

```

//ABSOLUTE CHAOS CONTROL

package org.firstinspires.ftc.teamcode;

//TeleOp and Hardware
import com.qualcomm.robotcore.eventloop.opmode.LinearOpMode;
import com.qualcomm.robotcore.hardware.DcMotor;
import com.qualcomm.robotcore.eventloop.opmode.TeleOp;
import com.qualcomm.robotcore.util.ElapsedTime;
import com.qualcomm.robotcore.eventloop.opmode.Disabled;

//Sensors
// Gyro
import com.qualcomm.hardware.modernrobotics.ModernRoboticsI2cGyro;
import com.qualcomm.robotcore.hardware.IntegratingGyroscope;
// ODS
import com.qualcomm.robotcore.hardware.OpticalDistanceSensor;
// Color Sensor
import com.qualcomm.robotcore.hardware.NormalizedColorSensor;
import com.qualcomm.robotcore.hardware.NormalizedRGBA;
import com.qualcomm.robotcore.hardware.SwitchableLight;

//Gyro References
import org.firstinspires.ftc.robotcore.external.navigation.AngleUnit;
import org.firstinspires.ftc.robotcore.external.navigation.AxesOrder;
import org.firstinspires.ftc.robotcore.external.navigation.AxesReference;

//Android App Control
import android.app.Activity;
import android.graphics.Color;
import android.view.View;

@TeleOp(name="AbsoluteChaosControl", group="Basic OP Mode")

public class AbsoluteChaosControl extends LinearOpMode{
    //Initializes hardware
    private DcMotor motor1;
    private DcMotor motor2;
    private DcMotor motor3;
    private DcMotor motor4;
    //Initializes Sensors
    //Gyro
    private IntegratingGyroscope gyro;
    private ModernRoboticsI2cGyro modernRoboticsI2cGyro;
    //ODS
    private OpticalDistanceSensor ods;
    //Color Sensor
    NormalizedColorSensor colorSensor;

```

```

View RelativeLayout;

@Override public void runOpMode() throws InterruptedException {

    // Get a reference to the RelativeLayout so we can later change the background
    // color of the Robot Controller app to match the hue detected by the RGB
    sensor.

    int relativeLayoutId =
hardwareMap.appContext.getResources().getIdentifier("RelativeLayout", "id",
hardwareMap.appContext.getPackageName());
    RelativeLayout = ((Activity)
hardwareMap.appContext).findViewById(relativeLayoutId);

    try {
        runSample(); // actually execute the sample
    } finally {
        // On the way out, *guarantee* that the background is reasonable. It
        doesn't actually start off
        // as pure white, but it's too much work to dig out what actually was used,
        and this is good
        // enough to at least make the screen reasonable again.
        // Set the panel back to the default color
        RelativeLayout.post(new Runnable() {
            public void run() {
                RelativeLayout.setBackgroundColor(Color.WHITE);
            }
        });
    }
}

public ElapsedTime timer = new ElapsedTime();

public void runSample() throws InterruptedException{
    double power = 0.2;

    float[] hsvValues = new float[3];
    final float values[] = hsvValues;

    //Telemetry initialized message
    telemetry.addData( "Status", "Initialized");
    telemetry.update();

    //Hardware definitions
    motor1 = hardwareMap.get(DcMotor.class, "motor1");
    motor2 = hardwareMap.get(DcMotor.class, "motor2");
    motor3 = hardwareMap.get(DcMotor.class, "motor3");
    motor4 = hardwareMap.get(DcMotor.class, "motor4");
    //Sensors
    //Gyro

```

```

modernRoboticsI2cGyro = hardwareMap.get(ModernRoboticsI2cGyro.class, "gyro");
gyro = (IntegratingGyroscope)modernRoboticsI2cGyro;
//ODS
ods = hardwareMap.opticalDistanceSensor.get("ods");
ods.enableLed(true);
//Color Sensor
colorSensor = hardwareMap.get(NormalizedColorSensor.class, "color_sensor");

if (colorSensor instanceof SwitchableLight) {
    ((SwitchableLight)colorSensor).enableLight(true);
}

telemetry.log().add("Gyro Calibrating. Do Not Move!");
modernRoboticsI2cGyro.calibrate();

while (!isStopRequested() && modernRoboticsI2cGyro.isCalibrating()) {
    telemetry.addData("calibrating", "%s", Math.round(timer.seconds()) % 2 == 0
? "|.." : "..|");
    telemetry.update();
    sleep(50);
}

telemetry.log().clear(); telemetry.log().add("Gyro Calibrated. Press Start.");
telemetry.clear(); telemetry.update();

//Variable instantiation
double left_y, left_x;
double left_t, right_t;
double g_angle;
double abs_x, abs_y;
int iteration = 0;
boolean bPrevState = false;
boolean bCurrState;
//Wait until phone interrupt
waitForStart();
timer.reset();
//While loop for robot operation
while (opModeIsActive()){
    //long delta_t = (time_base - timer.nanoseconds())/timer.SECOND_IN_NANO;
    //sigmoid(delta_t, false, false,false, 0.5, 0.1, 2);
    iteration++;
    bCurrState = gamepad1.x;
    //Toggle for light, this is the general toggle setup.
    if (bCurrState != bPrevState) {
        if (bCurrState) {
            if (colorSensor instanceof SwitchableLight) {
                SwitchableLight light = (SwitchableLight)colorSensor;
                light.enableLight(!light.isLightOn());
            }
        }
    }
}

```

```

    }
    bPrevState = bCurrState;

    //Gamepad's left stick x and y values
    left_y = -gamepad1.left_stick_y;
    left_x = gamepad1.left_stick_x;

    //Gamepad's left and right trigger values
    left_t = gamepad1.left_trigger;
    right_t = gamepad1.right_trigger;

    //Robot Heading Unit Vector

    //Boolean for distance reset
    g_angle = gyro.getAngularOrientation(AxesReference.INTRINSIC,
    AxesOrder.ZYX, AngleUnit.DEGREES).firstAngle;
    g_angle *= Math.PI/180;
    abs_x = (left_x*Math.cos(-g_angle)-left_y*Math.sin(-g_angle));
    abs_y = (left_x*Math.sin(-g_angle)+left_y*Math.cos(-g_angle));

    //Power variable (0,1), average drive train motor speed

    //x component vector
    //motor 2
    motor2.setPower(power*(-abs_x+left_t-right_t));
    //motor4
    motor4.setPower(power*(abs_x+left_t-right_t));

    //y vector
    //motor1
    motor1.setPower(power*(abs_y+left_t-right_t));
    //motor3
    motor3.setPower(power*(-abs_y+left_t-right_t));

    //More telemetry. Adds left stick values and trigger values
    /*
    telemetry.addLine()
        .addData("right_y", left_y)
        .addData("left_x", left_x );
    telemetry.addLine()
        .addData("Motor 1+3", abs_y);
    telemetry.addLine()
        .addData("Motor 2+4", abs_x);
    telemetry.addLine()
        .addData("angle", g_angle);
    */
    NormalizedRGBA colors = colorSensor.getNormalizedColors();
    Color.colorToHSV(colors.toColor(), hsvValues);
    telemetry.addLine()
        .addData("H", "%.3f", hsvValues[0])

```

```

        .addData("S", "%.3f", hsvValues[1])
        .addData("V", "%.3f", hsvValues[2]);
telemetry.addLine()
        .addData("a", "%.3f", colors.alpha)
        .addData("r", "%.3f", colors.red)
        .addData("g", "%.3f", colors.green)
        .addData("b", "%.3f", colors.blue);
int color = colors.toColor();
telemetry.addLine("raw Android color: ")
        .addData("a", "%02x", Color.alpha(color))
        .addData("r", "%02x", Color.red(color))
        .addData("g", "%02x", Color.green(color))
        .addData("b", "%02x", Color.blue(color));
float max = Math.max(Math.max(Math.max(colors.red, colors.green),
colors.blue), colors.alpha);
colors.red /= max;
colors.green /= max;
colors.blue /= max;
color = colors.toColor();
telemetry.addLine("normalized color: ")
        .addData("a", "%02x", Color.alpha(color))
        .addData("r", "%02x", Color.red(color))
        .addData("g", "%02x", Color.green(color))
        .addData("b", "%02x", Color.blue(color));
telemetry.update();
// convert the RGB values to HSV values.
Color.RGBToHSV(Color.red(color), Color.green(color), Color.blue(color),
hsvValues);
telemetry.addLine()
        .addData("distance", ods.getRawLightDetected());
telemetry.addLine().addData("distance normal", ods.getLightDetected());
//telemetry.addLine().addData("Delta_t", delta_t);
relativeLayout.post(new Runnable() {
    public void run() {
        relativeLayout.setBackgroundColor(Color.HSVToColor(0xff, values));
    }
});
    }
}
}

```