

### Suggestion 3: Air Traffic Control (ATC) Simulation

Write a program for Air Traffic Control Simulation. Different types of aircraft (large passenger jet planes, smaller turbo-prop planes, fighter jets, the extinct Concorde, etc.) have different characteristics (e.g. speed, maximum altitude) and behavior (e.g. rate of climb, rate of descent). Aircraft should obey the instructions of the traffic controllers while in their area. At least 3 different aircraft from 3 different categories must be present in the ATC simulated area at all times. Avoid crashes at all cost!!!!

**Level 1 – F: Fail** Includes **screen output** and **keyboard input** and **basic classes**. There are java source files for at least three major classes in the program. Good source comments and code indentation is expected for all implemented parts of the code

**Example:** The program reads and prints the details and status of the aircraft in the simulation

**Level 2 – E: Borderline Fail** Includes **methods** and **variables** for at least three major classes, and all constructions above. At least 3 major methods fully implemented and working for each class

**Example:** As above, but also an air traffic controller is present and able to issue basic commands.

**Level 3 – D: Bare Pass** At least three major program classes will be implemented, with **methods working and well designed**, and all constructions above Use of **inheritance** with at least one superclass and three subclasses Class, method and variable naming will be clear and consistent

**Example:** As above, but also there is a basic simulation, though movement of aircraft may be basic.

**Level 4 – C: Pass Polymorphism** should be used in at least three subclasses, and all constructions above **Exception handling** is used to catch and handle at least three different types of exceptions At least four major program classes will be implemented, with methods working and well designed, Comments are clear and applied to class and method level consistently

**Example:** As above, but game simulation is more natural, traffic controller's commands are obeyed by aircraft in at least one way (e.g. change direction heading)

**Level 5 – B: Satisfactory** Use of **Vectors** in all parts of the program, and all constructions above. Exception handling is carried out appropriately in all parts of the program Inheritance is correctly applied to all parts of the program.

**Example:** As above, but also a basic **GUI** will be included showing aircraft movement and ATC commands.

**Level 6 – A: Merit** Includes **file input and/or output**, and all constructions above The simulation (including player movement) will be displayed on the GUI Polymorphism will be fully implemented in all parts of the program

**Example:** As above, but ATC should be able to detect dangerous situations and direct aircraft to safety when collisions are likely to happen. Aircraft technical details should be read from a file.

**Level 7 – A+: Distinction** Includes everything required for an A grade but also **something special** (using other more advanced constructs or algorithms, or something you just read up on yourself). Make it a program someone would really want to use! **Example:** Use a fancy GUI for the simulation, add weather details in the simulation (e.g. wind). Or ...