Pigeon is a kind of Bird, and B777 is a kind of Airplane. Bird and Airplane are abstract classes. Pigeon and B777 are both Flyers. Every Flyer has public void methods `takeOff()` and `land()`. The strategies for taking off and landing are different between Birds and Airplanes, of course. Also, note that some Birds are not Flyers (e.g., Penguin).

A Pigeon is either Relaxed or Startled. It has public void methods `setRelaxed()` and `setStartled()`. When startled, a Pigeon will `takeOff()`.

Pigeons observe one other and startle easily, so that if one suddenly takes off, others also become startled and `takeOff`. It’s a pigeon thing (not all Birds so closely couple their flocking behaviors).

Airplanes can’t reliably track one another, so they are observed by an ATC (for “Air Traffic Controller”). Also, Airplanes observe the ATC. The Airplane notifies the ATC and passes a Request (there are various subclasses of Request) to the ATC. Likewise, the ATC notifies the Airplane when it needs to, passing various types of Command (to control the Airplane’s heading, altitude, runway to take off from, etc.). Don’t worry about the specific subclasses of Request and Command).

A Boy is a Visitor to various types of Flyers, including Pigeons and Airplane. If he visits a Pigeon, the latter will be startled and `takeOff()`. If he visits an Airplane, he will be invited into the cockpit\(^1\) by Airplane’s public method `void seeCockpit()`.

Design (don’t fully implement) a system for the above that uses the Observer, Strategy, State, and Visitor patterns. Draw UML class diagrams (there are about a dozen boxes to draw, so don’t spend time on the details of listing all methods unless you have time at the end, but do show which classes own instances of what other classes, etc.).

Use a UML sequence diagram to indicate how, when a Boy b visits pigeon p that p will become startled and fly away and then other pigeons will also suddenly fly away.

Show your understanding of the visitor pattern by completely writing the public class Boy.

Finish your design overview with any other descriptions, notes, diagrams as time permits.

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\(^1\) The cockpit? what is it?” “It's the little room in the front of the plane where the pilots sit, but that's not important right now”. (Airplane, 1980).