

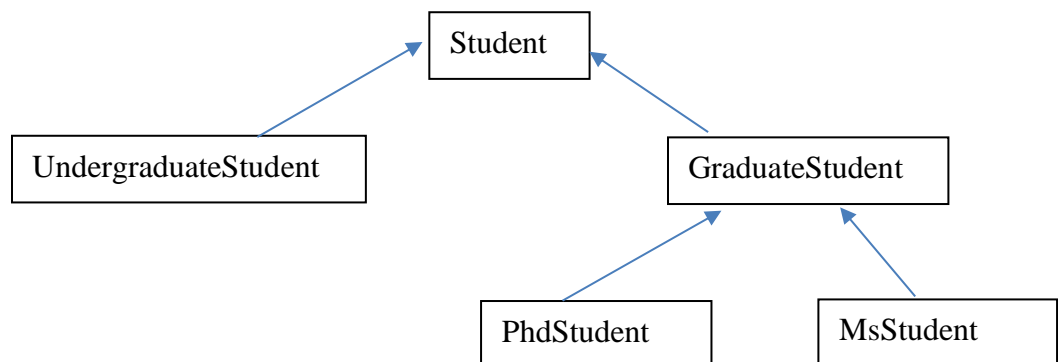
UCF-COP 3330-Unit5.hw

The purpose of this assignment is to create a fee invoice application for students attending **Valence College**, a college in the State of Florida. There are two types of students: graduate and undergraduate. Out-of-state undergraduate students pay twice the tuition of Florida-resident undergraduate students (all students pay the same health and id fees). A graduate student is either a PhD or a MS student. PhD students don't take any courses, but each has an advisor and a research subject. Each Ms and Phd student must be a teaching assistant for one undergraduate course. MS students can only take graduate courses.

A course with a Course Number(crn) less than 5000 is considered an undergraduate course, and courses with a 5000 crn or higher are graduate courses.

| CRN | Course | Credit Hours |
|------|---------|--------------|
| 4587 | MAT 236 | 4 |
| 4599 | COP 220 | 3 |
| 8997 | GOL 124 | 1 |
| 9696 | COP 100 | 3 |
| 4580 | MAT 136 | 1 |
| 2599 | COP 260 | 3 |
| 1997 | CAP 424 | 1 |
| 5696 | KOL 110 | 2 |
| 7587 | MAT 936 | 5 |
| 1599 | COP 111 | 3 |
| 6997 | GOL 109 | 1 |
| 2696 | COP 101 | 3 |
| 5580 | MAT 636 | 2 |
| 2099 | COP 268 | 3 |
| 4997 | CAP 427 | 1 |
| 3696 | KOL 910 | 2 |

You may find the following hierarchy useful when you code your classes.



Example of an MS student:

Name: Emily Jones
Id:em1254
Courses taken: 7587 and 8997
TA for: 1997

Example of an PhD student:

Name: Zaydoun BenSellam
Id: zb5954
Advisor: Gary Richarson
Research Subject: Fuzzy Topology
TA for: 2599

Note that it costs, for undergraduate Florida residents, 120.25 dollars per credit hour, and all MS students pay \$300 per credit hour. in addition to \$35.00 charged for health and id services. Undergraduate Students with gpa of 3.5 or higher receive a discount of 25% when the total payments exceed \$500. PhD students pay a separate research fee of \$700.

A fee invoice for an **undergraduate** student should look like

VALENCE COLLEGE
ORLANDO FL 10101

Fee Invoice Prepared for Student:

KJ2959-KARIM JONES

(Karim, a FL resident, has gpa higher than 3.5 gpa)

1 Credit Hour = \$120.25

| CRN | CR_PREFIX | CR_HOURS | |
|------|-----------|----------|-----------|
| 4599 | COP 220 | 3 | \$ 360.75 |
| 4587 | MAT 236 | 4 | \$ 481.00 |

Health & id fees \$ 35.00

\$ 876.75
-\$ 219.18

TOTAL PAYMENTS \$ 657.56

A fee invoice for an **MS** student should look like

```
VALENCE COLLEGE
ORLANDO FL 10101
-----

Fee Invoice Prepared for Student:
KA2959-ERICKA JUNAID

1 Credit Hour = $300.00

CRN    CR_PREFIX  CR_HOURS
6997   GOL 109    1          $ 300.00

Health & id fees  $ 35.00

-----
Total Payments    $ 335.00
```

A fee invoice for an **PhD** student should look like

```
VALENCE COLLEGE
ORLANDO FL 10101
-----

Fee Invoice Prepared for Student:
JO2978-John JUNAID

RESEARCH
Climate Change          $ 700.00

Health & id fees  $ 35.00

-----
Total Payments    $ 735.00
```

John's research subject:
Climate Change

- 1) In addition to the **DriverClass** class, you will need to add all the classes shown on the inheritance hierarchy shown above. (**Student**, **GraduateStudent**, **UndergraduateStudent**, **MsStudent** and **PhdStudent**). Both Student and GraduateStudent are to be made abstract. The **Student** class must contain the abstract method:
abstract public void printInvoice();
- 2) The abstract method, printInvoice, is to be overridden to display the right fee invoice, depending on the type of the student. Data fields of all classes are to be made private.
- 3) Do not change anything in the DriverClass.java (see skeleton below). You may add your own methods or data whenever you see that becomes necessary. Just don't duplicate code!
- 4) Your job is to add the necessary code whenever you see **// . . .**

```

//unit5.hw
//Group members: John Jones, Jenna Johnson, James Junaid

//imports...

public class DriverClass {

    // DO NOT CHANGE ANYTHING IN THIS CLASS (DriverClass)

    public static void main(String[] args) {

        Student s;
        //*****
        s = new PhdStudent ("Zaydoun BenSellam",
                           "zb5954" ,
                           "Gary Richarson",
                           "Fuzzy Topology" ,
                           2599 );

        s.printInvoice();

        //*****
        int [] gradCrnsTaken = {7587,8997} ;
        s = new MsStudent ( "Emily Jones",
                           "em1254",
                           gradCrnsTaken,
                           1997);

        s.printInvoice();

        //*****
        int [] undergradCrnsTaken = {4587,2599};
        s = new UndergraduateStudent ("Jamila Jones" ,
                                       "ja5225" ,
                                       undergradCrnsTaken ,
                                       3.0,
                                       false );

        s.printInvoice();

    } //end of main

}
//-----
abstract class Student {
    // . . .

    public Student ( String name , String id) {

        // . . .

    }
    abstract public void printInvoice();
}

```

```

//-----
class UndergraduateStudent extends Student{
    // . . .

public UndergraduateStudent(String name , String id , int [] undergradCrnsTaken , double gpa, boolean resident)
{
    super (name , id );
    // . . .

}

@Override
public void printInvoice() {
    // . . .

}

}

//-----
abstract class GraduateStudent extends Student {
    // . . .

public GraduateStudent ( String name , String id , int crn ) {
    //crn is the crn that the grad student is a teaching assistant for

    super ( name , id );
    // . . .

}

}

//-----
class PhdStudent extends GraduateStudent {
    // . . .

public PhdStudent (String name, String id , String advisor, String researchSubject , int crn ) {
    //crn is the course number that the Phd student is a teaching assistant for

    super ( name , id , crn );
    // . . .

}

@Override
public void printInvoice() {
    // . . .

}

}

//-----
class MsStudent extends GraduateStudent {
    // . . .

public MsStudent (String name, String id , int [] gradCrnsTaken , int crn ) {
    // gradCoursesTaken is the array of the crns that the Ms student is taking
    //crn is the course number that the Phd student is a teaching assistant for

    super ( name , id , crn );
    // . . .

}

@Override
public void printInvoice() {
    // . . .

}

}

```

- 1) Submit your code, the DriverClass.java file that has all the classes as shown above. Check that you submitted the correct file. Please don't ask the instructor to check your code or to check if you have submitted the correct file!
- 2) Whether you work solo or in groups, submission of the hw on Webcourses is individual. If you end up working on this hw in groups (up to 3 per group), write the full names of all the group members, in a comment as shown in the skeleton above.