Robot Controls

A robot team builds a different robot every season for a robotics competition. There are several types of drive systems they use. In all cases if all inputs are neutral the robot doesn't move.

- Swerve Drive, **unable to rotate**
  - Uses a single joystick
    - Forward moves 1 unit forward
    - Backward moves 1 unit backward
    - Left moves 1 unit left
    - Right moves 1 unit right
- Arcade Drive, **unable to rotate in place**
  - Uses a single joystick
    - Forward moves 1 unit forward
    - Backward moves 1 unit backward
    - Left moves 1 unit left **and** 1 unit forward, rotates 90 degrees left
    - Right moves 1 unit right **and** 1 unit forward, rotates 90 degrees right
- Tank Drive, **able to rotate in place**
  - Uses 2 joysticks
    - Both sticks forward moves 1 unit forward
    - Both sticks backward moves 1 unit backward
    - Left forward, right backward turns 90 degrees to the right in place
    - Left backward, right forward turns 90 degrees to the left in place
    - All other combinations fail to generate enough power to move the robot and are ignored
- Omni Directional Drive, **able to turn in place**
  - Uses 2 joysticks
    - Both sticks forward moves 1 unit forward
    - Both sticks backward moves 1 unit backward
    - Left forward, right backward turns 90 degrees to the right in place
    - Left backward, right forward turns 90 degrees to the left in place
    - Left stick forward moves 1 unit forward and 1 unit right, rotates 90 degrees right
    - Right stick forward moves 1 unit forward and 1 unit left, rotates 90 degrees left
    - Both sticks left moves 1 unit left
    - Both sticks right moves 1 unit right
    - All other combinations fail to generate enough force to move the robot and can be ignored

The team has requested that a RobotDriveTrain module be created which will read a file containing a set of instructions and exercise a robot. The file will consist of a list of joystick inputs.

- L - Left
- R - Right
- F - Forward
- B - Backward

In the case of a single joystick the file will contain one instruction per line, with each line terminated by the system defined newline character. In the case of a two joystick configuration the file will contain the instruction for the left stick followed by a comma and then the instruction for the right stick.

Example of Single Stick Instructions:
F
R
F
F

Example of Double Stick Instructions:
F, F
F, B
L, L
R, R

The most critical task is to come up with a drivable robot that can read an input file to navigate the robot in a figure 8. The next priority is to implement as many of the drive trains as possible. The ideal solution will be able to exercise all of the drive trains and navigate diagonals where possible.

The robot will be placed on a 5 x 5 square grid using north, south, east and west to indicate the robots orientation. The north-west corner of the grid is (0,0) with the first value representing the north/south position and the second value representing the east/west position. The north-east corner is (0,4) in this system, the south-west corner is (4,0) and the south-east corner (4,4).

Given these requirements create input file(s) and write code for as many drive trains as possible in the time allowed that will navigate the required figure 8 pattern. The robot should "move" by indicating it's position and orientation. The robot will always begin at (0,0) facing east and should always output this as a starting position.

Sample input for arcade drive:
F
F
F
R

Sample output for arcade drive:
(0,0) E
(0,1) E
(0,2) E
(0,3) E
(1,4) S

Code should demonstrate an understanding of object oriented programming and industry standard best practices.