Implementation of hashCode() & equals()

```
package maps;

import ~~jo~~ java.util.*;

public class HashCodeAndEquals {
    public static void main(String[] args) {

        Pen pen1 = new Pen(10, "blue");
        Pen pen2 = new Pen(10, "blue");

        System.out.println(pen1);
        System.out.println(pen2);

        // System.out.println(pen1.equals(pen2));

        Set<Pen> pens = new HashSet<>();
        pens.add(pen1);
        pens.add(pen2);

        System.out.println(pens);
    }
}
class Pen {
    int price;
    String color;
```

```
public Pen(int price, String color){
    this.price = price;
    this.color = color;
}

@Override
public boolean equals(Object obj){
    Pen that = (Pen) obj;

    boolean isEqual = this.price ==
        that.price && this.color.
                    equals(that.
                    color);

    return isEqual;
}

@Override
public int hashCode(){
    return price + color.hashCode();
}
}
```

The Contract

The contract blw equals() and hashCode() is:

1. If two objects are equal, then they must have same hashcode.

2. If two objects have the same hashcode they may or may not be equal.

Best practices

1. Always use same attributes of an object to generate hashCode() & equals() both

2. equals() must be consistent (if the objec are not modified, then it must keep returning the same value).

3. whenever a.equals(b), then a.hashCode() must be same as b.hashCode().

4. If you override one, then you should override the other.

```
@override
public int hashCode() {
    final int prime = 31;
    int result = 1;
    result = prime * result + ((color == null
                                ? 0 : color.
                                hashCode());
    result = prime * result + price;
    return result;
}

@ override
public boolean equals (Object obj) {
    if (this == obj)
        returns true;
    if (obj == null)
        returns false;
    if (getclass() != obj.getClass())
        return false;

    Pen other = (Pen) obj;
    if (color == null) {
        if (other.color != null)
            return false;
    }
    else if (!color.equals (other.color))
        return false;
        if (price != other.price)
            return false;
    return true;
```