Assignment 3 (TEAM 27) - Part 2
A SPI-based 1-wire Device Driver for LED Strip

Accurate Delays in Linux:

Symbol	Paramater	Acceptable Range	Max Value
T0H	0 code, high voltage time	200 to 500 ns	500ns
T1H	1 code, high voltage time	550 to ~5500ns	5500ns
T0L/T1L	0 code/1 code, low voltage time	450 to 5000ns	5000ns
Reset	Low voltage time	>=6000ns	---

This table is determined from the datasheet and experimental results

1) Inorder to encode a 0, We transmit a high pulse between the range of 200 - 500ns. This is achieved by accessing the GPIO port register directly and toggling the bits. The time taken to toggle using the iowrite() instruction takes about 44 cycles => 110ns

Hence we do not add any ndelay() between transmitting 1 and 0.

iowrite(SET BIT) => 110ns
iowrite(UNSET BIT)=> 110ns

Hence the time it takes to eventually see a zero pulse (T0L) meets with the requirements.

2) Inorder to encode a 1, We transmit a high pulse between the range 550 - 5500ns. We set this maximum of 5500 since this does not affect our encoding and we can successfully use this to meet our timing to encode a “1” comfortably.

We add ndelay(250) between the two iowrite() instructions.
(250 value is found experimentally to make detection of “1” possible as ndelay() does not give the exact granularity of measurement in ns)

iowrite(SET BIT) => 110ns
ndelay(250) => ~1000ns
iowrite(UNSET BIT) => 110ns

Using this we can meet the timing to encode a “1”.