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/**
 * @file init.c
 * @brief Perform initialization and start handler tasks
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 *
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 */

#include "../include/robot.h"

static inline float lMogoRecalc(int p) {
    return p * 1.1;
} /* lMogoRecalc */

static inline float lineRecalc(int v) {
    return (float)(v > 16);
} /* lineRecalc */

static inline float manipRecalc(int p) {
    return (manip.sensor->value < MANIP_PLACE) ? clipNum(p, 0, -48) :
        ((manip.sensor->value < MANIP_HOVER - 200) ? (float)p / 2.3f : p);
    // return (manip.sensor->value > 600) ? ((p < 0) ? (float)p * .30 : (float)p * .6)
    //
}

static inline float manipPotRecalc(int v) {
    return v;
    // return (v <= 100) ? (v - 75) * 4 : v;
    // return (v <= 200) ? v * 3 : ((v >= 600) ? (v - 600) / 2 + 600 : v) + 200;
}

void initializeIO() {
    watchdogInit();
} /* initializeIO */

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/**
 * Notify both through the terminal and an lcd
 *
 * @param buffer the text to display
 */
void notice(const char *buffer) {
    #ifdef DEBUG_MODE
        print(buffer);
    #endif /* ifdef DEBUG_MODE */
    lcdSetText(uart1, 2, buffer);
    delay(5);
} /* notice */

void init() {
    // LCD initialization
    lcdInit(uart1);
    lcdSetBacklight(uart1, true);

    #ifdef DEBUG_MODE
        print("\nInitializing... ");
    #endif /* ifdef DEBUG_MODE */
    lcdSetText(uart1, 1, "Initializing...");

    // Set up the analog sensors
    gyro      = newGyro(1, true, 200);
    gyro.child = new(Sensor);
    *gyro.child = newGyro(2, true, 195);
    notice("gyroscopes, ");
    Sensor *mogoAngle = new(Sensor);
    *mogoAngle = newAnalog(3, true);
    notice("mobile goal angle, ");
    Sensor *manipS = new(Sensor);
    *manipS = newAnalog(4, false);
    manipS->zero = 0;
    manipS->recalc = &manipPotRecalc;
    notice("4bar pot, ");
    Sensor *liftPot = new(Sensor);
    *liftPot = newAnalog(5, false);
    liftPot->zero = 0;
    notice("lift pot, ");

    for (int i = 0; i < 3; i++) {
        line[i]      = newAnalog(i + 6, false);
        line[i].inverted = true;
        line[i].recalc  = &lineRecalc;
    }
}

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notice("line sensors");

// Set up the digital sensors
Sensor *driveCoder[2] = { new(Sensor), new(Sensor) };
*driveCoder[0] = newQuad(4, 5, true);
notice("left drive quad, ");
*driveCoder[1] = newQuad(8, 9, true);
notice("right drive quad, ");
liftLimit[0] = newDigital(12, true);
liftLimit[1] = newDigital(11, true);
notice("lift limit switches, ");
sonic = new(Sensor);
*sonic = newSonic(6, 7);
notice("ultrasonic, ");

// Initialize and set up all of the motors, servos, etc

// intake motor
intake = motorCreate(3, true);
notice("intake motor, ");

// intake manipulator motor
manip = motorCreate(4, true);
manip.recalc = &manipRecalc;
manip.child = new(Motor);
*manip.child = motorCreate(8, false);
manip.child->recalc = &manipRecalc;
manip.sensor = manipS;

// lift motors
lift = motorCreate(5, true); // bottom left
lift.child = new(Motor);
*lift.child = motorCreate(6, false); // top left
lift.child->child = new(Motor);
*lift.child->child = motorCreate(7, false); // bottom right
lift.sensor = liftPot;
notice("lift motors, ");

// mobile goal intake motors
mogo = motorCreate(1, false); // left
mogo.recalc = &lMogoRecalc;
mogo.deadband = 6;
mogo.child = new(Motor);
*mogo.child = motorCreate(10, true); // right
mogo.child->deadband = 6;
mogo.sensor = mogoAngle;

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notice("mobile goal motors, ");

// left drive motors
drive[0] = motorCreate(2, true);
drive[0].sensor = driveCoder[0];

// right drive motors
drive[1] = motorCreate(9, false);
drive[1].sensor = driveCoder[1];
notice("drive motors, ");

lcdSetText(uart1, 1, "Ready!");
#ifdef DEBUG_MODE
    print("\n\n");
#endif /* ifdef DEBUG_MODE */
setTeamName("709S");
notice("done!");

delay(500);
// Start the LCD task
LCDHandle = GO(lcdTask, NULL);
print("\n\njofsd\n\n");
delay(500);
} /* init */

```