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## Principles of Software Quiz 5

October 25, 2018

10 points total

**Question 1.** (8pts) Consider this Duration class similar to the one we saw in lecture:

```
class Duration {
    private final int min;
    private final int sec;
    public Duration(int min, int sec) {
        this.min = min;
        this.sec = sec;
    }
    public boolean equals(Object o) {
        System.out.println("Duration.equals");
        if (! (o instanceof Duration) ) return false;
        Duration d = (Duration) o;
        return this.min == d.min && this.sec == d.sec;
    }
}

class NanoDuration extends Duration {
    private final int nano;
    public NanoDuration(int min,
        int sec,
        int nano){
        super(min,sec);// initializes min&sec
        this.nano = nano;
    }
    public boolean equals(Object o) {
        System.out.println("NanoDuration.equals");
        if (! (o instanceof Duration) ) return false;
        if (! (o instanceof NanoDuration) ) return super.equals(o);
        NanoDuration nd = (NanoDuration) o;
        return super.equals(nd) && nd.nano == nano;
    }
}

public class TestDuration2 {
    public static void main(String[] args) {
        Duration d1 = new NanoDuration(5,10,15);
        Object d2 = new Duration(5,10);
        Object d3 = new NanoDuration(5,10,30);
        System.out.println(d1.equals(d2));
        System.out.println(d2.equals(d3));
        System.out.println(d1.equals(d3));
    }
}
```

What is printed by the code above?

(8 points) -1 for each wrong or missing answer. No negative scores.

NanoDuration.equals

Duration.equals

true

Duration.equals

true

NanoDuration.equals

Duration.equals

false

**Question 2.** (2pts) Integer f(String) is a true function subtype of Number f(Object). Note: Integer is a subtype of Number.

(a) true

(b) false

b false