

物件導向軟體工程

(OBJECT-ORIENTED SOFTWARE ENGINEERING)

Homework 5

(An *association* is used to show how two classes are related to each other)

日期:2017/12/07

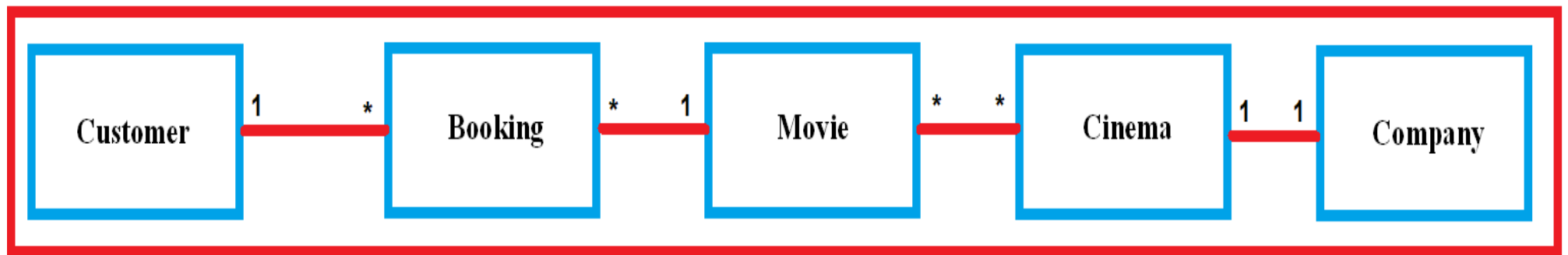
學號:P76064538

姓名:簡君聿

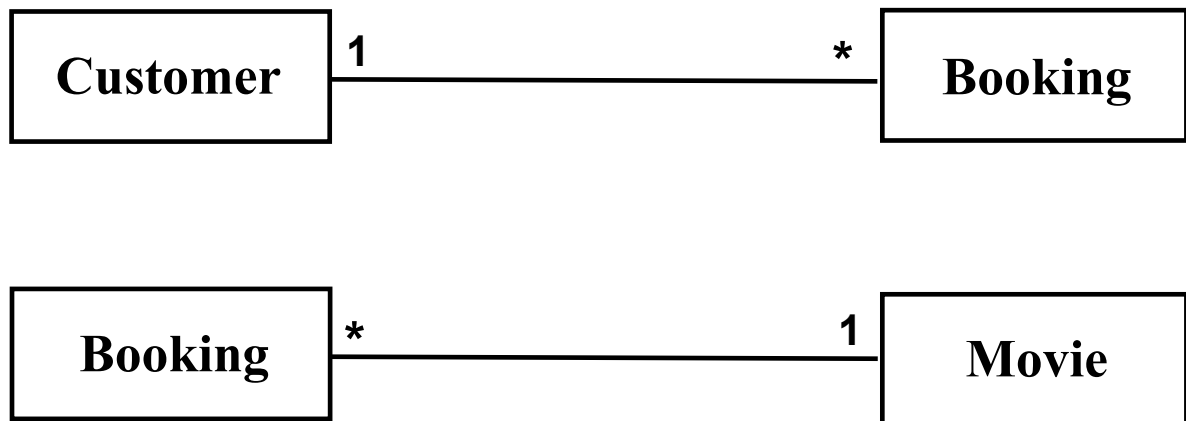
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整體關聯圖



One to Many AND Many to One



一對多以及多對一範例

```
"C:\Program Files\Java\jdk1.8.0_121\bin\java" ...  
  
簡君聿你好~以下為你電影訂票資訊:  
消費者:簡君聿 電影名稱:玩命關頭7 座位號碼:L8  
消費者:簡君聿 電影名稱:可可夜總會 座位號碼:P7  
  
電影:玩命關頭7  
消費者:簡君聿 電影名稱:玩命關頭7 座位號碼:L8  
消費者:張忠謨 電影名稱:玩命關頭7 座位號碼:L9  
  
電影:可可夜總會  
消費者:簡君聿 電影名稱:可可夜總會 座位號碼:P7  
消費者:劉德華 電影名稱:可可夜總會 座位號碼:P8
```

BookingTest Class

```
import booking_information.Customer;
import booking_information.Movie;

/**
 * 一對多以及多對一測試類別.
 */
class BookingTest {
    /**
     * This is test.
     * @param args system default
     */
    public static void main(String[] args) {
        // 電影院中存在兩部電影
        Movie movieOne = new Movie("玩命關頭 7");
        Movie movieSecond = new Movie("可可夜總會");
        // 以下三位顧客進行訂票
        Customer customerOne = new Customer("簡君聿");
        Customer customerSecond = new Customer("劉德華");
        Customer customerThird = new Customer("張忠謨");
        //將電影以及座位號碼給予消費者訂票資訊(實際 Link)
        customerOne.makeBooking(movieOne, "L8");
        customerOne.makeBooking(movieSecond, "P7");
        customerSecond.makeBooking(movieSecond, "P8");
        customerThird.makeBooking(movieOne, "L9");
        // 查看某個顧客的訂票清單(Association)
        customerOne.getAllBookingOfCustomer();
        // 查看某部電影的訂票資料(Association)
        movieOne.getAllBookingOfMovie();
        movieSecond.getAllBookingOfMovie();
    }
}
```

Customer Class

```
package booking_information;

import java.util.ArrayList;
import java.util.Iterator;

/**
 * Customer <-> Booking (一對多).
 * @version 1.0 2017 年 12 月 04 日
 * @author ALEX-CHUN-YU
 */
public class Customer {
    /**
     * Booking List.
     */
    private ArrayList<Booking> bookings = new ArrayList<Booking>();

    /**
     * Customer Name.
     */
    private String name;

    /**
     * Constructor.
     * @param name customer name
     */
    public Customer(String name) {
        this.name = name;
    }

    /**
     * Get Customer Name.
     * @return customer name
     */
    public String getName() {
```

```

        return name;
    }

    /**
     * Make Booking.
     * @param movie movie
     * @param seatNumber seat Number
     */
    public void makeBooking(Movie movie, String seatNumber) {
        new Booking(this, movie, seatNumber);
    }

    /**
     * Add Booking(link).
     * @param bookOne book one
     */
    void addLinkToBooking(Booking bookOne) {
        bookings.add(bookOne);
    }

    /**
     * Get All Booking Of Customer(association).
     */
    public void getAllBookingOfCustomer() {
        System.out.println("\n" + this.getName() + "你好~以下為你電影
訂票資訊:");
        Iterator<Booking> iterator = bookings.iterator();
        while (iterator.hasNext()) {
            iterator.next().showInformationOfBooking();
        }
    }
}

```

Booking Class

```
package booking_information;
```

```
/**
```

```
 * Customer <-> Booking (一對多), Booking <-> Movie (多對一).
```

```
 * @version 1.0 2017 年 12 月 04 日
```

```
 * @author ALEX-CHUN-YU
```

```
 */
```

```
public class Booking {
```

```
    /**
```

```
     * Customer.
```

```
    */
```

```
    private Customer customer;
```

```
    /**
```

```
     * Movie.
```

```
    */
```

```
    private Movie movie;
```

```
    /**
```

```
     * Seat Number.
```

```
    */
```

```
    private String seatNumber;
```

```
    /**
```

```
     * Constructor(link).
```

```
     * @param customer customer
```

```
     * @param movie movie
```

```
     * @param seatNumber seatNumber
```

```
    */
```

```
    Booking(Customer customer, Movie movie, String seatNumber) {
```

```
        this.customer = customer;
```

```
        this.customer.addToBooking(this);
```

```
        this.movie = movie;
```

```
        this.movie.addToBooking(this);
```

```
        this.seatNumber = seatNumber;
```



```
}

/**
 * Show Booking Information.
 */
public void showInformationOfBooking() {
    System.out.print("消費者:" + customer.getName());
    System.out.print(" 電影名稱:" + movie.getName());
    System.out.println(" 座位號碼:" + seatNumber);
}
}
```

Movie Class

```
package booking_information;

import company_information.Cinema;

import java.util.ArrayList;
import java.util.Iterator;

/**
 * Booking <-> Movie (多對一), Movie <-> Cinema (多對多).
 * @version 1.0 2017 年 12 月 04 日
 * @author ALEX-CHUN-YU
 */
public class Movie {
    /**
     * Booking List.
     */
    private ArrayList<Booking> bookings = new ArrayList<Booking>();

    /**
     * Cinemas List.
     */
    private ArrayList<Cinema> cinemas = new ArrayList<Cinema>();

    /**
     * Movie Name.
     */
    private String name;

    /**
     * Constructor.
     *
     * @param name movie name
     */
    public Movie(String name) {
        this.name = name;
    }
}
```

```

    }

    /**
     * Get Movie Name.
     *
     * @return movie name
     */
    public String getName() {
        return name;
    }

    /**
     * Make Booking(link).
     * @param bookOne book one
     */
    void addLinkToBooking(Booking bookOne) {
        bookings.add(bookOne);
    }

    /**
     * Get All Booking Of Movie(association).
     */
    public void getAllBookingOfMovie() {
        System.out.println("\n" + "電影:" + this.getName());
        Iterator<Booking> iterator = bookings.iterator();
        while (iterator.hasNext()) {
            iterator.next().showInformationOfBooking();
        }
    }

    /**
     * Make Cinema(link).
     * @param cinema cinema
     */
    public void addLinkToCinema(Cinema cinema) {
        cinemas.add(cinema);
    }

```

```

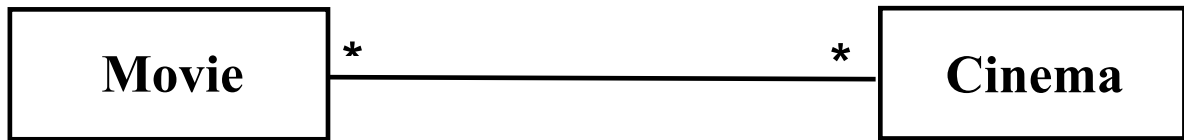
/**
 * Find Cinema(link).
 * @param cinemaOne cinema
 */
public void findCinema(Cinema cinemaOne) {
    Iterator<Cinema> iterator = cinemas.iterator();
    while (iterator.hasNext()) {
        if (cinemaOne.equals(iterator.next())) {
            System.out.println("\n 你所找到的電影院:" +
cinemaOne.getName());
        }
    }
}

/**
 * Get All Cinema Of Movie(association).
 */
public void getAllCinemaOfMovie() {
    System.out.println("\n" + this.getName() + "電影，目前為以下
電影院所擁有:");
    Iterator<Cinema> iterator = cinemas.iterator();
    while (iterator.hasNext()) {
        iterator.next().showInformationOfCinema();
    }
}

/**
 * Show Movie Information.
 */
public void showInformationOfMovie() {
    System.out.println("電影名稱:" + this.getName());
}
}

```

Many to Many (多對多)



多對多範例

```
"C:\Program Files\Java\jdk1.8.0_121\bin\java" ...
```

威秀電影院目前所上映：
電影名稱：玩命關頭7
電影名稱：可可夜總會

日新電影院目前所上映：
電影名稱：玩命關頭7

玩命關頭7電影，目前為以下電影院所擁有：
電影院：威秀
電影院：日新

可可夜總會電影，目前為以下電影院所擁有：
電影院：威秀

你所找到的電影：玩命關頭7

CinemaAndMovieTest Class

```
import booking_information.Movie;
import company_information.Cinema;

/**
 * 多對多測試類別.
 */
class CinemaAndMovieTest {
    /**
     * This is test.
     * @param args system default
     */
    public static void main(String[] args) {
        // 產生兩個電影院
        Cinema cinemaOne = new Cinema("威秀");
        Cinema cinemaSecond = new Cinema("日新");
        // 電影院中存在兩部電影
        Movie movieOne = new Movie("玩命關頭 7");
        Movie movieSecond = new Movie("可可夜總會");
        // 將電影加入並秀出此電影院目前上映的有哪些電影(實際
Link)
        cinemaOne.addToMovie(movieOne);
        cinemaOne.addToMovie(movieSecond);
        cinemaSecond.addToMovie(movieOne);
        // 秀出目前電影院所有電影(Association)
        cinemaOne.getAllMovieOfCinema();
        cinemaSecond.getAllMovieOfCinema();
        // 將電影院加入當前電影目前售予的電影院(實際 Link)
        movieOne.addToCinema(cinemaOne);
        movieOne.addToCinema(cinemaSecond);
        movieSecond.addToCinema(cinemaOne);
        // 秀出目前電影歸屬的電影院(Association)
        movieOne.getAllCinemaOfMovie();
        movieSecond.getAllCinemaOfMovie();
        // 此電影院擁有的電影名稱 (實際 Link)
        cinemaSecond.findMovie(movieOne);    } }
```

Movie Class

```
package booking_information;

import company_information.Cinema;

import java.util.ArrayList;
import java.util.Iterator;

/**
 * Booking <-> Movie (多對一), Movie <-> Cinema (多對多).
 * @version 1.0 2017 年 12 月 04 日
 * @author ALEX-CHUN-YU
 */
public class Movie {
    /**
     * Booking List.
     */
    private ArrayList<Booking> bookings = new ArrayList<Booking>();

    /**
     * Cinemas List.
     */
    private ArrayList<Cinema> cinemas = new ArrayList<Cinema>();

    /**
     * Movie Name.
     */
    private String name;

    /**
     * Constructor.
     *
     * @param name movie name
     */
    public Movie(String name) {
        this.name = name;
    }
}
```

```

    }

    /**
     * Get Movie Name.
     *
     * @return movie name
     */
    public String getName() {
        return name;
    }

    /**
     * Make Booking(link).
     * @param bookOne book one
     */
    void addLinkToBooking(Booking bookOne) {
        bookings.add(bookOne);
    }

    /**
     * Get All Booking Of Movie(association).
     */
    public void getAllBookingOfMovie() {
        System.out.println("\n" + "電影:" + this.getName());
        Iterator<Booking> iterator = bookings.iterator();
        while (iterator.hasNext()) {
            iterator.next().showInformationOfBooking();
        }
    }

    /**
     * Make Cinema(link).
     * @param cinema cinema
     */
    public void addLinkToCinema(Cinema cinema) {
        cinemas.add(cinema);
    }

```



```

/**
 * Find Cinema(link).
 * @param cinemaOne cinema
 */
public void findCinema(Cinema cinemaOne) {
    Iterator<Cinema> iterator = cinemas.iterator();
    while (iterator.hasNext()) {
        if (cinemaOne.equals(iterator.next())) {
            System.out.println("\n 你所找到的電影院:" +
cinemaOne.getName());
        }
    }
}

/**
 * Get All Cinema Of Movie(association).
 */
public void getAllCinemaOfMovie() {
    System.out.println("\n" + this.getName() + "電影，目前為以下
電影院所擁有:");
    Iterator<Cinema> iterator = cinemas.iterator();
    while (iterator.hasNext()) {
        iterator.next().showInformationOfCinema();
    }
}

/**
 * Show Movie Information.
 */
public void showInformationOfMovie() {
    System.out.println("電影名稱:" + this.getName());
}
}

```

Cinema Class

```
package company_information;

import booking_information.Movie;

import java.util.ArrayList;
import java.util.Iterator;

/**
 * Movie <-> Cinema (多對多) , Cinema <-> Company(一對一).
 * @version 1.0 2017 年 12 月 04 日
 * @author ALEX-CHUN-YU
 */
public class Cinema {
    /**
     * Movie List.
     */
    private ArrayList<Movie> movies = new ArrayList<Movie>();

    /**
     * Company.
     */
    private Company company;

    /**
     * Cinema Name.
     */
    private String name;

    /**
     * Constructor.
     * @param name cinema name
     */
    public Cinema(String name) {
        this.name = name;
    }
}
```

```

/**
 * Get Cinema Name.
 * @return cinema name
 */
public String getName() {
    return name;
}

/**
 * Make Movie(link).
 * @param movie movie
 */
public void addLinkToMovie(Movie movie) {
    movies.add(movie);
}

/**
 * Find Movie(link).
 * @param movie movie
 */
public void findMovie(Movie movie) {
    Iterator<Movie> iterator = movies.iterator();
    while (iterator.hasNext()) {
        if (movie.equals(iterator.next())) {
            System.out.println("\n 你所找到的電影:" +
movie.getName());
        }
    }
}

/**
 * Get All Movie Of Cinema(association).
 */
public void getAllMovieOfCinema() {
    System.out.println("\n" + this.getName() + "電影院目前所上
映:");
    Iterator<Movie> iterator = movies.iterator();

```

```

        while (iterator.hasNext()) {
            iterator.next().showInformationOfMovie();
        }
    }

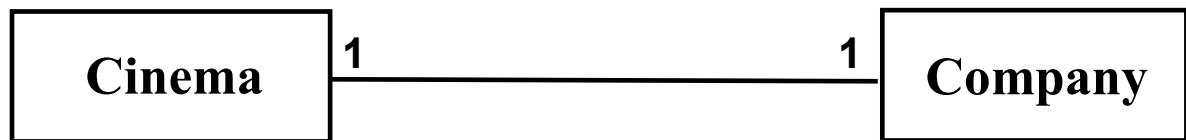
    /**
     * Show Cinema Information.
     */
    public void showInformationOfCinema() {
        System.out.println("電影院:" + this.getName() + " ");
    }

    /**
     * Add Company(link).
     * @param companyOne company one
     */
    public void addLinkToCompany(Company companyOne) {
        this.company = companyOne;
    }

    /**
     * Get All Booking Of Customer(association).
     */
    public void getCompanyOfCinema() {
        System.out.print("\n" + this.getName() + "影城~\n 目前所屬的公  
司為:");
        System.out.println(this.company.getName());
    }
}

```

One to One (一對一)



一對一範例

The screenshot shows a Java application window with a dark background and a light blue border. The title bar at the top reads "C:\Program Files\Java\jdk1.8.0_121\bin\java" followed by an ellipsis. The main content area displays the following text in a light blue font:

```
威秀影城股份有限公司你好~以下為你名下電影院資訊:  
電影院:威秀影城  
  
日日新國際商業股份有限公司你好~以下為你名下電影院資訊:  
電影院:日新影城  
  
威秀影城~  
目前所屬的公司為:威秀影城股份有限公司  
  
日新影城~  
目前所屬的公司為:日日新國際商業股份有限公司
```

CompanyAndCinemaTest Class

```
import company_information.Cinema;
import company_information.Company;

/**
 * 一對一測試類別.
 */
class CompanyAndCinemaTest {
    /**
     * This is test.
     * @param args system default
     */
    public static void main(String[] args) {
        // 產生兩家公司
        Company companyOne = new Company("威秀影城股份有限公司");
        Company companySecond = new Company("日日新國際商業股份有限公司");
        // 產生兩個電影院
        Cinema cinemaOne = new Cinema("威秀");
        Cinema cinemaSecond = new Cinema("日新");
        // 一對一將公司與電影院產生實際 Link
        companyOne.addLinkToCinema(cinemaOne);
        companySecond.addLinkToCinema(cinemaSecond);
        cinemaOne.addLinkToCompany(companyOne);
        cinemaSecond.addLinkToCompany(companySecond);
        // 秀出公司所擁有之電影院
        companyOne.getCinemaOfCompany();
        companySecond.getCinemaOfCompany();
        // 秀出電影院所屬之公司
        cinemaOne.getCompanyOfCinema();
        cinemaSecond.getCompanyOfCinema();
    }
}
```

Cinema Class

```
package company_information;

import booking_information.Movie;

import java.util.ArrayList;
import java.util.Iterator;

/**
 * Movie <-> Cinema (多對多) , Cinema <-> Company(一對一).
 * @version 1.0 2017 年 12 月 04 日
 * @author ALEX-CHUN-YU
 */
public class Cinema {
    /**
     * Movie List.
     */
    private ArrayList<Movie> movies = new ArrayList<Movie>();

    /**
     * Company.
     */
    private Company company;

    /**
     * Cinema Name.
     */
    private String name;

    /**
     * Constructor.
     * @param name cinema name
     */
    public Cinema(String name) {
        this.name = name;
    }
}
```

```

/**
 * Get Cinema Name.
 * @return cinema name
 */
public String getName() {
    return name;
}

/**
 * Make Movie(link).
 * @param movie movie
 */
public void addLinkToMovie(Movie movie) {
    movies.add(movie);
}

/**
 * Find Movie(link).
 * @param movie movie
 */
public void findMovie(Movie movie) {
    Iterator<Movie> iterator = movies.iterator();
    while (iterator.hasNext()) {
        if (movie.equals(iterator.next())) {
            System.out.println("\n 你所找到的電影:" +
movie.getName());
        }
    }
}

/**
 * Get All Movie Of Cinema(association).
 */
public void getAllMovieOfCinema() {
    System.out.println("\n" + this.getName() + "電影院目前所上
映:");
    Iterator<Movie> iterator = movies.iterator();

```



```

        while (iterator.hasNext()) {
            iterator.next().showInformationOfMovie();
        }
    }

    /**
     * Show Cinema Information.
     */
    public void showInformationOfCinema() {
        System.out.println("電影院:" + this.getName() + " ");
    }

    /**
     * Add Company(link).
     * @param companyOne company one
     */
    public void addLinkToCompany(Company companyOne) {
        this.company = companyOne;
    }

    /**
     * Get All Booking Of Customer(association).
     */
    public void getCompanyOfCinema() {
        System.out.print("\n" + this.getName() + "影城~\n 目前所屬的公  
司為:");
        System.out.println(this.company.getName());
    }
}

```

Company Class

```
package company_information;

/**
 * Cinema <-> Company (一對一).
 * @version 1.0 2017 年 12 月 05 日
 * @author ALEX-CHUN-YU
 */
public class Company {
    /**
     * Cinema.
     */
    private Cinema cinema;

    /**
     * Company Name.
     */
    private String name;

    /**
     * Constructor.
     * @param name company name
     */
    public Company(String name) {
        this.name = name;
    }

    /**
     * Get Company Name.
     * @return company name
     */
    public String getName() {
        return name;
    }

    /**
```

```

    * Add Cinema(link).
    * @param cinemaOne cinema one
    */
    public void addLinkToCinema(Cinema cinemaOne) {
        this.cinema = cinemaOne;
    }

    /**
    * Get All Booking Of Customer(association).
    */
    public void getCinemaOfCompany() {
        System.out.println("\n" + this.getName() + "你好~以下為你名下
電影院資訊:");
        System.out.println("電影院:" + this.cinema.getName() + "影城");
    }
}

```