Digital Outputs

Last updated 6/30/22

Digital Outputs

- Many pins on the Nucleo board are capable of acting as digital outputs
    - Digital output: drives the pin with
        - Logical: 0 or 1
        - Electrical: 0.0V or 3.3V

    - There are limitation on how much current the pins can supply
        - Typically: <8mA to maintain V_{OL} < 0.4V and V_{OH} > 2.9V
        - Max: 20mA to provide V_{OL} < 1.3V and V_{OH} > 2.0V

Digital Outputs

- Digital Outputs are created by creating DigitalOut *"objects"*
  - Creating an object
    - called someName
    - tied to pin somePin

    DigitalOut someName(somePin);

    - someName now references the digital output object

  - Forcing a 1 or 0 on the digital output pin

    someName.write(0);   // write a 0
    someName.write(1);   // write a 1

Digital Outputs

- DigitalOut example
  - DigitalOut object named MyOutput connected to the on-board LED

```
/////////////////////////////////////
//
// digital_out_ex project
//
// created 7/8/21 by tj
// rev 0
//
/////////////////////////////////////
//
// Example of using DigitalOut class
//
// This program prints out the value and uses the DigitalOut class
// to flash an LED tired to the on-board LED (LED1)
//
/////////////////////////////////////

#include "mbed.h"
#include <stdio.h>          // only needed when printing

#define T_WAIT 2000000      // in us - 2s

// Global HARDWARE Objects
// create the digital output object tied to the on-board LED
DigitalOut MyOutput(LED1);

int main(void){
    setbuf(stdout, NULL);   // disable buffering when printing

    // splash
    printf("\n\ndigital_out_ex\n");
    printf("Using Mbed OS version %d.%d.%d\n\n",
            MBED_MAJOR_VERSION, MBED_MINOR_VERSION, MBED_PATCH_VERSION);

    // run an infinite loop
    while(1){
        // flash LED and print value
        MyOutput.write(0);
        printf("The LED is now off\n");
        wait_us(T_WAIT);

        MyOutput.write(1);
        printf("The LED is now on\n");
        wait_us(T_WAIT);
    }// end while

    return 0;
}// end main
```
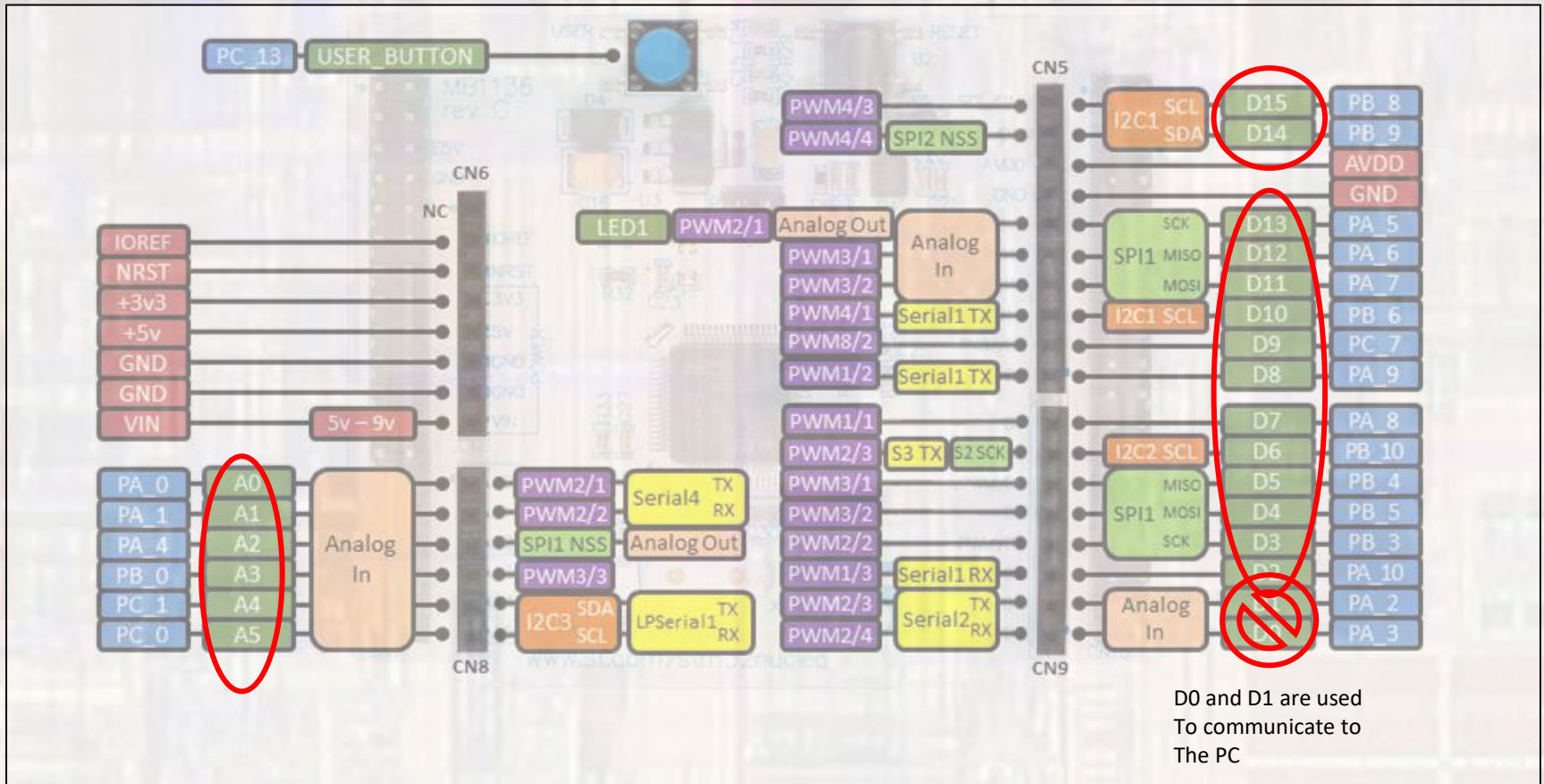
Digital Outputs

- DigitalOut Pins – Arduino Headers

D0 and D1 are used
To communicate to
The PC

Digital Outputs

- DigitalOut Class

Public Member Functions		
	DigitalOut (PinName pin)	
	Create a DigitalOut connected to the specified pin. More...	
	DigitalOut (PinName pin, int value)	
	Create a DigitalOut connected to the specified pin. More...	
void	write (int value)	
	Set the output, specified as 0 or 1 (int) More...	
int	read ()	
	Return the output setting, represented as 0 or 1 (int) More...	
int	is_connected ()	
	Return the output setting, represented as 0 or 1 (int) More...	
DigitalOut &	operator= (int value)	
	A shorthand for write() More...	
DigitalOut &	operator= (DigitalOut &rhs)	
	A shorthand for write() using the assignment operator which copies the state from the DigitalOut argument. More...	
	operator int ()	
	A shorthand for read() More...	

DigitalOut myPin(D3);

DigitalOut myPin(D3, 0);

myPin.write(1);   myPin.write(0);

foo = myPin.read();

foo = myPin.is_connected();

myPin = 0;

myPin = yourPin = 0;