A car racing simulation (difficult project)

Write a program that simulates a car racing. You should include different types of cars (e.g. by brand or engine size or horsepower, etc) with different abilities (e.g. braking, straight line speed, acceleration), characteristics (e.g. aerodynam- ics, poor at cornering, tends to overheat) etc. Notice the project can be very difficult if you try to implement "arcade rac- ing" where you see the race through the windscreen (you need 3D for that); a simpler simulation is looking at the race from above (you just need 2D for this)

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 names of cars and their basic characteristics.

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 the structure of the track is shown.

Level 3 – D: Bare Pass At least three major program classes will be implemented, with **methods working and well designed**, and all constructs 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 of the race, though most details, commentary etc. may be very simple

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 race simulation is more natural, there is a running commentary of the race with major events reported.

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 all types of cars and functionality will now be included in the simulation. The simulation is now mostly ruled by a basic **GUI**.

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, with a full GUI now controlling all aspects of the simulation; data should be read from files.

Level 7 – A+: Distinction Includes everything required for an A grade but also **something special** (using other more advanced constructs or algo- rithms, or something you just read up on yourself). Make it a program someone would really want to use!
Example: ....