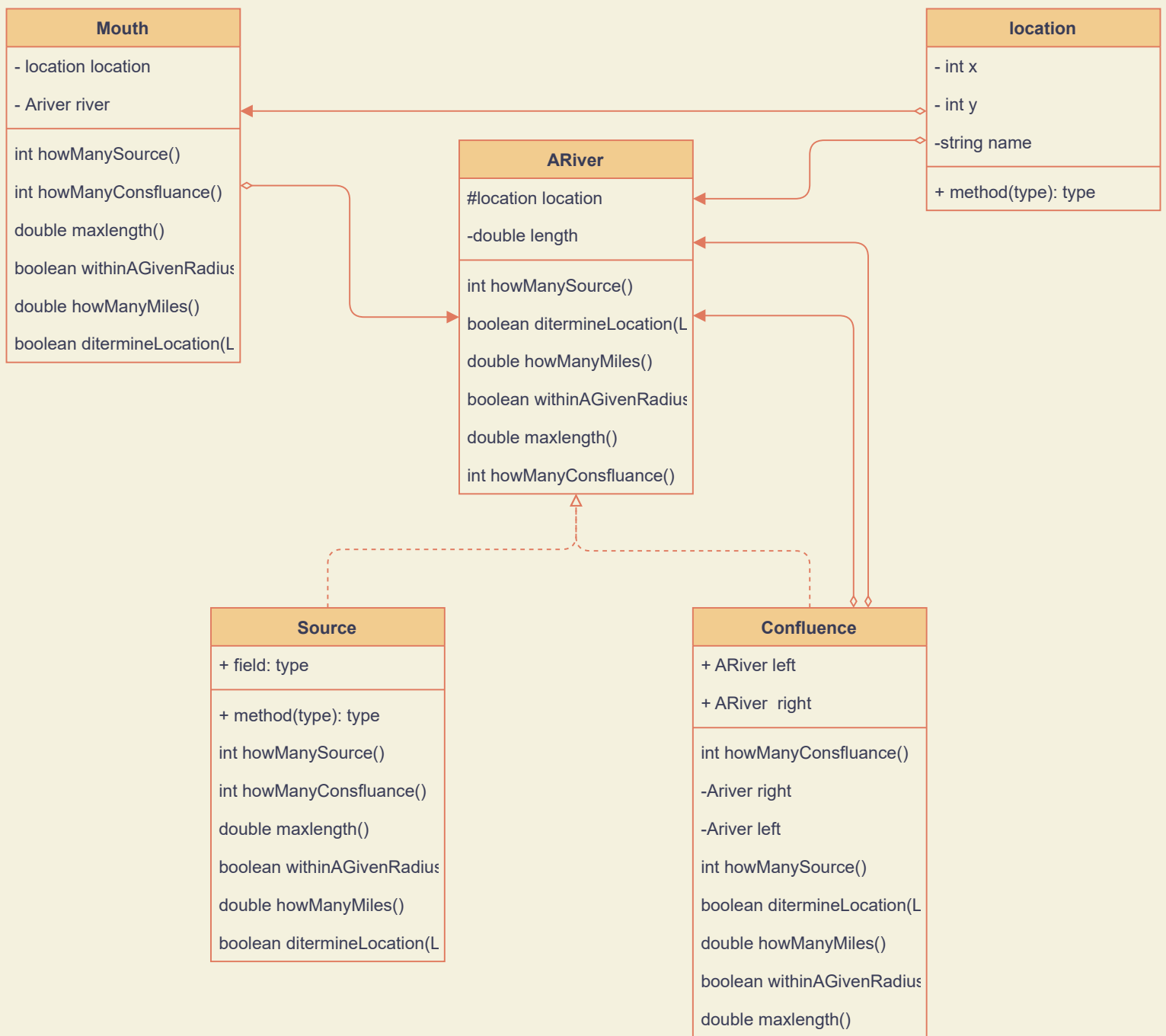
Develop a program for managing discount bookstores
(see exercise 5.2):

Design a representation for lists of books;

Write down (in English) three examples of book lists
and their corresponding data representations;

Develop the method thisAuthor, which produces the
list of books that this author has authored.

Develop the method sortByTitle, which sorts lists of
books by title



* The EPA must represent river systems and monitor them... An EPA officer may wish to query a computer about the number of sources that feed a river system.

* An EPA officer may wish to find out whether some location is a part of a river system, regardless of whether it is a source, a confluence, or the river mouth.

*An EPA officer may request the number of miles of a river system, either starting from the river's mouth or any of its confluence points.

*An EPA officer may wish to find out whether some location is within a given radius of some confluence or source on a river system

* Problems

* Extend the following methods to classes that represent river systems with the following methods:

* maxLength, which computes the length of the longest river segment;

*confluences, which counts the number of confluences in the river system;

*locations, which produces a list of all locations on this river -- the sources, the mouths, and the confluences.