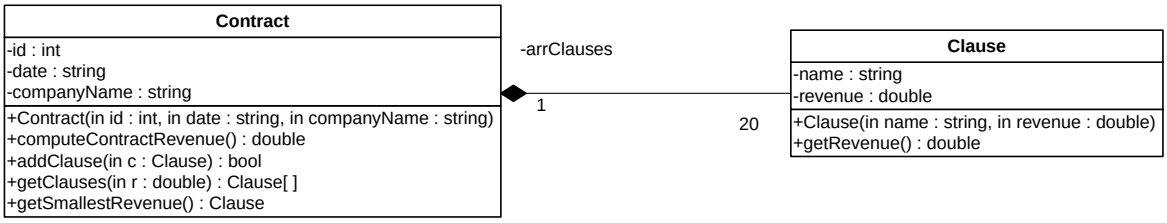
King Saud University
College of Computer and Information Sciences
Department of Computer Science
CSC113 – Computer Programming II Mid Term 1 Exam – Spring 2013

Exercise 1:



Contract class***:***

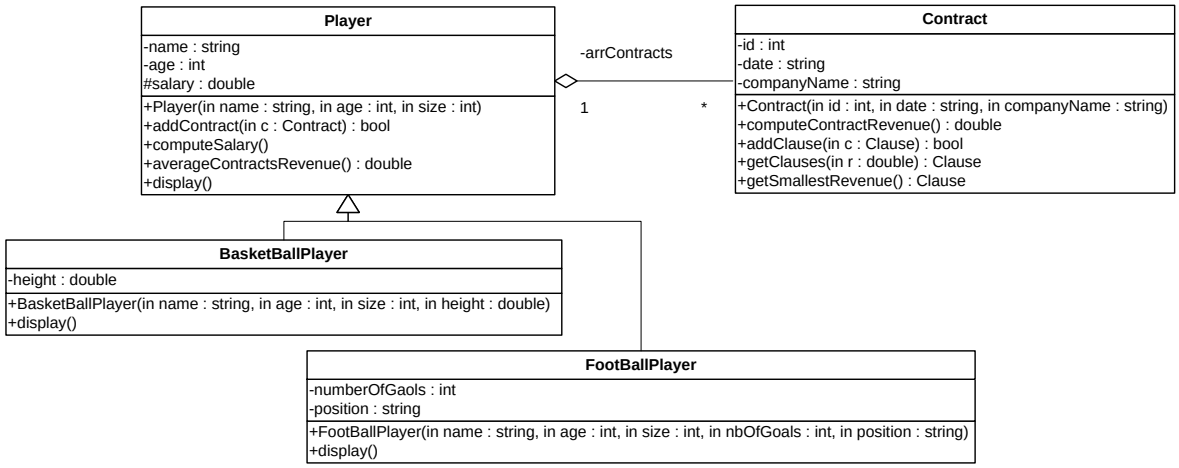
- Attributes:
  - ***id***: the id of the contract.
  - ***date***: the date of the contract.
  - ***companyName***: the name of the company.
- Methods:
  - ***Contract(id: int, date: String, companyName:String)***: constructor
  - ***computeContractRevenue( )***: this method returns the total revenue of all the clauses of the contract.
  - ***addClause(c: Clause)***: this method adds the clause ***c*** to the contract. It returns true if the clause ***c*** is added; false otherwise.
  - ***getClauses(r: double***): this method returns an array of clauses having a revenue less than the given revenue ***r***.
  - ***getSmallestRevenue( )***: this method returns the clause having the smallest revenue.

Clause class

- Attributes:
  - ***name***: the name of the clause.
  - ***revenue***: the amount of money offered in the clause.
- Methods:
  - ***Clause(name: string, revenue: double)***: constructor.
  - ***getRevenue( )***: this method returns the revenue of the clause.

QUESTION: Translate into Java code the class ***Clause***, and the class ***Contract***.

Exercise 2:



A player has a fixed salary and a revenue (extra income) earned by the different contracts he signed. The fixed salary is calculated differently for the football and basketball players.

Player class***:***

- Attributes:
  - ***name***: the name of the player.
  - ***age***: the age of the player.
  - ***salary:*** the salary of the player
- Methods:
  - ***Player(name: string, age: int, size: int)***: constructor
  - ***addContract(c: Contract):*** this method adds a contract ***c*** to the player. It returns true if the contract ***c*** is added; false otherwise.
  - ***computeSalary( ):*** this method calculates and updates the global salary earned by the player. The salary of the player is calculated as follows:
    - ***For Football players:***
      - ***salary = 20000 + number Of goals * 1000***
    - ***For Basketball players:***
      - ***salary = 10000 + height * 500***
  - ***averageContractsRevenue():***this method returns the average of the revenue (extra income) earned by the player from his contracts.
  - ***display()***: this method displays all the attributes of the player.

BasketBallPlayer class

- Attributes:
  - ***height***: the height of the basketball Player.
- Methods:
  - ***BasketBallPlayer (name: string, age: int, size: int, height: double)***: constructor.
  - ***display()***: this method displays all the attributes of the Basketball player.

FootBallPlayer class:

- Attributes:
  - ***numberOfGoals***: the number of goals scored by the player.
  - ***position***: the position of the player on the field of play (defender, midfield, forward...)
- Methods:
  - ***FootBallPlayer (name: string, age: int, size: int, numberOfGoals:int , position: String)***: constructor.
  - ***display()***: this method displays all the attributes of the Football player.

QUESTION: Translate into Java code the class ***Player***, and the class ***FootBallPlayer***.

Exercise 3:

Write a class ***Application*** that contains a ***main()*** method to do the following statements in the given order:

- Create a ***Contract*** object **C1 (id is 1111, date is "12/5/2010", company name: "STC")** that contains the following clauses.
    - o Clause 1: name: "Advertising", revenue: 250000.00
    - o Clause 2: name: "Kids program", revenue: 150000.00

- Create a ***Contract*** object **C2 (id is 2222, date is "22/8/20111", company name: "MBC TV")** that contains the following clauses.
    - o Clause 1: name: "Media", revenue: 120000.0
    - o Clause 2: name: "TV programs", revenue: 90000.0
    - o Clause 3: name: "Visiting Schools", revenue: 350000.0

- Create a FootBallPlayer object **PL (name is "Beckham", age is 37)** that has 10 contracts:
- Add the Contracts **C1** and **C2** to the Player PL.
- Display the average contract revenue of the football player **PL**.

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Answer Exercise 1: The class *Clause*

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Answer Exercise 1: The class *Contract*

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Answer Exercise 1: The class *Contract* (Continued)

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Answer Exercise 2: The class *Player*

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Answer Exercise 2: The class *Player* (Continued)

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Answer Exercise 2: The class *FootBallPlayer*

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Student Id:		**Instructor:**

Answer Exercise 3 : The class *Application*

Exercice 1

/ 4 Marks

```
public class Clause {
	private String name;
	private double revenue;

	public Clause(String name, double revenue) {
		this.name = name;.....0.5
		this.revenue = revenue;.....0.5
	}

	public Clause(Clause c) {
		this.name = c.name;.....1
		this.revenue = c.revenue;.....1
	}

	public double getRevenue() {
		return revenue;.....1
	}
}
```

```
public class Contract {  /25 Marks

	private int id;
	private String date;
	private String companyName;
	private Clause[] arrClauses;.....1
	private int nbC;.....1

	public Contract(int id, String date, String companyName) {
		this.id = id;
		this.date = date;
		this.companyName = companyName;
		arrClauses = new Clause[20];.....1
		nbC = 0;.....1
	}

	public double computeContractRevenue() {
		double sum = 0.0;.....1

		for (int i=0; i < nbC; i++) {.....1
			sum += arrClauses[i].getRevenue();.....1
		}
		return sum;.....1
	}

	public boolean addClause(Clause c) {
		if (nbC < arrClauses.length) {.....1
			arrClauses[nbC] = new Clause(c);.....1 + 1
			nbC++;.....1
			return true; .....0.5
		}
		else return false; .....0.5
	}

	public Clause[] getClauses(double r) {
		Clause [] res = new Clause[nbC]; .....1
		int j=0; .....1

		for (int i=0; i < nbC; i++) {.....1
			if (arrClauses[i].getRevenue() < r) {.....1
				res[j] = arrClauses[i]; .....1
				j++;.....1
			}
		}
		return res; .....1
	}

	public Clause getSmallestRevenue() {
		Clause smallest = arrClauses[0]; .....1

		for (int i=1; i < nbC; i++) {.....1
			if (arrClauses[i].getRevenue() < smallest.getRevenue())...1
				smallest = arrClauses[i]; .....1
		}
		return smallest; .....1
	}}
```

Exercice 2

/16 Marks

```
public abstract class Player {.....1

	private String name;
	private int age;
	protected double salary;
	private Contract[] arrContracts; .....1
	private int nbC; .....1

	public Player(String name, int age, int size) {
		this.name  = name;
		this.age = age;
		arrContracts = new Contract[size]; .....1
		nbC = 0; .....1
	}

	public boolean addContract(Contract c) {
		if (nbC < arrContracts.length) {.....1
			arrContracts[nbC] = c; .....1
			nbC++;.....1
			return true; .....0.5
		}
		else return false; .....0.5
	}

	public abstract void computeSalary();.....1

	public double averageContrcatsRevue() {
		double sum = 0.0; .....1

		for (int i=0; i < nbC; i++) {.....1
			sum += arrContracts[i].computeContractRevenue();.....1
		}

		if (nbC != 0) .....1
			return (sum/nbC); .....0.5
		else return 0.0; .....0.5
	}

	public void display() {
		System.out.println(name + age + salary); .....1
	}

}
```

/7 Marks

```
public class FootballPlayer extends Player {.....1

	private int numberOfGoals;
	private String position;

	public FootballPlayer(String name, int age, int size, int nbOfGoals,
String position) {
		super(name, age, size); ..... 2
		numberOfGoals = nbOfGoals;
		this.position = position;
	}

	public void computeSalary() {.....1
		salary = 20000 + numberOfGoals * 1000; .....1
	}

	public void display() {
		super.display();.....1
		System.out.println(numberOfGoals + position); .....1
	}

}
```

Exercice 3 /8 Marks

```
public class Application {

	public static void main(String[] args) {

		Contract c1 = new Contract(1111, "12/5/2010", "STC");.....0.5
		Clause a = new Clause("Advertising", 250000.0); .....0.5
		Clause b = new Clause("Kids Program", 150000.0); .....0.5
		c1.addClause(a); .....0.5
		c1.addClause(b); .....0.5

		Contract c2 = new Contract(2222, "22/8/2011", "MBC TV");.....0.5
		Clause c = new Clause("Media", 120000.0); .....0.5
		Clause d = new Clause("TV", 90000.0); .....0.5
		Clause e = new Clause("Visiting Schools", 350000.0); .....0.5
		c2.addClause(c); .....0.5
		c2.addClause(d); .....0.5
		c2.addClause(e); .....0.5

		FootballPlayer pl = new FootballPlayer("Beckham", 37, 10, 75,
"Mid Field");.....0.5
		pl.addContract(c1); .....0.5
		pl.addContract(c2); .....0.5
		System.out.println(pl.averageContrcatsRevue());.....0.5

	}

}
```