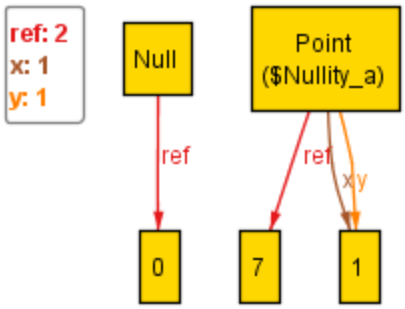
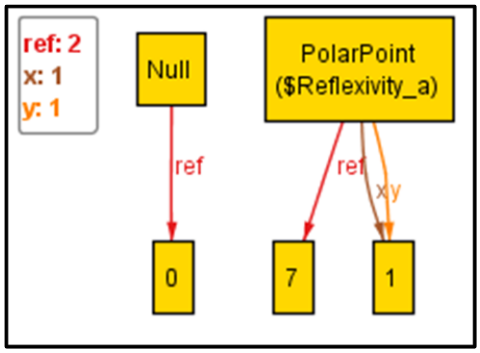
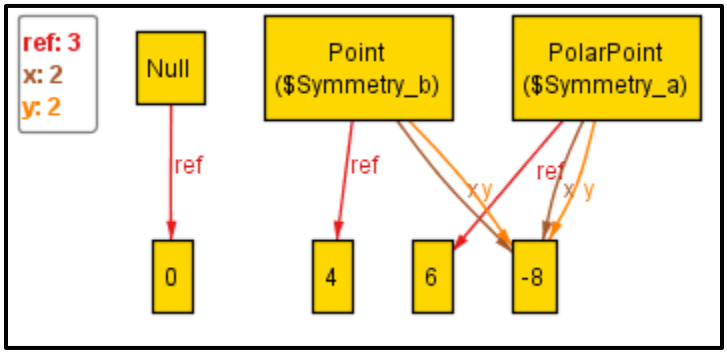
1. Set 0 violated the nullity rule since a point was not equal to itself. Below is the code for reproducing the error.




```
Point p = new Point(1,1);
System.out.printf("Expected: %b, Actual: %b", false, p.equals(null));
```

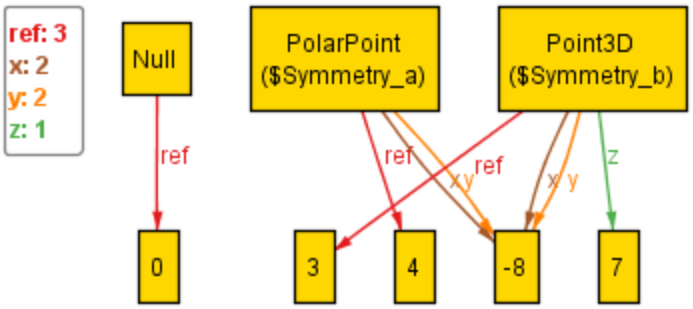
2. Set 1 violated the reflexivity and symmetry rules.





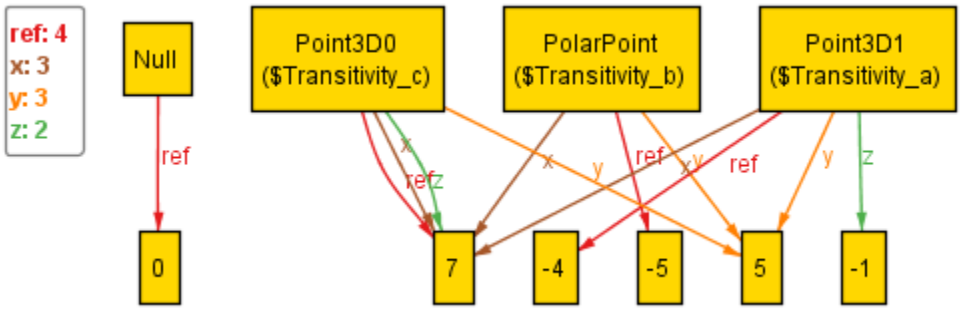

```
PolarPoint p1 = new PolarPoint(new Point(1, 1));
System.out.println("Reflexitvity violation: p1 != p1");
System.out.printf("Expected: true, Actual: %b\n", p1.equals(p1));

Point p2 = new Point(-8, -8);
PolarPoint p3 = new PolarPoint(p2);
System.out.println("Symmetry violation: p2 != p3 but p3 = p2");
System.out.printf("Expected: false, false, Actual: %b, %b\n", p2.equals(p3),
p3.equals(p2));
```

3. Set 2 violated symmetry.



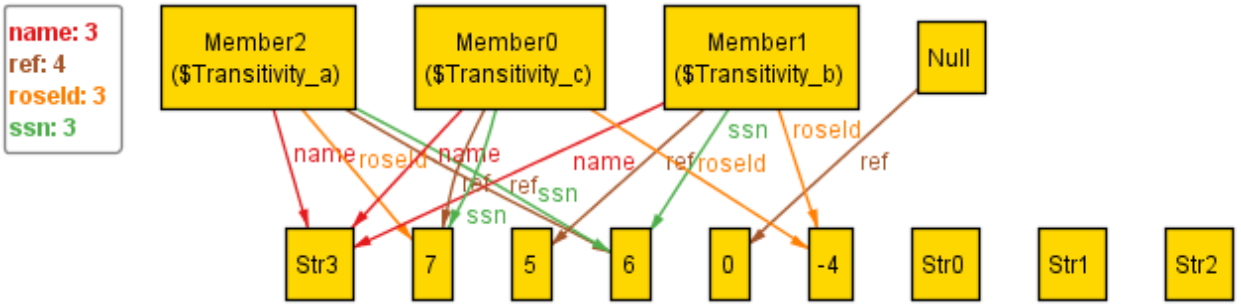

```
Point p1 = new Point(-8, -8);
Point3D p2 = new Point3D(-8, -8, 7);
System.out.println("Symmetry violation: p1 = p2 but p2 != p1");
System.out.printf("Expected: false, false, Actual: %b, %b", p1.equals(p2),
      p2.equals(p1));
```

4. Set 3 violated transitivity.




```
Point3D p1 = new Point3D(7, 5, -1);
PolarPoint p2 = new PolarPoint(new Point(7, 5));
Point3D p3 = new Point3D(7, 5, 7);
System.out.println("Transitivity violation: p1 = p2, p2 = p3, but p1 != p3");

boolean c1 = p1.equals(p2);
boolean c2 = p2.equals(p3);
boolean c3 = p1.equals(p3);
System.out.printf("Expected: false, false, false, Actual: %b, %b, %b",
      c1, c2, c3);
```

5. Set 4 did not violate any principles.
6. Set 5 violated transitivity




```
Member a = new Member("Str$3", 7, 6);
Member b = new Member("Str$3", -4, 6);
Member c = new Member("Str$3", -4, 7);

System.out.println("Transitivity error: a = b, b = c, a != c");

boolean c1 = a.equals(b);
boolean c2 = b.equals(c);
boolean c3 = a.equals(c);
System.out.printf("Expected: false, false, false, Actual: %b, %b, %b",
      c1, c2, c3);
```