Products
Abstract Classes and Polymorphism

Object-oriented Programming

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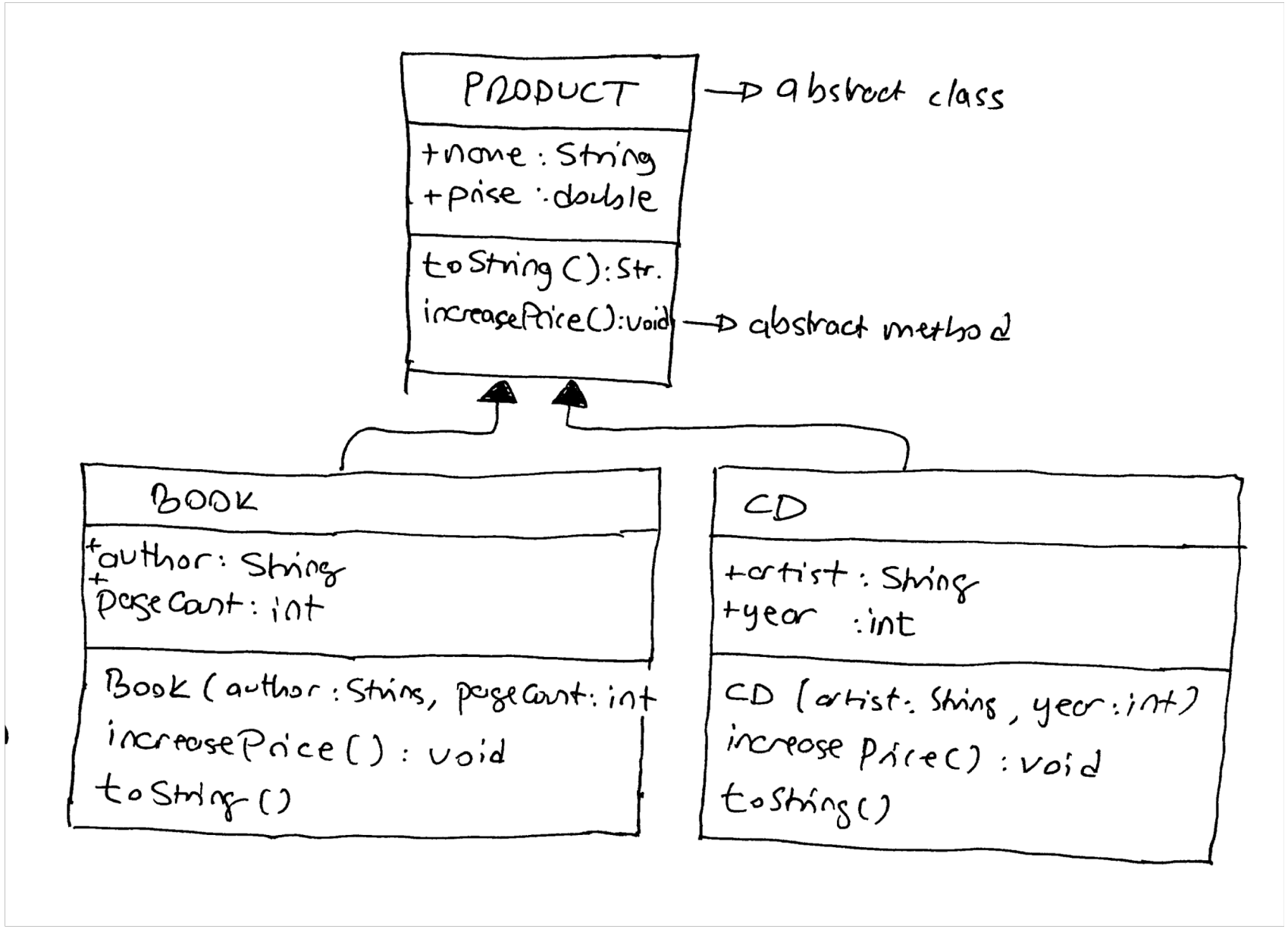
Product Management

- Books and CDs are Products.
  - Product is a super class of Book and CD.
- Each product has name and a price
- Each product should have an increarePrice() method
  - Must be declared in Product class as an abstract method
  - Product class is an abstract class
- Additional data fields in subclasses:
  - Books have author and page count
  - CDs have artist and year

UML Diagrams



- All products are stored in products.txt file
- Books are stored in lines that start with BOOK
  - Book lines contain the following information: Name of the book, price, author name, and page count
- CDs are stored in lines that start with CD keyword
  - CD lines contain: album name, price, album release year, and artist information
- Example products.txt file:

```
BOOK;OOP;150;LIANG;1203
BOOK;PYTHON;100;JOHN;600
BOOK;DATABASE;30;ROBERT;304
CD;AQUA;20;1980;MARILLION
CD;ASTRA;30;1986;ASIA
BOOK;ALGORITHM;98;ALICE;450
CD;SHAMAL;55;1977;GONG
```

Program Requirements

- Your program should read the products.txt file and **loads all products into a single array list** (named: **products** array list)
- Type of the products array list should be Product
- In the main code, write a method which increases each product's price found the input array list.
  - Book prices always increase by %10.
  - CD prices always increase by %50.
  - These price increase details are coded in each subclasses' increasePrice methods.
- Sample method call:
  `increaseAllPrices(products); // void method. input is an array list of products.`
- Display all products before and after price increase method call.

Sample Program Output

```
Initial prices:
Book author=LIANG, pageCount=1203 name=OOP, price=150.0
Book author=JOHN, pageCount=600 name=PYTHON, price=100.0
Book author=ROBERT, pageCount=304 name=DATABASE, price=30.0
CD   artist=MARILLION, year=1980 name=AQUA, price=20.0
CD   artist=ASIA, year=1986 name=ASTRA, price=30.0
Book author=ALICE, pageCount=450 name=ALGORITHM, price=98.0
CD   artist=GONG, year=1977 name=SHAMAL, price=55.0


After price increase:
Book author=LIANG, pageCount=1203 name=OOP, price=165.0
Book author=JOHN, pageCount=600 name=PYTHON, price=110.0
Book author=ROBERT, pageCount=304 name=DATABASE, price=33.0
CD   artist=MARILLION, year=1980 name=AQUA, price=40.0
CD   artist=ASIA, year=1986 name=ASTRA, price=60.0
Book author=ALICE, pageCount=450 name=ALGORITHM, price=107.8
CD   artist=GONG, year=1977 name=SHAMAL, price=110.0
```

Read Data from a Text File: Example

LISTING 12.15 ReadData.java

```java
import java.util.Scanner;

public class ReadData {
  public static void main(String[] args) throws Exception {
    // Create a File instance
    java.io.File file = new java.io.File("scores.txt");

    // Create a Scanner for the file
    Scanner input = new Scanner(file);

    // Read data from a file
    while (input.hasNext()) {
      String firstName = input.next();
      String mi = input.next();
      String lastName = input.next();
      int score = input.nextInt();
      System.out.println(
        firstName + " " + mi + " " + lastName + " " + score);
    }

    // Close the file
    input.close();
  }
}
```

scores.txt

```
John T Smith 90
Eric K Jones 85
```

has next?
read items

close file

Hints

- To convert a string to an integer, use Integer.parseInt() method.
  - Similar method is also available for Double types.
- You can split a string based on a delimiter character using split() method.
  - Usage: String[] parts = str.split("#") splits str using the # symbol and returns parts of the string in a String array