

1. vi was actually used to write the entire homework.

2a. `find /usr/bin -type f | grep '\usr\bin\.{3,5}$' | wc -w`

2b. 204

3a. `chmod g+rx,o+r opamp.m`

3b. `chmod 544 sensor`

4.

HEADER:

```
#include <stdio.h>
#include <fcntl.h>      // open
#include <unistd.h>     // close
#include <string.h>
```

```
int export_pin(char *num);
int unexport_pin(char *num);
int set_dir(char *num, char *dir);
int set_val(char *num, char *val);
```

C functions:

// Open the export file to GPIO pin # specified by num

```
int export_pin(char *num)
{
    fe = open("/sys/class/gpio/export", O_WRONLY);
    if (fe < 0) {
        fprintf(stderr, "\tError enabling\n");
        return -1;
    }
    write(fe, num, strlen(num));
    close(fe);
    usleep(1000000);      // Wait 1s for export process
    return 0;
}
```

// Disable GPIO pin specified by num

```
int unexport_pin(char *num)
{
    int fe = open("/sys/class/gpio/unexport", O_WRONLY);
    if (fe < 0) {
        fprintf(stderr, "\tError disabling\n");
        return -1;
    }
    write(fe, num, strlen(num));
    close(fe);
    usleep(1000000);      // Wait 1 sec
    return 0;
}
```

// Configure pin direction as "in" or "out"

```
int set_dir(char *num, char *dir)
{
    char *path = "/sys/class/gpio/gpio";
    char direction[11] = "/direction";
    int fd;

    // Build the direction file path
    strcat(path, num);
    strcat(path, direction);

    // Open file and set pin direction
    fd = open(path, O_WRONLY);
    if (fd < 0) {
```

```
        fprintf(stderr, "\tError direction!\n");
        return -1;
    }
    write(fd, dir, strlen(dir));
    close(fd);

    return 0;
}

// Set pin high or low depending on val
int set_val(char *num, char *val)
{
    char *path = "/sys/class/gpio/gpio";
    char value[7] = "/value";
    int fv;

    // Build the value file path
    strcat(path, num);
    strcat(path, value);

    // Open value file and check if it opened
    fv = open(path, O_WRONLY);
    if(fv < 0) {
        fprintf(stderr, "\tError writing value!\n");
        return -1;
    }

    // Set pin
    write(fv, val, strlen(val));
    return fv;
}
```

5. I could not get the repository cloned in time. These are the commands I used:

```
sudo chown pi /usr/src
cd /usr/src
git clone https://github.com/raspberrypi/linux.git
```

It's at this step that I keep running into problems, my pi froze up twice at 86% resolving deltas. Another time I got the error: "fatal out of memory, calloc failed8555)". After that I ran to walmart and picked up a 128 GB microSD (since 32 GB didn't seem to work) and this is when I covered the pi wasn't freezing up, the cpu was overheating even with a heatsink and it was just crawling along that last 14%. This time I got the error: "fatal index-pack died of signal 968414". I need help.

6. `enscript --header='$n %D $C|$%' Tyler Punch'`  
`hw.03.txt -o temp | ps2pdf temp Punch-Tyler-ECE331-HW03.pdf`