angle of 180 degrees". We encode these actions as individual "states", which are then chained together into a state machine. We then continuously poll our state machine, checking whether it has completed its current state, if so, moving on to the next state. These state machines make our autonomous extremely easy to program. A sample autonomous is shown below.

```java
private StateMachine auto_depotSample = getStateMachine(autoStage)

.addNestedStateMachine(auto_setup)
//common states to all autonomous

.addMineralState(mineralStateProvider,
//turn to mineral, depending on mineral
                    () ->
robot.rotateIMU(39, TURN_TIME), //turn left
                    () -> true, //don't turn if mineral is in the middle
                    () ->
robot.rotateIMU(321, TURN_TIME)) //turn right

.addMineralState(mineralStateProvider,
//move to mineral
                    () ->
robot.driveForward(true, .604, DRIVE_POWER), //move more on the sides
                    () ->
robot.driveForward(true, .47, DRIVE_POWER), //move less in the middle
                    () ->
robot.driveForward(true, .604, DRIVE_POWER))

.addMineralState(mineralStateProvider,
//turn to depot
                    () ->
robot.rotateIMU(345, TURN_TIME),
```

allow the robot to make precise turns. We also use the IMU to determine whether our robot is tipping, so that we can perform corrective action to avoid us from completely tipping over our robot.

- Motor encoders - Motor encoders allow us to determine how far our robot has moved or what position its subsystems are at, which is used alongside a PID Control loop to allow the robot to make precise movements. Every subsystem on our robot uses encoders.
    - The drivetrain encoders allow us to determine how far our robot has moved. We also look at the differences between encoder values between both sides of our drivetrain in order to ensure that our robot is driving in a straight line. Along with a PID loop, this allows us to make precise lateral movements. We use these especially during autonomous, to ensure that our robot is driving the same distance and direction between each run. These are also used during teleop, to force the robot to drive in a straight line rather than veer to the side.
    - The superman arm encoders allow us to determine the current position of the arm. Using a PID contol loop, we can set a target position for the motors, and then the arm will