**CS5800 – Advanced Software Engineering**

**Cal Poly Pomona**

**Homework 3**

**Spring 2024**

**Description:**

UML

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Github & Source code:

<https://github.com/fidelisprasetyo/CS5800/tree/hw3/hw3>

# Class Diagrams

* Inheritance
  + Source code:

@startuml  
abstract class Employee {  
 - firstName: String  
 - lastName: String  
 - socialSecurityNumber: String  
  
 + getFirstName(): String  
 + setFirstName(firstName: String): void  
 + getLastName(): String  
 + setLastName(lastName: String): void  
 + getSocialSecurityNumber(): String  
 + setSocialSecurityNumber(socialSecurityNumber: String): void  
 + toString(): String  
}  
  
class HourlyEmployee {  
 - wage: int  
 - hoursWorked: int  
  
 + getWage(): int  
 + setWage(wage: int): void  
 + getHoursWorked(): int  
 + setHoursWorked(hoursWorked: int): void  
 + toString(): String  
}  
  
class CommissionEmployee {  
 - commissionRate: int  
 - grossSales: int  
  
 + getCommissionRate(): int  
 + setCommissionRate(commissionRate: int): void  
 + getGrossSales(): int  
 + setGrossSales(grossSales: int): void  
 + toString(): String  
}  
  
class BaseEmployee {  
 - baseSalary: int  
  
 + getBaseSalary(): int  
 + setBaseSalary(baseSalary: int): void  
 + toString(): String  
}  
  
class SalariedEmployee {  
 - weeklySalary: int  
  
 + getWeeklySalary(): int  
 + setWeeklySalary(weeklySalary: int): void  
 + toString(): String  
}  
  
Employee <|-- HourlyEmployee  
Employee <|-- CommissionEmployee  
Employee <|-- SalariedEmployee  
Employee <|-- BaseEmployee  
@enduml

A screenshot of a computer

Description automatically generated

* Polymorphism
  + Source code:

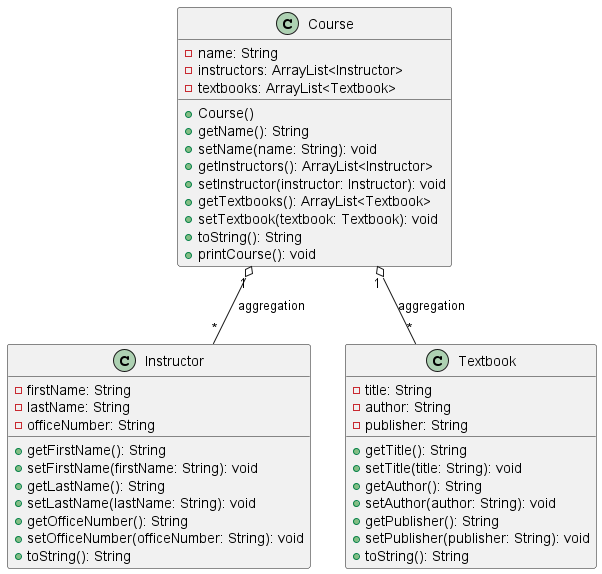
@startuml  
class Ship {  
 - shipName: String  
 - yearBuilt: String  
  
 + getShipName(): String  
 + setShipName(shipName: String): void  
 + getYearBuilt(): String  
 + setYearBuilt(yearBuilt: String): void  
 + toString(): String  
 + printShip(): void  
}  
  
class CargoShip {  
 - cargoCapacityInTonnage: int  
  
 + getCargoCapacityInTonnage(): int  
 + setCargoCapacityInTonnage(cargoCapacityInTonnage: int): void  
 + toString(): String  
}  
  
class CruiseShip {  
 - maxNumberPassengers: int  
  
 + getMaxNumberPassengers(): int  
 + setMaxNumberPassengers(maxNumberPassengers: int): void  
 + toString(): String  
}  
  
Ship <|-- CargoShip  
Ship <|-- CruiseShip  
@enduml

A screenshot of a computer

Description automatically generated

* Aggregation
  + Source code:

@startuml  
class Course {  
 - name: String  
 - instructors: ArrayList<Instructor>  
 - textbooks: ArrayList<Textbook>  
 + Course()  
 + getName(): String  
 + setName(name: String): void  
 + getInstructors(): ArrayList<Instructor>  
 + setInstructor(instructor: Instructor): void  
 + getTextbooks(): ArrayList<Textbook>  
 + setTextbook(textbook: Textbook): void  
 + toString(): String  
 + printCourse(): void  
}  
  
class Instructor {  
 - firstName: String  
 - lastName: String  
 - officeNumber: String  
 + getFirstName(): String  
 + setFirstName(firstName: String): void  
 + getLastName(): String  
 + setLastName(lastName: String): void  
 + getOfficeNumber(): String  
 + setOfficeNumber(officeNumber: String): void  
 + toString(): String  
}  
  
class Textbook {  
 - title: String  
 - author: String  
 - publisher: String  
 + getTitle(): String  
 + setTitle(title: String): void  
 + getAuthor(): String  
 + setAuthor(author: String): void  
 + getPublisher(): String  
 + setPublisher(publisher: String): void  
 + toString(): String  
}  
  
Course "1" o-- "\*" Instructor : aggregation  
Course "1" o-- "\*" Textbook : aggregation  
  
@enduml



* Composition
  + Source code:

@startuml  
class File {  
 - name: String  
 + File(name: String)  
 + getName(): String  
 + setName(name: String): void  
 + toString(): String  
}  
  
class Folder {  
 - name: String  
 - subfolders: ArrayList<Folder>  
 - files: ArrayList<File>  
 + Folder()  
 + getName(): String  
 + setName(name: String): void  
 + removeSubfolder(subFolderName: String): void  
 + addSubfolder(subFolderName: String): void  
 + getSubfolder(subFolderName: String): Folder  
 + removeFile(file: File): boolean  
 + addFile(fileName: String): void  
 + toString(): String  
 + printFolderContents(): void  
}  
  
Folder "1" \*-- "\*" File : composition  
Folder "1" \*-- "\*" Folder : composition  
@enduml

A screenshot of a computer

Description automatically generated

# Object Diagrams

* Polymorphism
  + Source code:

@startuml  
object "<u>ships[0] : Ship</u>" as ship0 {  
 shipName = "Titanic"  
 yearBuilt = "March 31st, 1909"  
}  
  
object "<u>ships[1] : Ship" as ship1 {  
 shipName = "MVGemini"  
 yearBuilt = "May 30th, 1991"  
}  
  
object "<u>ships[1] : CruiseShip</u>" as cruiseShip1 {  
 maxNumberPassengers = 100  
}  
  
object "<u>ships[2] : Ship" as ship2 {  
 shipName = "EverGiven"  
 yearBuilt = "September 25th, 2018"  
}  
  
object "<u>ships[2] : CargoShip</u>" as cargoShip2 {  
 cargoCapacityInTonnage = 220940  
}  
  
ship1 <|-- cruiseShip1  
ship2 <|-- cargoShip2  
  
@enduml

A screenshot of a computer

Description automatically generated

* Aggregation
  + Source code:

@startuml  
object "<u>c1 : Course</u>" as c1 {  
 name = "CS5800 - Advanced Software Engineering"  
 instructors = c1Instructor  
 textbooks = c1Textbook  
}  
  
object "<u>c1Instructor : Instructor</u>" as c1Instructor {  
 firstName = "Nima"  
 lastName = "Davarpanah"  
 officeNumber = "3-2636"  
}  
  
object "<u>c1Textbook : Textbook</u>" as c1Textbook {  
 title = "Clean Code: A Handbook of Agile Software Craftsmanship"  
 author = "Robert Cecil Martin"  
 publisher = "Pearson"  
}  
  
c1 o-- c1Instructor  
c1 o-- c1Textbook  
  
@enduml

A computer screen shot of a computer program

Description automatically generated with medium confidence

* Composition
  + Source code:

@startuml  
'https://plantuml.com/object-diagram  
  
object "<u>phpDemo1 : Folder</u>" as phpDemo1 {  
 name = "php\_demo1"  
 subfolders: sourceFiles, includePath, remoteFiles  
 files:  
}  
  
object "<u>sourceFiles : Folder</u>" as sourceFiles {  
 name = "Source Files"  
 subfolders: phalcon, cache, public  
 files:  
}  
  
object "<u>includePath : Folder</u>" as includePath {  
 name = "Include Path"  
 subfolders:  
 files:  
}  
  
object "<u>remoteFiles : Folder</u>" as remoteFiles {  
 name = "Remote Files"  
 subfolders:  
 files:  
}  
  
object "<u>phalcon : Folder</u>" as phalcon {  
 name = ".phalcon"  
 subfolders:  
 files:  
}  
  
object "<u>cache : Folder</u>" as cache {  
 name = "cache"  
 subfolders:  
 files:  
}  
  
object "<u>public : Folder</u>" as public {  
 name = "public"  
 subfolders:  
 files: htaccess, htrouter, index  
}  
  
object "<u>htaccess : File</u>" as htaccess {  
 name = ".htaccess"  
}  
  
object "<u>htrouter : File</u>" as htrouter {  
 name = ".htrouter"  
}  
  
object "<u>index : File</u>" as index {  
 name = "index.html"  
}  
  
phpDemo1 \*-- sourceFiles  
phpDemo1 \*-- includePath  
phpDemo1 \*-- remoteFiles  
  
sourceFiles \*-- phalcon  
sourceFiles \*-- cache  
sourceFiles \*-- public  
  
public \*-- htaccess  
public \*-- htrouter  
public \*-- index  
@enduml

A diagram of a computer

Description automatically generated

# Source Code & Supporting Files

The entire source code and other supporting documents/ files can be obtained from this GitHub repository:

<https://github.com/fidelisprasetyo/CS5800/tree/hw3/hw3>