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/*****
* Title          avoid.c
*
* Programmer     Ivan Zapata
*
* Date           November, 1996
*
* Version        1
*
*
* Description    A very simple collision avoidance program.  TJ will read
*                each IR detector, and turn away from any obstacles in its
*                path.  Also, if something hits TJ's bumper, it will back up,
*                turn, and go on.
*
*
*****

/***** Includes *****/
#include <servotj.h>
#include <irtj.h>
#include <analog.h>
#include <vectors.h>
/***** End of includes *****/

/***** Constants *****/
#define FORWL 2000
#define FORWR 4000
#define BACKL 4000
#define BACKR 2000
/***** End of Constants *****/

/***** Prototypes *****/
void turn(void);
/***** End of Prototypes *****/

/***** Globals *****/
int rv, lv;
/***** End of Globals *****/

int main(void)
/***** Main *****/
{
    int rval, lval;
    int i;

    init_servos();          /* Initialize necessary registers, etc. */
    init_analog();
    init_ir();

    DDRC = 0x00;           /* Set PORTC (bumper) for input */

    while(1)
    {
/* The following block will read the ir ports, and decide whether */
/* TJ needs to turn to avoid any obstacles */
        rval = ir_value(6);
        lval = ir_value(7);

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    if (rval > 100)
        rv = BACKR;
    else
        rv = FORWR;
    if (lval > 100)
        lv = BACKL;
    else
        lv = FORWL;

    servo(RIGHT_SERVO, rv);
    servo(LEFT_SERVO, lv);

/* This "if" statement checks the bumper. If the bumper is pressed, */
/* Tj will back up, and turn. */

    if(PORTC & 0x20)
    {
        servo(LEFT_SERVO, BACKL);
        servo(RIGHT_SERVO, BACKR);
        for(i = 0; i < 25000; i++);
        turn();
    }
    for(i = 1; i < 2500; i++);
}
/***** End of Main *****/

void turn()
/*****
 * Function: Will turn in a random direction for a random amount of
 * time
 * Returns: None
 *
 * Inputs
 * Parameters: None
 * Globals: None
 * Registers: TCNT
 * Outputs
 * Parameters: None
 * Globals: None
 * Registers: None
 * Functions called: None
 * Notes:
 *****/
{
    int i;
    unsigned rand;

    rand = TCNT;

    if (rand & 0x0001)
    {
        servo(RIGHT_SERVO, FORWR);
        servo(LEFT_SERVO, BACKL);
    }
    else
    {
        servo(RIGHT_SERVO, BACKR);
        servo(LEFT_SERVO, FORWL);
    }
}

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for (i = 0; i < rand; i++);  
}
```