

**The Hong Kong Polytechnic University**  
**Department of Electronic and Information Engineering**

**EIE3320 Tutorial 5: Object-Oriented Programming (Polymorphism)**

**(Deadline for Submission: Check the course information)**

1. **(Assignment)** Use Polymorphism to write THREE new methods in the class Database.
  - a. This question is extended from the project in Question 2, Tutorial 4. All class files can be found in “dome-v2-dorisl” from <http://www.eie.polyu.edu.hk/~encccl>.
  - b. Add a method with the following signature to the class Database.

```
Item searchByTitle(String theTitle);
```

This method shall return a CD, Video or VideoGame object which title field matches the input parameter theTitle. For example, a call to `db.searchByTitle("Miss You Mix").print()` in “TestDatabase.java” will display the following:

```
CD
Title: Miss You Mix
Got it: Yes
Playing time: 70
Comment: Best album
Artist: Leslie Cheung
No. of tracks: 12
```

- c. Add a method with the following signature to the class Database.

```
Item searchByTitlePattern(String pat);
```

This method shall return a CD, Video or VideoGame object which title field contains the input parameter pat. For example, a call to `db.searchByTitlePattern("Star").print()` in “TestDatabase.java” will display the following:

```
Video
Title: Star Trek
Got it: Yes
Playing time: 127
Comment:
Director: J. J. Abrams
```

- d. Add a method with the following signature to the class Database.

```
Item searchByPattern(String pat);
```

This method shall return either a CD, Video or VideoGame object if any of its field contains the input parameter pat. For example, a call to `db.searchByPattern("Joey").print()` in "TestDatabase.java" will display the following:

```
CD
Title: Joey & Joey
Got it: Yes
Playing time: 60
Comment: My favorite album
Artist: Joey Yung
No. of tracks: 11
```

**Hints:** You may need to use the Pattern and Matcher classes in Java.

2. Write two methods `close()` and `getUnsold()` to the Auction class.
- Open the project "auction" and read the code in the four classes: Auction, Bid, Lot, and Person.
  - Add a `close` method to the Auction class. This should iterate over the collection of Lot objects and print out details of all the lots. For lots that have been sold, the details should include the name of the successful bidder, and the value of the winning bid. For lots that have not been sold, print a message that indicates this fact.
  - Add a `getUnsold` method to the Auction class with the following signature:

```
public ArrayList getUnsold();
```

This method should iterate over the `lots` field, storing unsold lots in a new `ArrayList` local variable. At the end of the method, return the list of unsold lots.

You may use the following class to test your program.

```
public class TestMyAuction {
    public static void main(String [] args) {
        Person p1 = new Person("Peter");
        Person p2 = new Person("Tom");
        Auction auction = new Auction();
        auction.enterLot("Camera");
        auction.enterLot("Phone");
        auction.enterLot("TV");
        auction.enterLot("DVD");
        auction.showLots();
        Lot lot1 = auction.getLot(1);
        lot1.bidFor(p1,100);
        auction.showLots();
        Lot lot2 = auction.getLot(2);
```

```
lot2.bidFor(p2,200);
auction.showLots();
lot2.bidFor(p1,300);
auction.showLots();
auction.close();
ArrayList unsoldLots = auction.getUnsold();
Iterator it = unsoldLots.iterator();
while (it.hasNext()) {
    Lot unsoldLot = (Lot) it.next();
    System.out.println("Unsold lot: " + unsoldLot.getNumber() +
        " " + unsoldLot.getDescription());
}
}
```

*Lawrence Cheung*  
*August 2017*