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Name: ..... ID:		

EXECRICE 1 (15 marks)

1.1 Write the output of the following program .

```
class A {
  public A() {
    System.out.println(
      "The default constructor of A is invoked");
  }
}

class B extends A {
  public B() {
    System.out.println(
      "The default constructor of B is invoked");
  }
}

public class C {
  public static void main(String[] args)  {
    B b = new B();
  }
}
```

Output:

1.2 Write the output of the following program.

```
class Test {
  public static void main(String[] args) {
    try {
      System.out.println("Welcome to Java");
      int i = 0;
      int y = 2/i;
      System.out.println("Welcome to Java");
    }
    catch (ArithmeticException ex) {
      System.out.println("Welcome to Java");
    }
    finally {
      System.out.println("End of the block");
    }
  }
}
```

Output:

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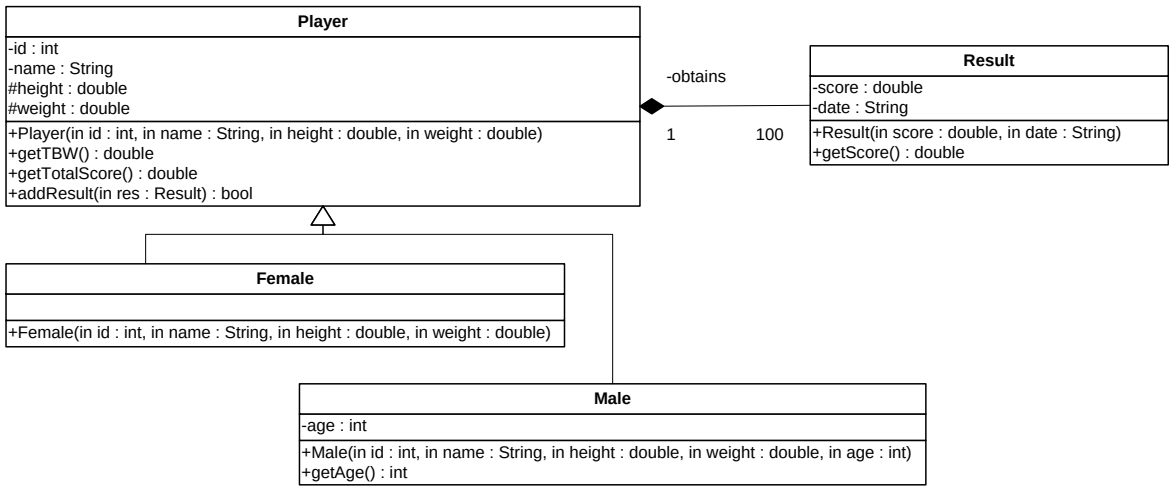
EXECRICE 2 (30 marks)



- ***Class Player***
  Player(…): constructor. By default a player may have 100 results.
  getTBW(): calculates the Total Body Water (TBW) based on the following formulas:
  For Male: TBW = 2.447 - (0.09156 x age) + (0.1074 x height) + (0.3362 x weight)
  For Female: TBW = -2.097 + (0.1069 x height) + (0.2466 x weight)
  getTotalScore(): returns the sum of the scores obtained by the player.
  addResult(…): adds a new result to the player results. It returns true if the insertion is done. Otherwise, it returns false.

- ***Class Result***
  Result(…): constructor
  getScore(): returns the score of the result.

- ***Class Male***
  Male(…): constructor
  getAge(): returns the age of the male.

<u>Write in Java the classes: Player, Result and Male.</u>

Class Player

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Class Result

Class Male

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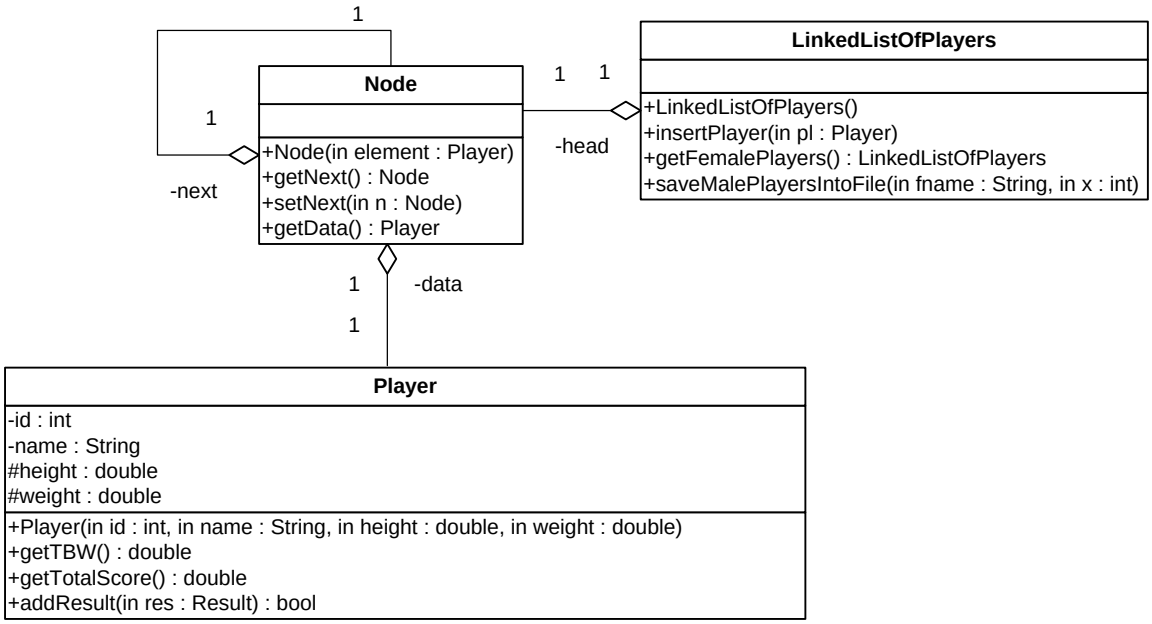
EXECRICE 3 (35 marks)



- ***Class LinkedListOfPlayers***

LinkedListOfPlayers(): constructor

insertPlayer(…): inserts a Player object in the list. If the player is a **male**, he will be inserted **at front**. If the player is a **female**, she will be inserted **at back**.

getFemalePlayers(): returns a list of all Female player objects.

saveMalePlayersIntoFile(String fname, int x): writes into the file fname the Male player objects which have an age < x.

Write in Java the class *LinkedListOfPlayers*. Suppose that all the other classes are implemented.

Class LinkedListOfPlayers

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  }
}

public class C {
  public static void main(String[] args)  {
    B b = new B();
  }
}
```

Output (6 Marks):

```
The default constructor of A is invoked
The default constructor of B is invoked
```

1.2 Write the output of the following program.

```
class Test {
  public static void main(String[] args) {
    try {
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      int i = 0;
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      System.out.println("Welcome to Java");
    }
    catch (ArithmeticException ex) {
      System.out.println("Welcome to Java");
    }
    finally {
      System.out.println("End of the block");
    }
  }
}
```

Output (9 Marks):

```
Welcome to Java
Welcome to Java
End of the block
```

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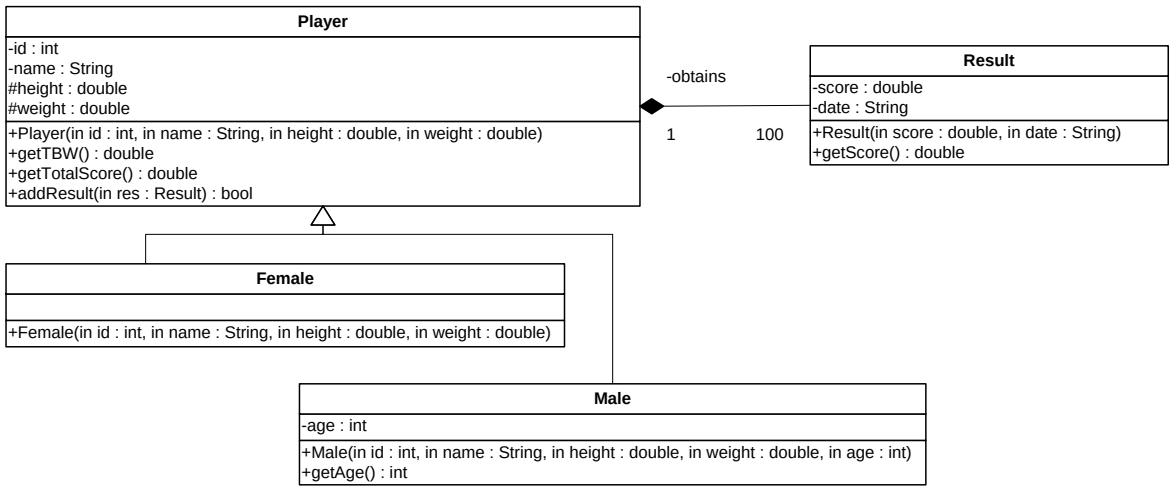
EXECRICE 2 (30 marks)



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  Male(…): constructor
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<u>Write in Java the classes: Player, Result and Male.</u>

Class Player

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Name: ..... ID:		

Class Result

Class Male

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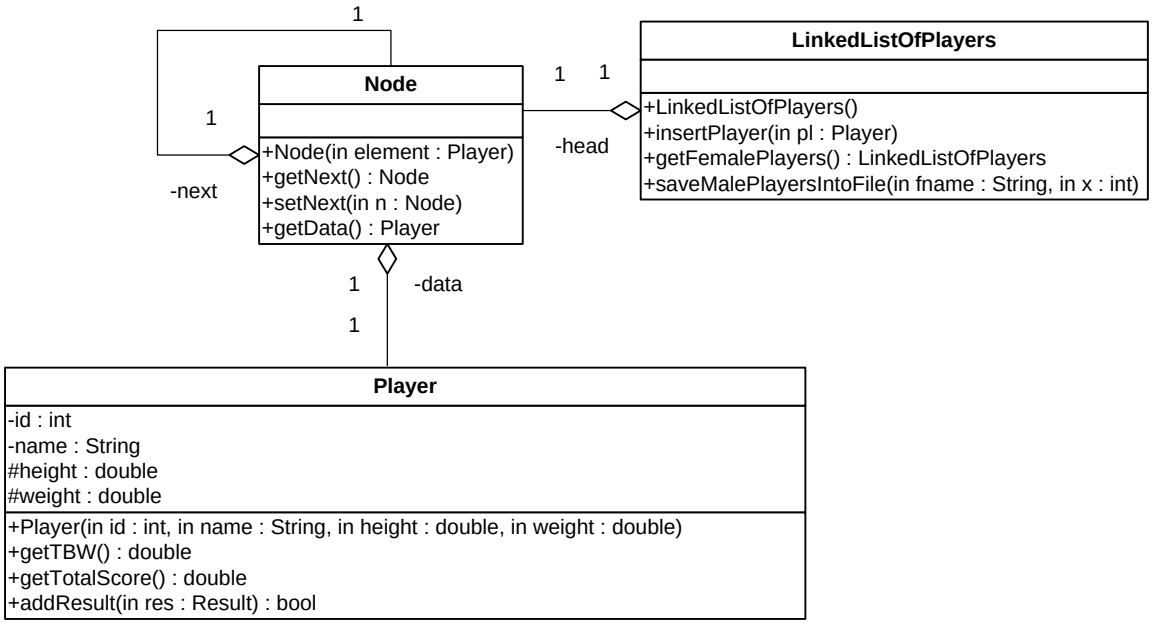
Name: ..... ID:		

EXECRICE 3 (35 marks)



- ***Class LinkedListOfPlayers***

LinkedListOfPlayers(): constructor

insertPlayer(…):inserts a Player object in the list. If the player is a **male**, he will be inserted **at front**. If the player is a **female**, she will be inserted **at back**.

getFemalePlayers(): returns a list of all Female player objects.

saveMalePlayersIntoFile(String fname, int x): writes into the file fname the Male player objects which have an age < x.

Write in Java the class *LinkedListOfPlayers*. Suppose that all the other classes are implemented.

Class LinkedListOfPlayers

```
(Marks: 16) public abstract class Player implements java.io.Serializable … 2
{
	private int id;
	private String name;
	protected double height;
	protected double weight;
	private Result[] obtained;  …… 1
	int nb;   …… 1

	public Player(int id, String name, double height, double weight)
	{
		this.id = id;
		this.name = name;
		this.height = height;
		this.weight = weight;
		obtained = new Result[100]; …… 1
		nb = 0;     …… 1
	}

	public abstract double getTBW();        …… 2

	public double getTotalScore()
	{
		double sum = 0.0;
		for(int i=0; i<nb; i++) …… 1
		{
			sum += obtained[i].getScore();…… 1
		}
		return sum; …… 1
	}

	public boolean addResult(Result res)
	{
		if(nb < obtained.length) …… 1
		{
			obtained[nb] = new Result(res); …… 2
			nb++;  …… 1
			return true; …… 0.5
		}
		return false; …… 0.5
	}
}
```

```
public class Result (Marks: 6)
{
	private double score;
	private String date;

	public Result(double s, String d)
	{
		this.score = s; ..... 1
		this.date = d;  ..... 1

	}


	public Result(Result r) ..... 2
	{
		this.score = r.score; ..... 0.5
		this.date = r.date;  ..... 0.5

	}
	public double getScore()
	{
		return score; ..... 1
	}

}



(Marks: 8) public class Male extends Player ..... 1
{
	private int age;

	public Male(int id, String name, double height, double weight, int age)
	{
		super(id, name, height, weight); ..... 2
		this.age = age;  ..... 1
	}

	public int getAge()
	{
		return age; ..... 1
	}

	public double getTBW()..... 2
	{
		return 2.447 - (0.09156 * age) + (0.1074 * height) + (0.3362 *
weight); ..... 1
	}
}
```

```
import java.io.*;


public class LinkedListOfPlayers (Marks: 35)
{
	private Node head; ..... 1

	public LinkedListOfPlayers()
	{
		head = null; ..... 1
	}

	public void insertPlayer(Player pl)
	{
		Node q = new Node(pl); ..... 1

		if (  pl instanceof Male) { ..... 1
			q.setNext(head); ..... 2
			head = q; ..... 1
		}
		else ..... 1
		{
			Node tail = head; ..... 1

			if(head == null) ..... 1
			{
				head = q; ..... 1
			}
			else ..... 1
			{
				while (tail.getNext() != null) ..... 1
				{
					tail = tail.getNext();..... 1
				}
				tail.setNext(q); ..... 2
			}

		}

	}

	public LinkedListOfPlayers getFemalePlayers()
	{
		Node d = head; ..... 1
		LinkedListOfPlayers list = new LinkedListOfPlayers(); ..... 1

		while (d != null) ..... 1
		{
			if (d.getData() instanceof Female) ..... 1
			{
				list.insertPlayer(d.getData());..... 1
			}
			d = d.getNext();..... 1
		}
		return list; ..... 1
	}
```

```
	public void saveMalePlayersIntoFile(String fname, int x)
			throws IOException ..... 2
	{
		try
		{
			File f = new File(fname); ..... 1
			FileOutputStream fo = new FileOutputStream(f); ..... 1
			ObjectOutputStream os = new ObjectOutputStream(fo); ..... 1

			Node d = head;	..... 1
			while (d != null) ..... 1
			{
				if (  d.getData() instanceof Male &&
					((Male)d.getData()).getAge() < x) ..... 2
				{
					os.writeObject(d.getData());..... 1
				}
				d = d.getNext();..... 1
			}
			os.close();..... 1

		}
		catch(IOException e)
		{
			System.out.println("Error handling file " + fname);
		}

	}


}
```