

Quiz 17

Name: \_\_\_\_\_ Grade: \_\_\_\_\_

1. Fill in the blanks to specify LiftInterface in the left column and Lift in the right column:

```
public interface LiftInterface {
    /* You don't need to specify anything about these constants. */
    public final int UP = 1;
    public final int STOP = 0;
    public final int DOWN = -1;

    /**** MODEL FIELDS ****/
    //@ public model instance _____;

    //@ public model instance _____;

    //@ public model instance _____;

    //@ public model instance _____;

    //@ public model instance _____;

    /**** INVARIANTS ****/
    /*@
    @
    @ public invariant _____;
    @
    @ public invariant _____;
    @
    @ public invariant _____;
    @
    @ public invariant _____;
    @
    @ public invariant _____;
    @
    @ public invariant _____;
    @*/
```

```
class Lift implements LiftInterface {
    /**** REPRESENTATION ****/
    private int location; //@ in _____;

    //@ private represents _____;

    private boolean[] floorRequestLight;
    //@ maps floorRequestLight[*] \into requests;
    /*@ private represents requests \such_that
    @ (\forall int i; 0<=i && i<floorRequestLight.length;
    @ floorRequestLight[i] <==> requests.contains(i+1));
    @
    @ private represents topFloor <- floorRequestLight.length;
    @*/

    private boolean upArrowLight; //@ in arrows

    /*@ private represents arrows \such_that
    @ upArrowLight <==> (arrows == UP);
    @*/

    private boolean downArrowLight; //@ in _____;

    /*@ private represents _____
    @
    @ _____;
    @
    @*/

    private int nextDirection; //@ in _____;

    //@ represents _____;

    private boolean doorsOpen; //@ in _____;

    //@ represents _____;
```

## LiftInterface

```

/*@
@ public initially -----;
@
@ public initially -----;
@
@ public initially -----;
@
@ public initially -----;
@
@ public initially -----;
@*/

/*@
@ requires -----;
@
@ assignable -----;
@
@ ensures -----;
@*/
public void buttonPressed(int floor);

/*@
@ requires -----;
@
@ assignable -----;
@
@ ensures -----;
@*/
public /*@ pure @*/ boolean isFloorRequestLit(int floor);
// rest elided ...

```

## Lift class

```

/*@
@ requires -----;
@
@ assignable -----;
@
@ ensures -----;
@*/
public Lift(int numberOfFloors) {
    this.location = 0;
    this.floorRequestLight = new boolean[numberOfFloors];
    this.upArrowLight = false;
    this.downArrowLight = false;
    this.nextDirection = STOP;
    this.doorsOpen = false;
}

public void buttonPressed(int floor) {
    this.floorRequestLight[floor - 1] = true;
}

public boolean isFloorRequestLit(int floor) {
    return this.floorRequestLight[floor - 1];
}

// rest elided ...

```