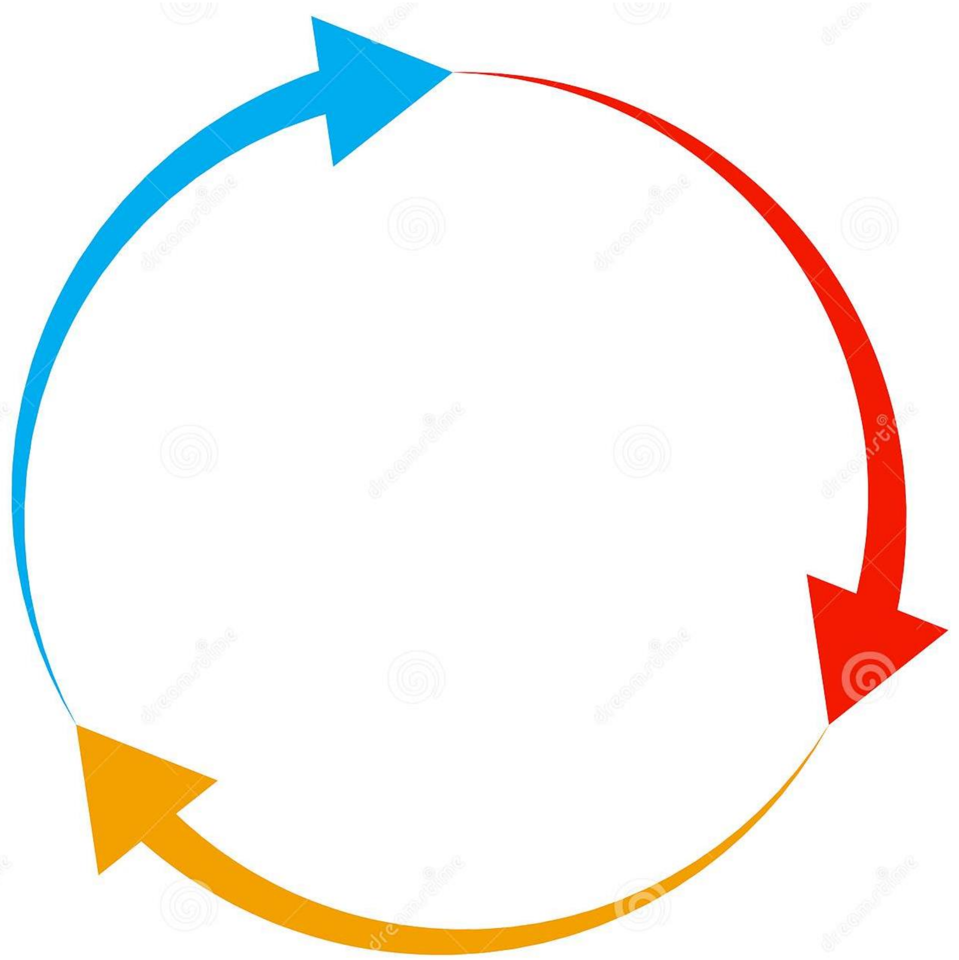
OBJECTIVES

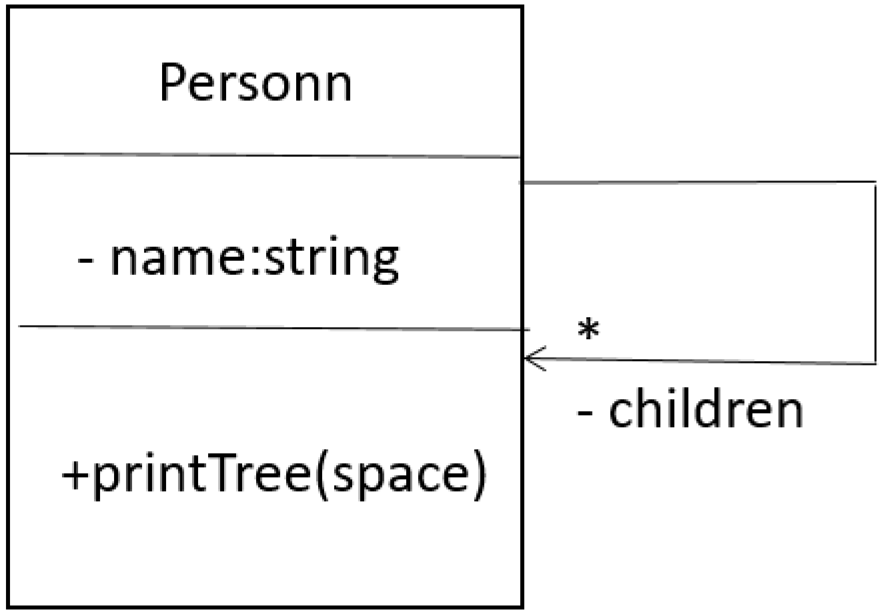
- ✓ Be able to write a **recursive** method
- ✓ Know what is a **circular reference** and how to fix it
- ✓ Be able to write a method to check if **2 object are equal**
- ✓ Understand the difference between **object with ID** and **without ID**

RECURSIVITY & CIRCULAR REFERNCE



Understand a recursive call

A person can have **many children**:



We want to **print the tree** of persons:

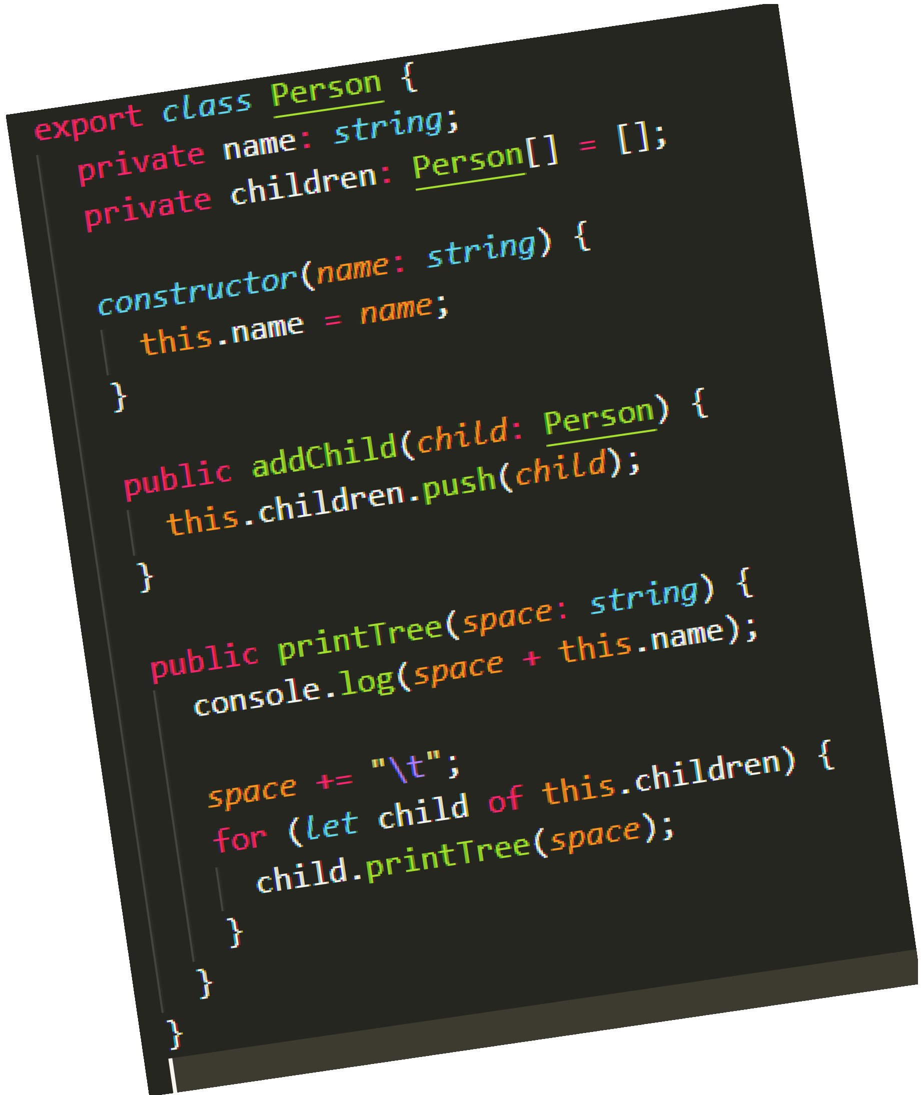
```
RONAN
    RADY
        HIM
    RITH
```

Ronan has 2 children Rady and Rith

Rady has 1 child Him

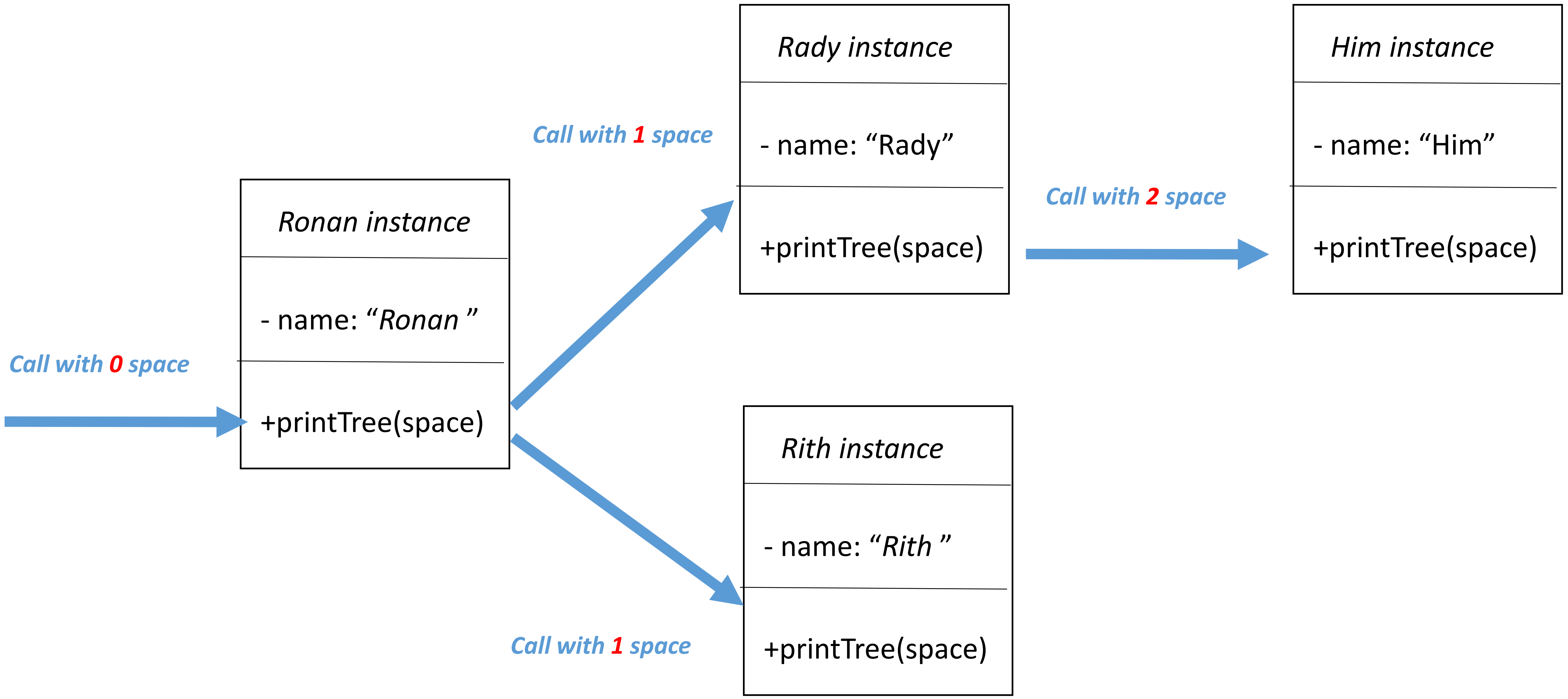
ACTIVITY 1

```
//  1 – Read the printTree method

//  2 – Understand how we increment the space
variable   to display the tree of personns


//  3 – Add a child to RITH and another child to
RADY
```



```
export class Person {
    private name: string;
    private children: Person[] = [];

    constructor(name: string) {
        this.name = name;
    }

    public addChild(child: Person) {
        this.children.push(child);
    }

    public printTree(space: string) {
        console.log(space + this.name);

        space += "\t";
        for (let child of this.children) {
            child.printTree(space);
        }
    }
}
```

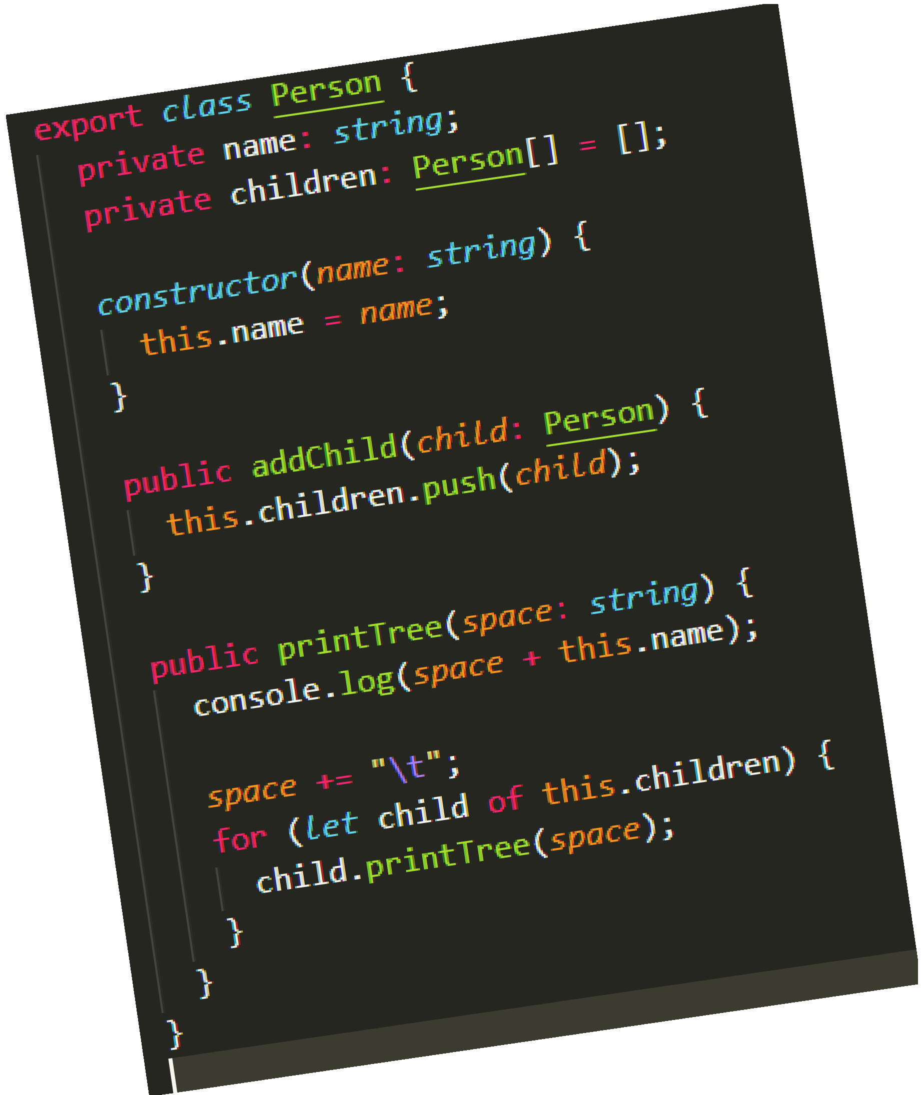
We recursively call the same method on children



ACTIVITY 2

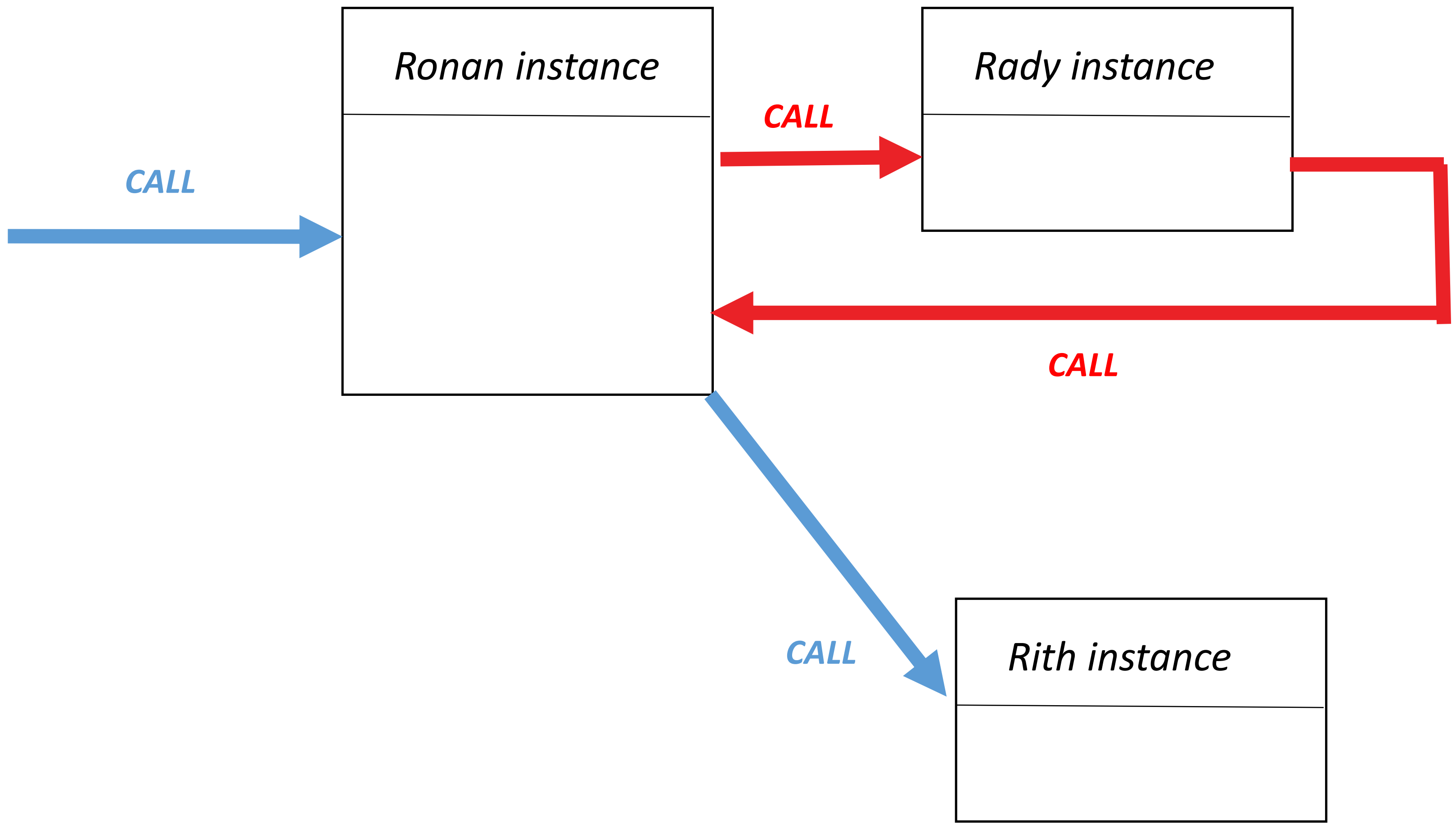
```
//  1 – Now Ronan is the child of Rady !!!!

//  2 – Run the code and understand see what happen
!
```

Note : to break the code : **CTRL + Z**



```
export class Person {
  private name: string;
  private children: Person[] = [];

  constructor(name: string) {
    this.name = name;
  }

  public addChild(child: Person) {
    this.children.push(child);
  }

  public printTree(space: string) {
    console.log(space + this.name);

    space += "\t";
    for (let child of this.children) {
      child.printTree(space);
    }
  }
}
```

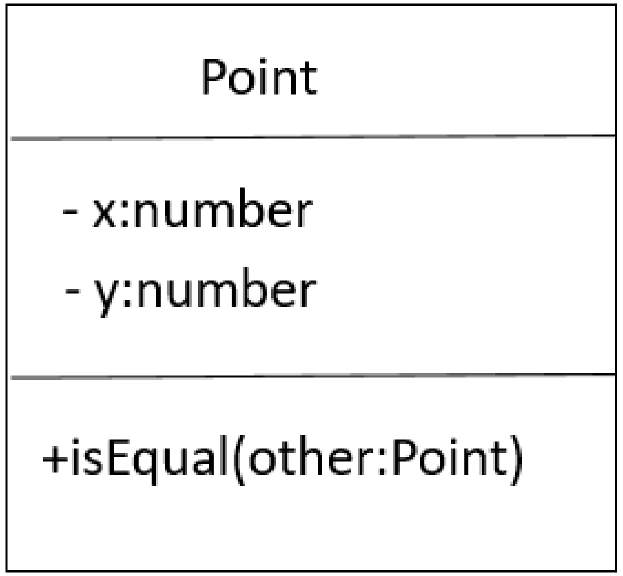
We loop because there is a circular reference



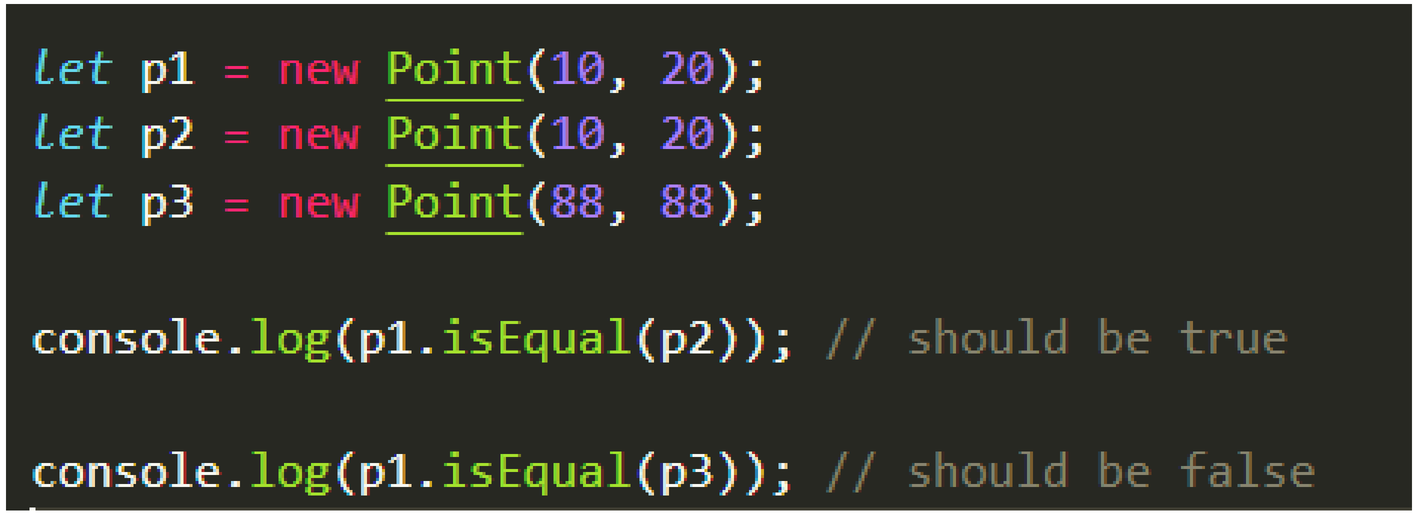
Equality of objects

Equality of objects

A point has 2 positions : X and Y



We want to **COMPARE** 2 points :



```
let p1 = new Point(10, 20);
let p2 = new Point(10, 20);
let p3 = new Point(88, 88);

console.log(p1.isEqual(p2)); // should be true

console.log(p1.isEqual(p3)); // should be false
```

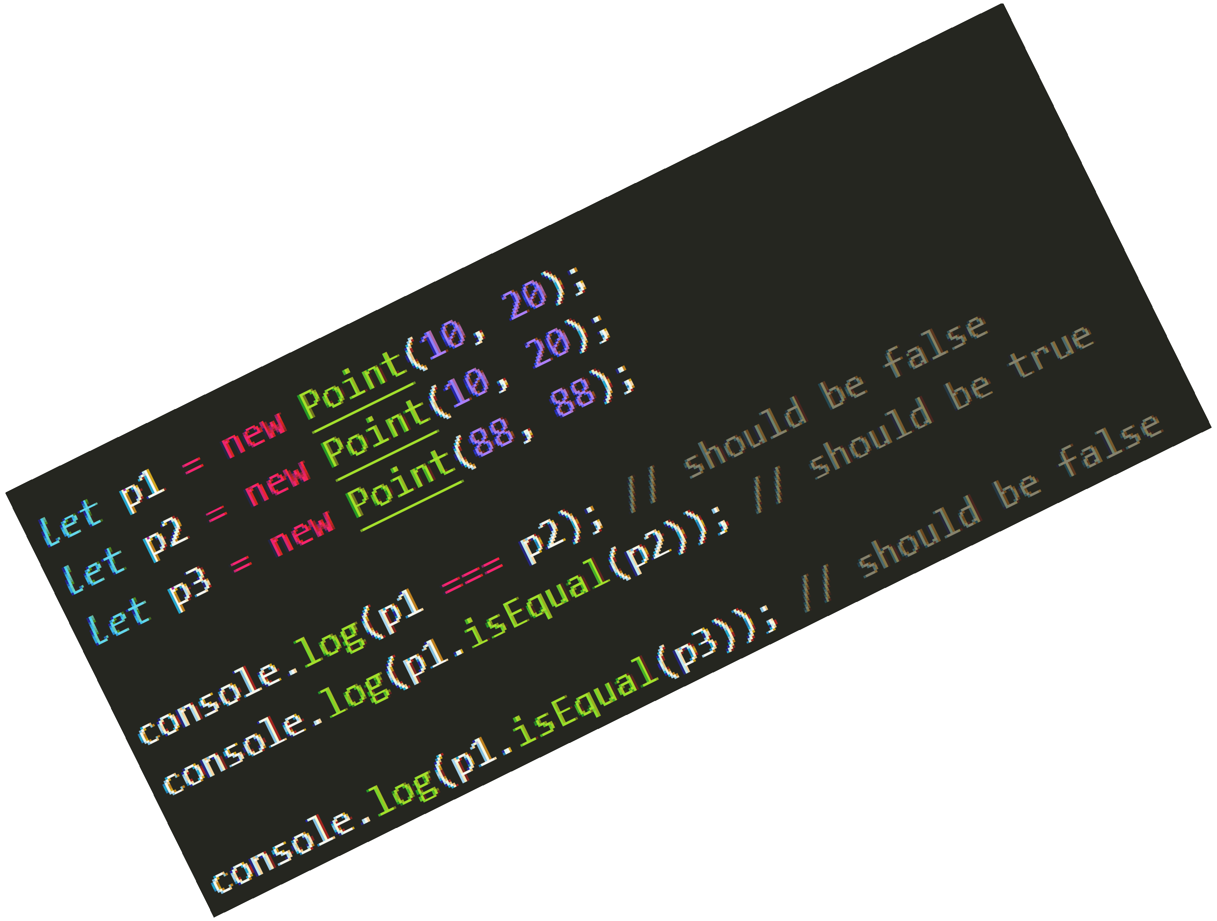
ACTIVITY 3

// 1 – What p1 === p2 return **false** ?

// 2 – Implement the **equal method** on Point class

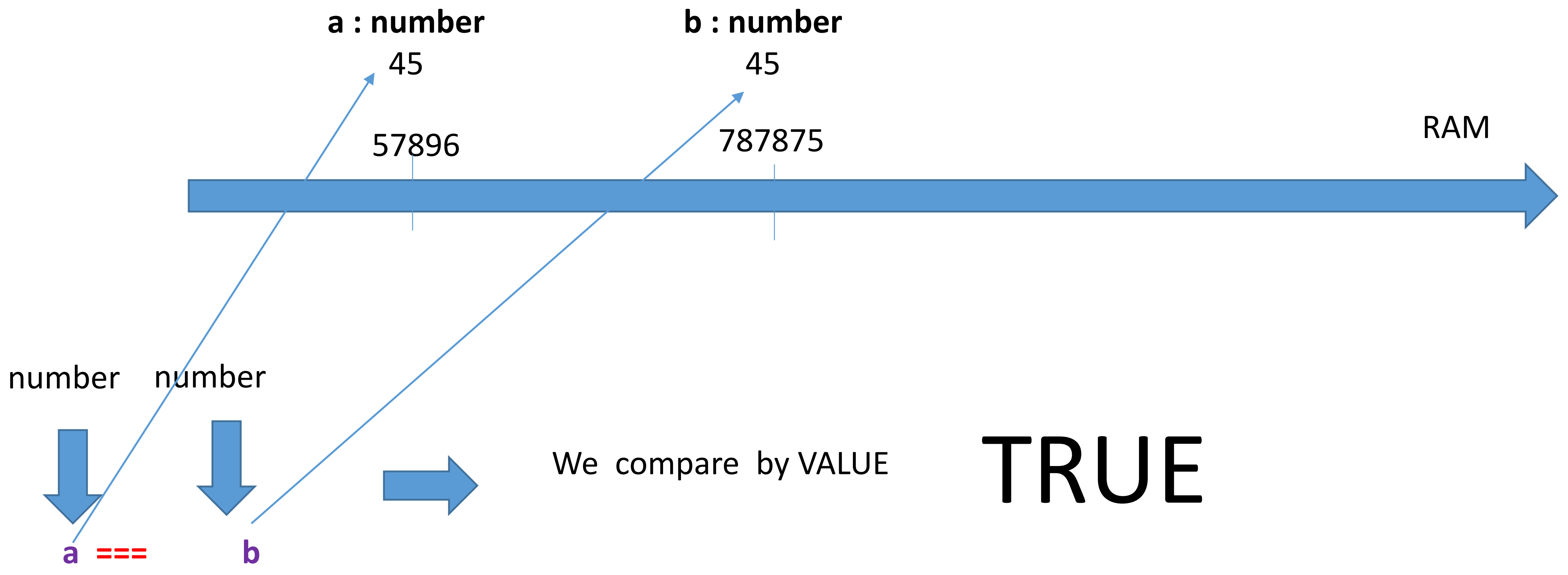
// 3 – Check that p1.equal(p2) return **true**

// 4 – Check that p1.equal(p3) return **false**



```
let p1 = new Point(10, 20);
let p2 = new Point(10, 20);
let p3 = new Point(88, 88);

console.log(p1 === p2); // should be false
console.log(p1.isEqual(p2)); // should be true

console.log(p1.isEqual(p3)); // should be false
```

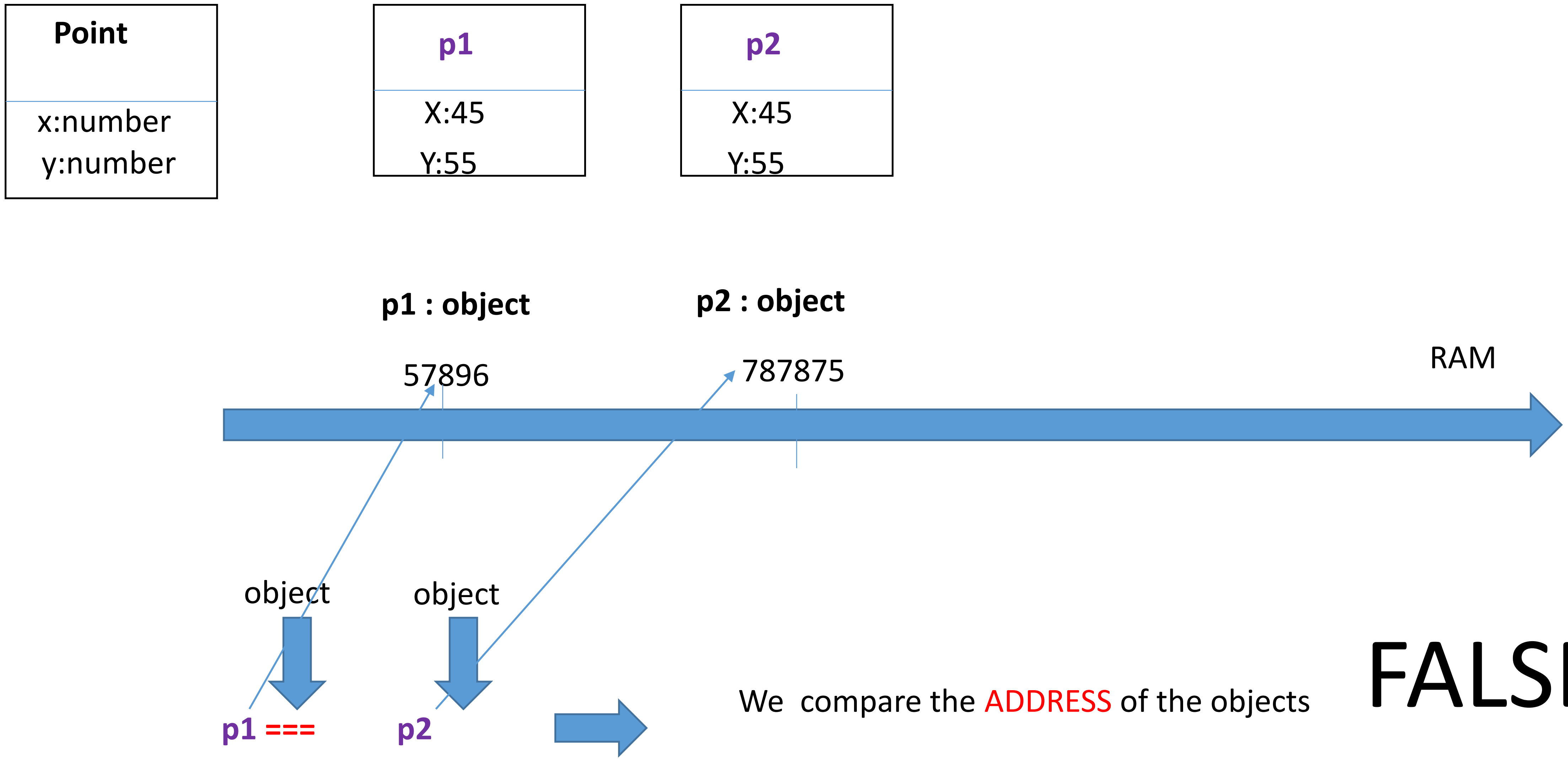
FOR PRIMITIVE TYPES number boolean string



We compare by VALUE

TRUE

FOR OJECT/ARRAY TYPES



We compare the ADDRESS of the objects

FALSE

Equality of objects

```
let a = 45;
let b = 45;

let c = a === b
```

True because a and b are

primitive types

For primitives == is done is on the value

```
let a = new Person(‘x’);
let b = new Person(‘x’);

let c = a === b
```

False because a and b are

object types

For object == is done is on the @ in RAM

```
let a = new Person(‘x’);
let b = new Person(‘x’);

let c = a.equals(b)
```

True because now we really compare the 2 persons using their attributes

ID or not ID ?

ACTIVITY 4

Which class should have an ID attribute ?

A
```
class Address {
}
```

B
```
class Car {
}
```

C
```
class Date {
}
```

D
```
class Student {
}
```

E
```
class Point {
}
```

F
```
class Computer {
}
```

ACTIVITY 4

Which class should have an ID attribute ?

A
```
class Address {
}
```

[✓ B]
```
class Car {
}
```

C
```
class Date {
}
```

[✓ D]
```
class Student {
}
```

E
```
class Point {
}
```

[✓ F]
```
class Computer {
}
```

ID or not ID ?

Objects **without proper identity** do **not** need ID

Example: Address, Date, Time, Point, Vector

```
class Point {
   x: number;
   y: number
}
```

Objects **which refer to something unique** **needs an ID**

Example: Student, School, Travel, Bus

```
class Student {
   id: number;
   name: string;
}
```

isEqual() with id/no id

```
public isEqual(other: student): boolean
{
    return  this.id === other.id;
}
```

```
public isEqual(other: point): boolean {
    return
         this.x === other.x
      && this.y === other.y;
}
```

SO !!!

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