

2020-09-11

## ES-1

static boolean control (int[] nums, int n)

```
/* requires n > 0 && nums != null && (forall int i; i >= 0 && i < nums.length;
e      !(exists int j; j >= 0 && j < nums.length && j != i; nums[j] == nums[i])) &&
e      n < nums.length;
e
e  ensures (result == true) <==> (forall int i; i >= 0 && i < n;
e      !(exists int j; j >= n && j < nums.length; nums[j] > nums[i]));
e
e */
```

```
/* requires n > 0 && nums != null && (forall int i; i >= 0 && i < nums.length;
e      !(exists int j; j >= 0 && j < nums.length && j != i; nums[j] == nums[i]));
e
e
e  ensures (result == true) <==> (forall int i; i >= 0 && i < n;
e      !(exists int j; j >= n && j < nums.length; nums[j] > nums[i]));
e
e  signals (InvalidArgumentException IAE) n >= nums.length;
```

## ES-2

```
• public NumBin sum (NumBin a, NumBin b) {
    NumBin result = new NumBin (Integer.max (a.dim(), b.dim()) + 1);
    Integer<Integer> iA = new a.dehoSinistro();
    Integer<Integer> iB = new b.dehoSinistro();
    int i = result.dim() - 1; int bitSum = 0; int carry = 0;
    while (iA.hasNext() || iB.hasNext()) {
        bitSum = (iA.hasNext() ? iA.next() : 0) + (iB.hasNext() ? iB.next() : 0) + carry;
        result.setBit(i, bitSum > 1 ? 0 : 1);
        carry = (bitSum > 1 ? 1 : 0);
        i--;
    }
}
```

LSB  
↑  
1 0 0 1 0

```
• public boolean simetrico() {
    Integer<Integer> onati = new this.dehoSinistro();
    Integer<Integer> indela = new this.sinistroDestra();

    while (onati.hasNext()) {
        if (onati.next() != indela.next()) return false;
    }
    return true;
}
```

### ES-3

$\{$  Film:  $\rightarrow$  startPlayingVideo() & startPlayingSound()  
 $\{$  filmMuto  $\rightarrow$  startPlayingVideo()

$\Rightarrow$  Film  $\xrightarrow{\text{ext}}$  FilmMuto per il principio di sostituzione di Liskov

$\{$  Film: playing  $\begin{cases} \rightarrow \text{hasVideo() } \\ \rightarrow \text{hasAudio() } \end{cases}$   
 $\{$  filmMuto: playing  $\rightarrow$  hasVideo()

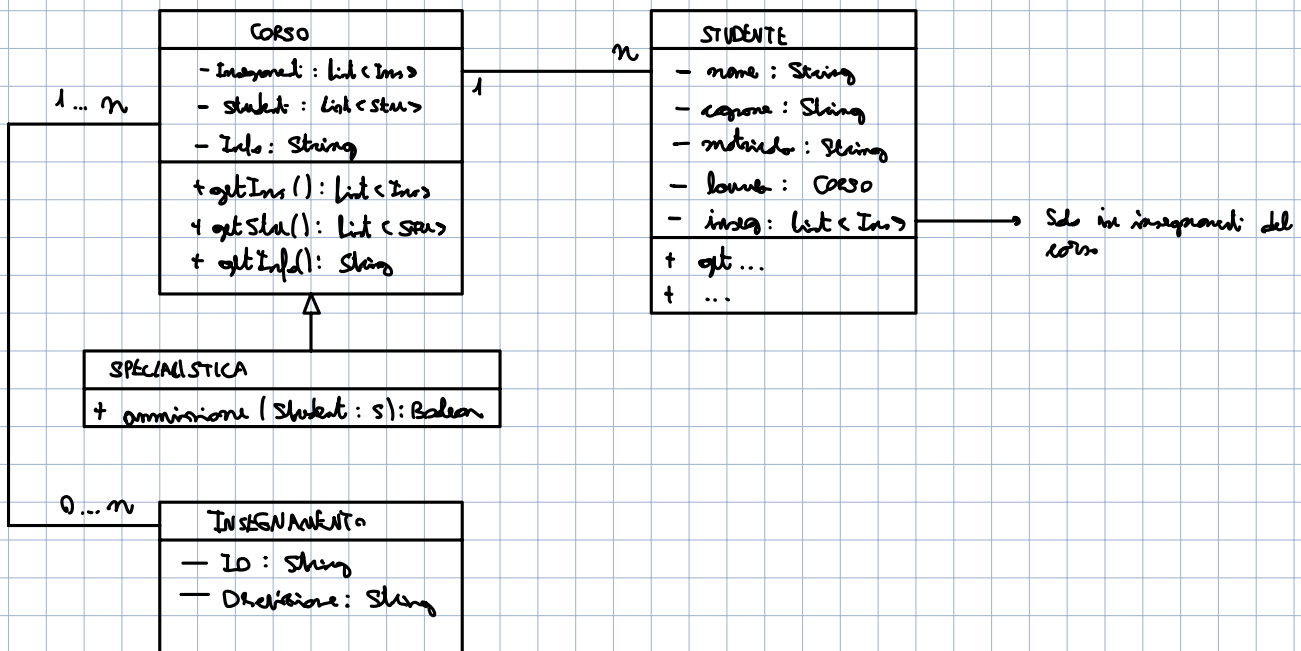
$\Rightarrow$  Film  $\rightarrow$  Extends  $\rightarrow$  Muto in quanto hasAudio() è necessario solo per film

• L'ultimo è irrilevante: hasVideo() hasAudio() sono necessari ad entrambi i metodi

### ES-4

return list.toString(), filter ( str  $\rightarrow$  str.length() % 2 == 0 & str.charAt(0) == 'a' ), count()

### ES-5



### ES-6

