Servomotor library function

Sanjay T	Library

🧭 Ruggedboard A5D2X PWM Servo Library — `servo_lib`

✅ Step-by-Step: Create Your Own C Library for Servo Motor Control

We'll build a reusable C static library named `servo_lib` to control a servo motor using PWM on Ruggedboard A5D2X.

🎯 Target: Servo Motor Control via PWM on RuggedBoard

Signal	PWM Path	Period	Duty Cycle Range
PWM0	`/sys/class/pwm/pwmchip0/pwm0`	20ms (20000000 ns)	1ms–2ms (1000000–2000000 ns)

🧰 1. Folder Structure

```
servo_lib/
├── include/
│   └── servo.h
├── src/
│   └── servo.c
├── examples/
│   └── set_servo.c
├── Makefile
```

📄 2. `include/servo.h`

```
#ifndef SERVO_H
#define SERVO_H

void setup_pwm();
void set_servo_angle(int angle);

#endif
```

3. src/servo.c

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <unistd.h>
#include <fcntl.h>
#include "servo.h"

#define PWM_CHIP "/sys/class/pwm/pwmchip0"
#define PWM_CHANNEL "0"

void setup_pwm() {
int fd;
fd = open(PWM_CHIP "/export", O_WRONLY);
if (fd >= 0) {
   write(fd, PWM_CHANNEL, strlen(PWM_CHANNEL));
   close(fd);
   usleep(100000);
}

fd = open(PWM_CHIP "/pwm0/period", O_WRONLY);
if (fd >= 0) {
   write(fd, "20000000", 8); // 20ms period
```

```
    close(fd);
}

fd = open(PWM_CHIP "/pwm0/enable", O_WRONLY);
if (fd >= 0) {
    write(fd, "1", 1);
    close(fd);
}
}

void set_servo_angle(int angle) {
int duty_ns = 1000000 + (angle * 1000000 / 180);
char buffer[32];
snprintf(buffer, sizeof(buffer), "%d", duty_ns);
int fd = open(PWM_CHIP "/pwm0/duty_cycle", O_WRONLY);
if (fd >= 0) {
    write(fd, buffer, strlen(buffer));
    close(fd);
}

printf("Servo set to %d°\\n", angle);
}
```

4. `examples/set_servo.c` — Sample Application

```
#include <unistd.h>
#include <stdio.h>
#include "servo.h"

int main() {
setup_pwm();
for (int i = 0; i <= 180; i += 45) {
    set_servo_angle(i);
```

```
    sleep(1);
}

return 0;
}
```

4. 📄 `Makefile` for `servo_lib`

```
CC? = ${CC}
CFLAGS = -Wall -Iinclude
LIB_SRC = src/servo.c
EXAMPLE_SRC = examples/set_servo.c

all: set_servo

set_servo:
$(CC) $(CFLAGS) $(LIB_SRC) $(EXAMPLE_SRC) -o set_servo

clean:
rm -f set_servo
```

✅ Usage Instructions

```
. /opt/poky-tiny/2.5.2/environment-setup-cortexa5hf-neon-poky-linux-muslea

make            # Cross-compile set_servo for RuggedBoard

sudo cp set_servo /srv/tftp
//then
//in rugged board
tftp -r set_servo -g 192.168.1.15 //replace ur ipaddress of host machine
```

On the RuggedBoard:

```
chmod +x
./set_servo
```