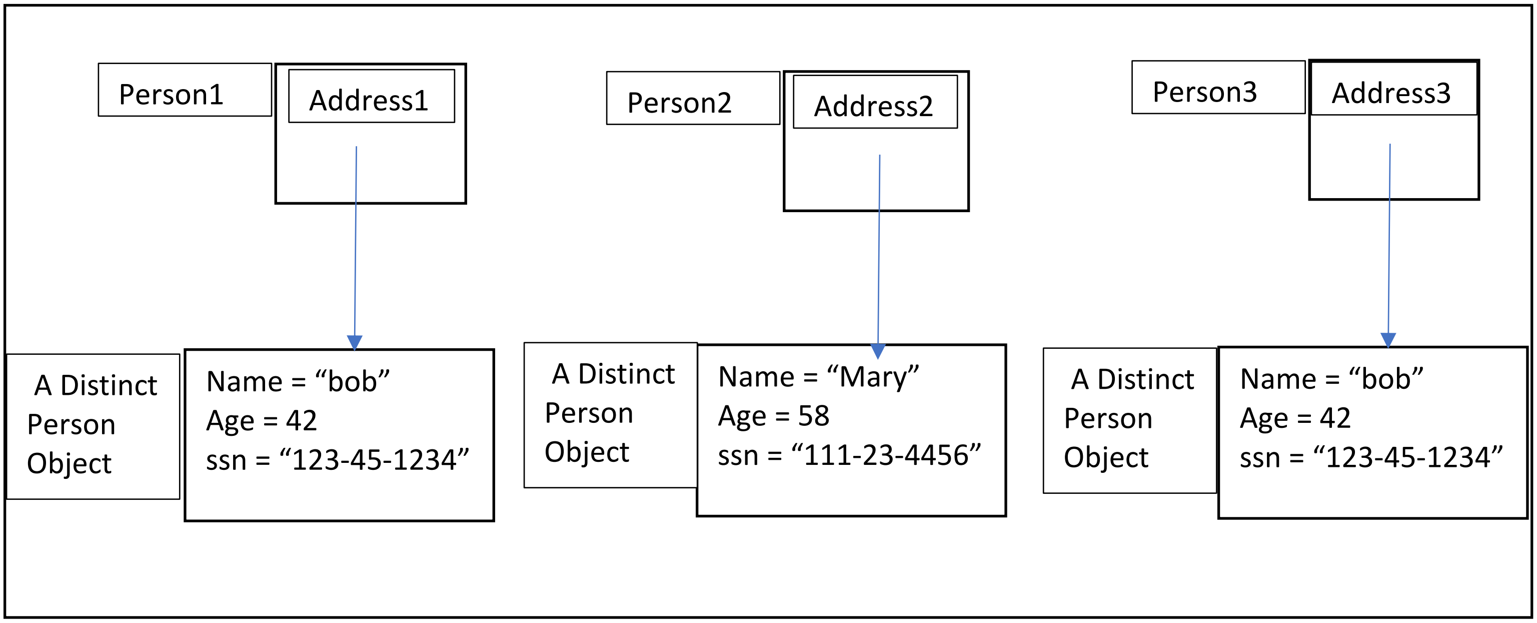
Recitation 0: Equals Method, Clone Method, Documentation

Making Equals Easy

- Using the "==" operator
  - Compares *Addresses* NOT *objects*
  - Example 1:

```
Person person1 = new Person("bob",42,"123-45-1234");
Person person2 = new Person("Mary",58,"111-23-4456");
Person person3 = new Person("bob",42,"123-45-1234");
```



What is the result of: person1 == person3
Answer: ________________

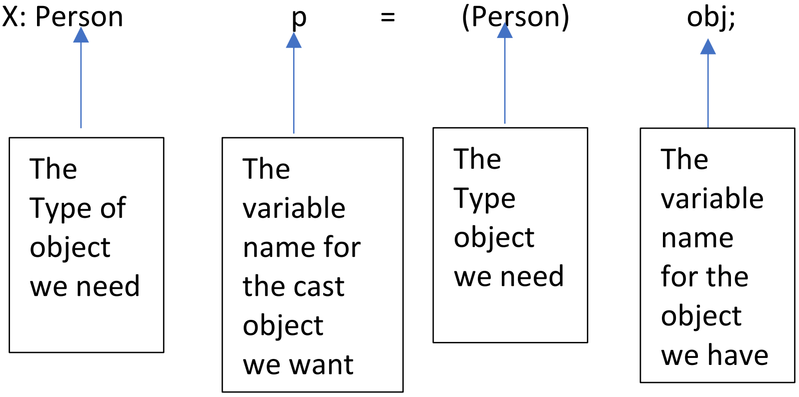
Why?

How do we check for object Equality?

- The pseudo-code of the equals method:

```
public boolean equals(Object obj){

    If(obj is actually a person){          ______________________________

    Person p = (Person)obj;                ______________________________

    return true if all fields are equal

    }

    return false;
}
```

- ***Typecasting****
  - The equals method accepts an ____________ as an argument
  - To tell the compiler that the object is actually a "Person" we typecast
  - EX: Person   p   =   (Person)   obj;



The Type of object we need

The variable name for the cast object we want

The Type object we need

The variable name for the object we have

The full person equals method:

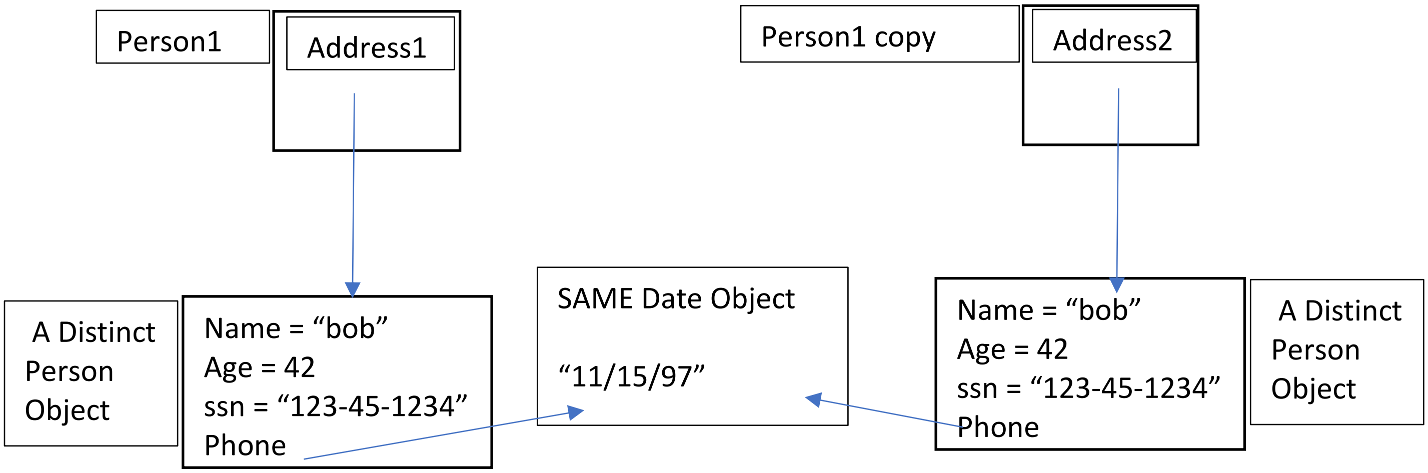
Clarifying the Clone Method

- The clone method:

```
public Person clone(){

Person newPerson = new Person(this.name,this.age,this.ssn);

return newPerson;

}
```

  - Shallow copy:
    - Lets say we add a new field to Person
      - private Date birthdate
        - Which is an object that represents a person’s birthday
      - What happens when we try:

```
public Person clone(){

Person newPerson = new Person(this.name,this.age,this.ssn, this.birthdate);

return newPerson;

}
```



- This will create a SHALLOW copy: if we edit the birthday of one person, the other persons birthday will also be edited
- How Do we fix this? ___________________________________
- String do not have to be deep copied because they are immutable (cannot be altered once created)!

```
public Person clone(){

        Person newPerson = new Person(this.name,this.age,this.ssn, this.birthdate.clone);

        return newPerson;
}
```

Creating deep Clone (and Equals) methods

- To create a “deep” clone (or equals) method you use the cloning (or equals) method of one object inside of the cloning (or equals) method of another object.
  - Methods with many lines are hard to read and debug
  - How can we shorten clone and equals method?
  - Cloning example:
    - Let’s say we have a UniversityClass object which has a private field Person[] roster
    - We could do:

```
public Class clone(){
        Class classCopy = new Class();
        for(Person p: roster){
                Person newPerson = new Person(p.getName(),p.getAge(),p.getSSN());

                //THIS MAKES US USE TOO MANY GETTERS WHICH IS UNESSECCERY

                classCopy.add(newPerson);
        }

        Return classCopy;
}
```

- Instead we will do:

```
public Class clone(){

        Class classCopy = new Class();

        for(person p in the class){

                classCopy.add(p.clone());

}

Return classCopy;
}
```

MUCH SHORTER! EASIER TO READ/DEBUG!

Discovering Documentation

- API: Application Programmer Interface
    - How can we use the code someone else wrote?
- How can we document how to use our code so that other programmers can use it?
    - *Javadoc*
        - Javadoc creates a set style in which to write documentation so different programmers can communicate how their code works to each other

Tag	Meaning	Place
@see	See related content	Class, Method
@author	Author of the class	Class
@version	The version of the class (Used for updates to code)	Class
@param	Information on the parameter of a method	Method
@return	Information of the return value for a method	Method
@exception	Information on exceptions thrown by a method	Method
@throws	Information on exceptions thrown by a method	Method
@deprecated	Marks an element as deprecated	Class, Method
@since	The API version this element was first included	Class, Method

*Bold tags are the most important ones you will need to know for CSE 214

Documentation Examples

```
/**
 * This class Represents a person which has a name, age and associated SSN
 *
 * @author Juan Tarquino
 */
public class Person {
.........
}

/**
 * This method adds two positive numbers together
 *
 * @param num1
 * The first number to be added
 * @param num2
 * The second number to be added
 *
 * @return
 *The sum of the first and second number
 *
 * @throws IllegalArgumentException
 *  when either of the numbers is negative
 */
public int add (int num1, int num2) throws IllegalArgumentException{
   if(num1 < 0 || num2 < 0)
      throw new IllegalArgumentException("One of the numbers is negative!");

   return num1 + num2;
}

/**
 * This is a Constructor used to create a new Person object
 *
 * @param name
 *     The name of the person
 * @param age
 *     The age of the Person
 * @param ssn
 *  The social security number of the person
 */
public Person(String name, int age, String ssn){
   this.name = name;
   this.age = age;
   this.ssn = ssn;
}
```