

**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>

# 1. 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

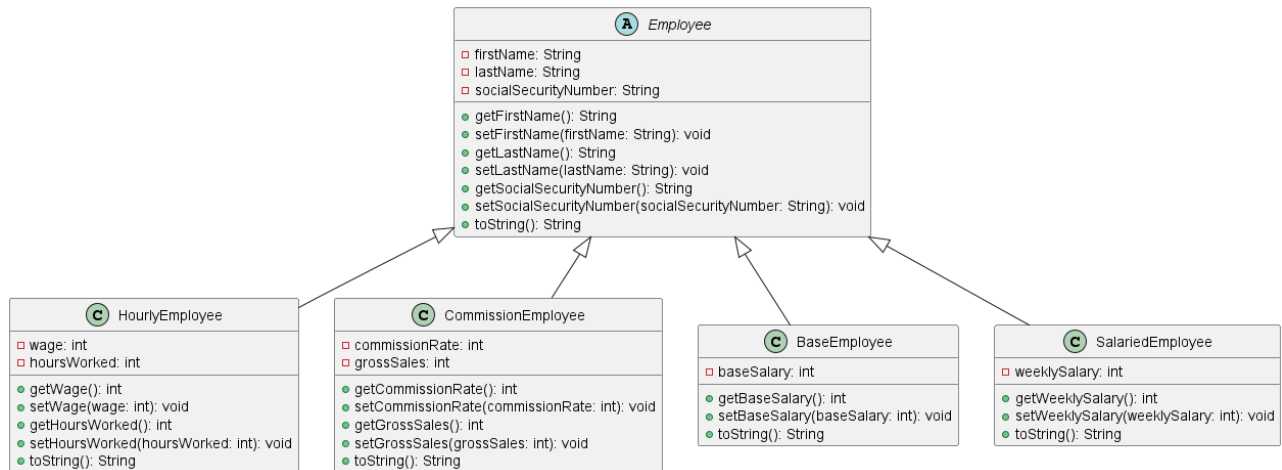
    + getWeeklySalary(): int
    + setWeeklySalary(weeklySalary: int): void
}
```

```

+ toString(): String
}

Employee <|-- HourlyEmployee
Employee <|-- CommissionEmployee
Employee <|-- SalariedEmployee
Employee <|-- BaseEmployee
@enduml

```



- 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
}

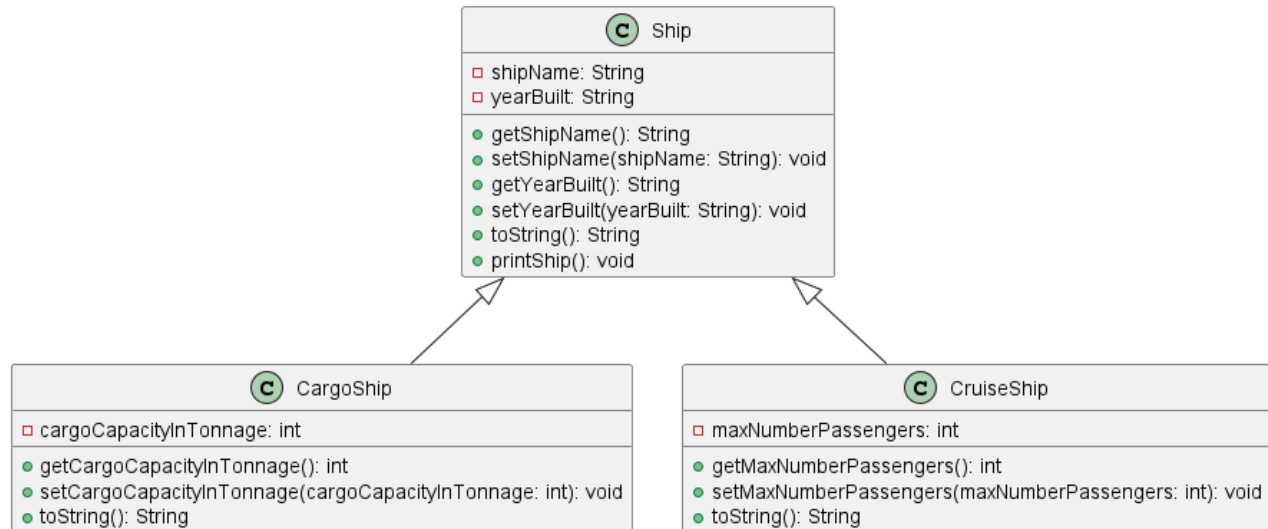
```

```

    + toString(): String
}

Ship <|-- CargoShip
Ship <|-- CruiseShip
@enduml

```



- 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
}

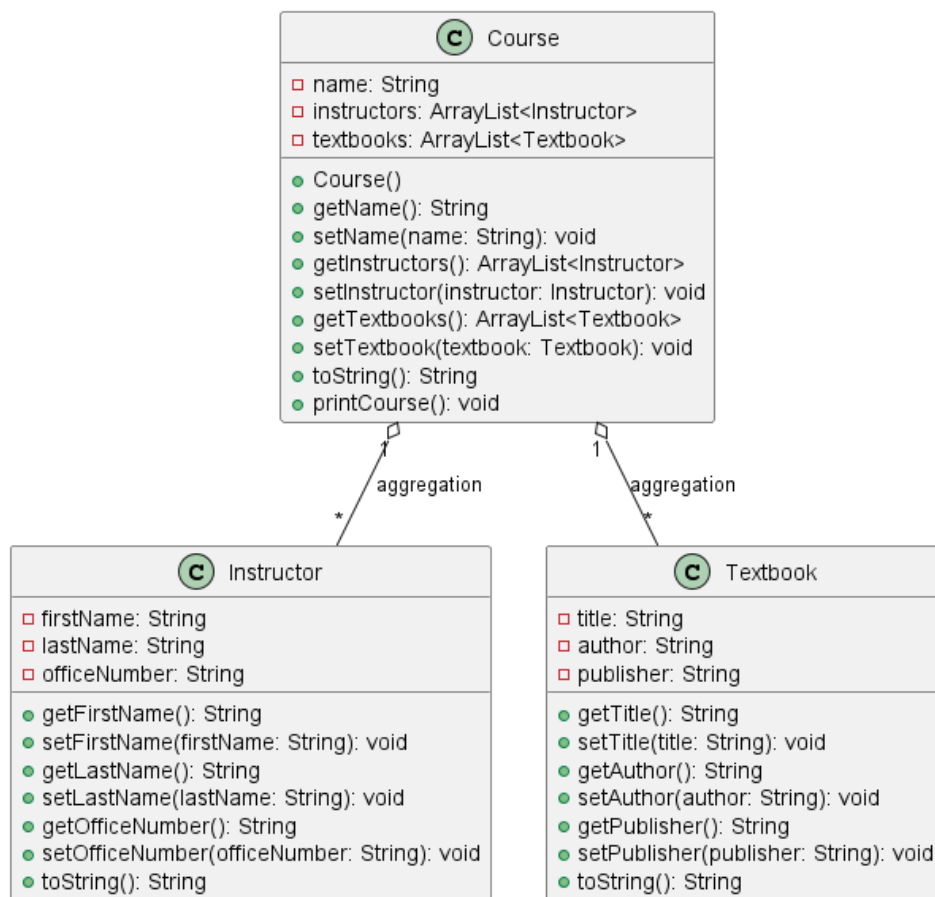
```

```

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
}

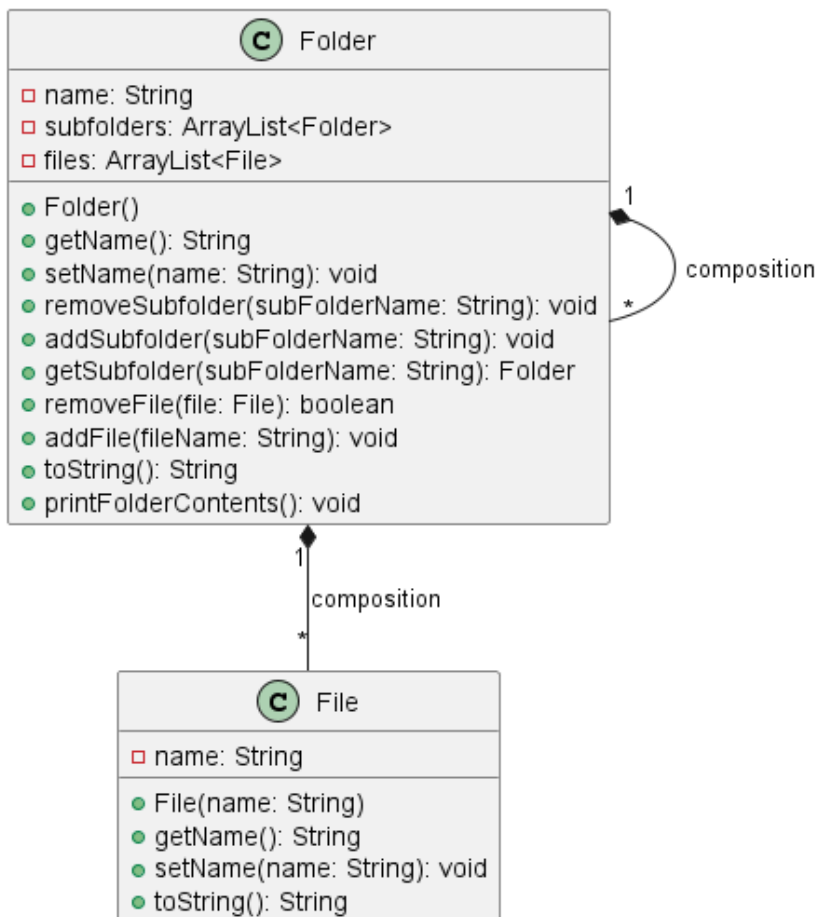
class Folder {
- name: String
- subfolders: ArrayList<Folder>
- files: ArrayList<File>
+ Folder()
+ getName(): String
+ setName(name: String): void
+ removeSubfolder(subFolderName: String): void
+ addSubfolder(subFolderName: String): void
+ getSubfolder(subFolderName: String): Folder
+ removeFile(file: File): boolean
+ addFile(fileName: String): void
+ toString(): String
+ printFolderContents(): void
}

```

```

Folder "1" *-- "*" File : composition
Folder "1" *-- "*" Folder : composition
@enduml

```



## 2. Object Diagrams

- Polymorphism
  - Source code:

```
@startuml
object "<u>ships[0] : Ship</u>" as ship0 {
    shipName = "Titanic"
    yearBuilt = "March 31st, 1909"
}

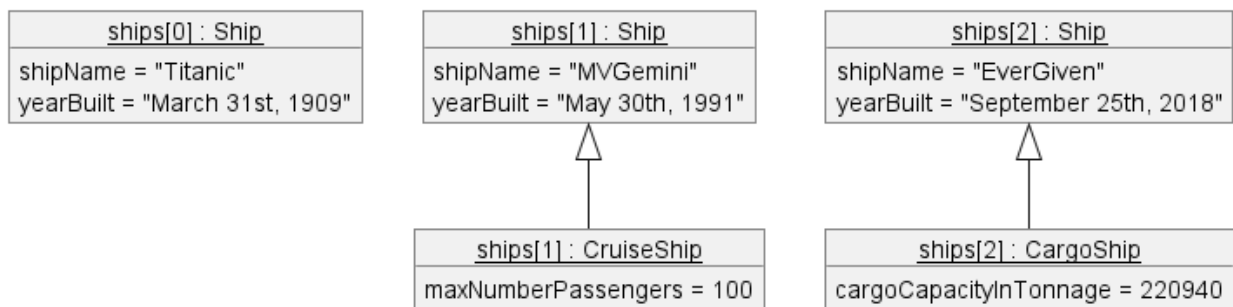
object "<u>ships[1] : Ship" as ship1 {
    shipName = "MVGemini"
    yearBuilt = "May 30th, 1991"
}

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
```



- Aggregation
  - Source code:

```
@startuml
object "<u>c1 : Course</u>" as c1 {
    name = "CS5800 - Advanced Software Engineering"
    instructors = c1Instructor
    textbooks = c1Textbook
}
```

```

}

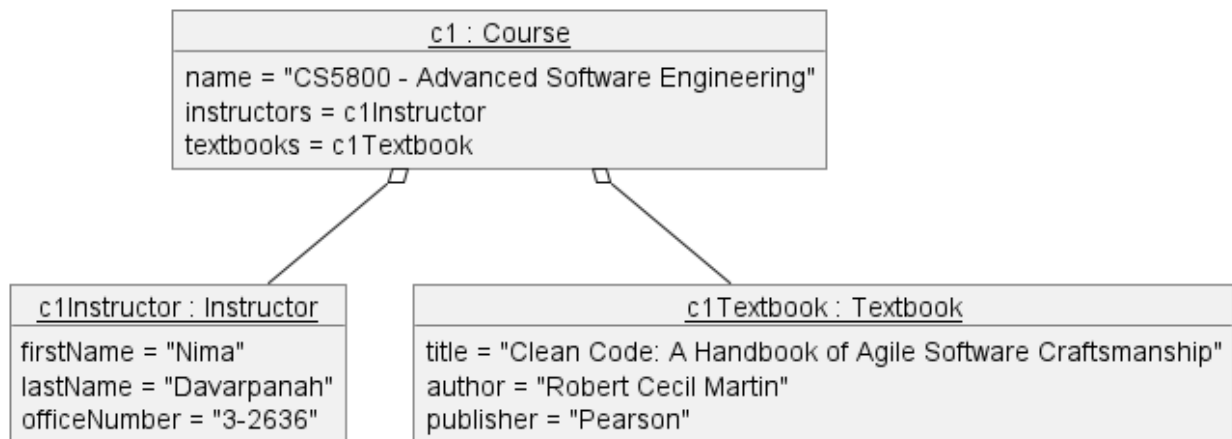
object "<u>c1Instructor : Instructor</u>" as c1Instructor {
  firstName = "Nima"
  lastName = "Davarpanah"
  officeNumber = "3-2636"
}

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

```





- 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"
}
```

```

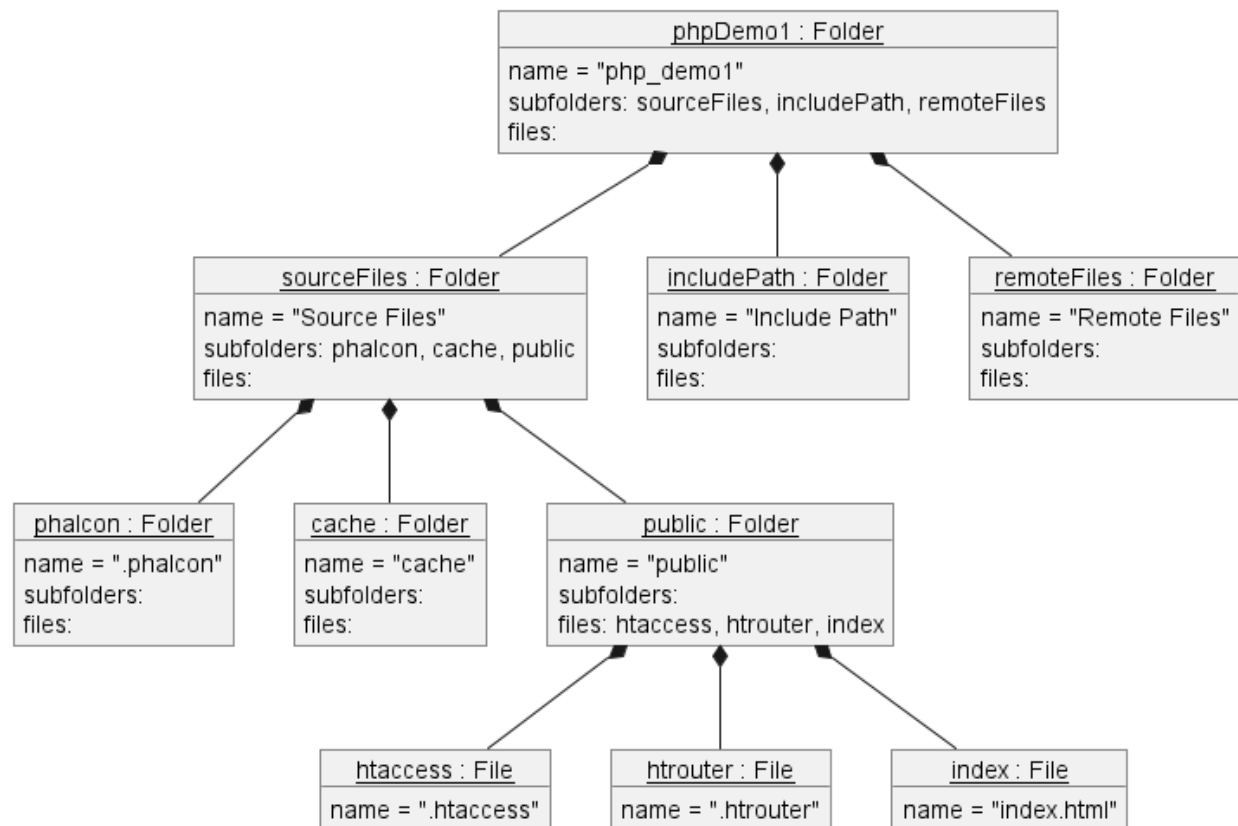
object "<u>index : File</u>" as index {
    name = "index.html"
}

phpDemo1 *-- sourceFiles
phpDemo1 *-- includePath
phpDemo1 *-- remoteFiles

sourceFiles *-- phalcon
sourceFiles *-- cache
sourceFiles *-- public

public *-- htaccess
public *-- htrouter
public *-- index
@enduml

```



## 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>