**Tasks**

1. Breakdown resources and tasks
   1. Download PMOD documentation from Digilent, schematic of PMOD, and SSD1331 OLED controller reference manual
   2. Determine I/O of PMOD
      1. SPI?
      2. Clock rates? Dividers?
      3. How to send data/commands?
   3. Determine how to startup, turn off, and reset controller
   4. Determine different available commands
2. FPGA SPI interface
   1. Drive FPGA as master to control chip select, MOSI, and slave clock
   2. Should send 1 byte of data, or 2 hex values at a time
   3. Should drive D/C (data/command control) bit at start of every byte sent
3. Startup and reset of OLED display
4. Draw a line
5. Draw a rectangle
6. Clear the screen without reset
7. Wrapper for SPI interface to change color of drawn shapes
8. Write text, update over certain amount of time
   1. Create table for ASCII values

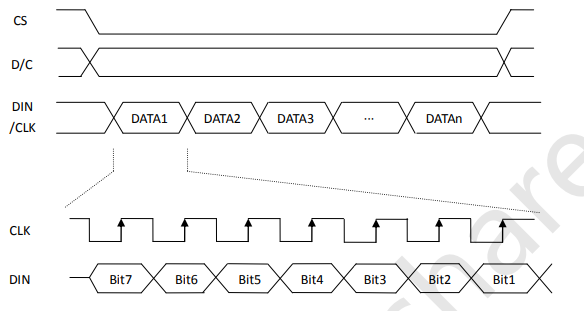
**FPGA SPI tx Interface**

Input

* I\_SCK: clock for slave interface, has to transmit on it
* I\_DATA: byte to transmit to OLED interface slave (can either be command or data)
* START: begin transmitting byte in i\_DATA

Output

* MOSI: Output 1 bit at a time of i\_DATA, starting with MSB



**SPI Master Buffer**

Take in X inputs parallel, serially load them and drive start of master SPI MOSI

**OLED Interface wrapper**

Input

* Mode: line, rectangle, text
* Row1
* Row2
* Row3
* Col1
* Col2
* Col3

Output

* O\_CS
* O\_D/C
* O\_SCK
* O\_RES
* O\_VCCEN
* O\_PMODEN