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////////////////////////////////////
// Lab 3 - PWM
//Colin & Daniel
//PART 1
////////////////////////////////////

/*
 * Include header files for all drivers
 */
#include <clock.h>
#include <conf_clocks.h>
#include <fastmath.h>

//setup a the correct TC pointer for the corresponding pins. (use table 5-1 as a reference)
/* Set correct PA pins as TC pins for PWM operation */

Tc *TCptr = 0x42002800;
//TcCount8 *TC_ptr = &(TCptr);
int k=0;
void enable_port(void)
{
    Port *ports = PORT_INSTS;
    PortGroup *porA = &(ports->Group[0]);
    porA -> PMUX[6].bit.PMUXO = 0x4;
    porA -> PINCFG[13].bit.PMUXEN = 0x1 ;
    //setup pins
}
/* Perform Clock configuration to source the TC
1) ENABLE THE APBC CLOCK FOR THE CORREECT MODULE
2) WRITE THE PROPER GENERIC CLOCK SELECTION ID*/
void enable_tc_clocks(void)
{
    PM->APBCMASK.reg |= 0x1 << 10; // PM_APBCMASK_____ is in the ____ position
    uint32_t temp=0x14; // ID for _____ is _____ (see table 14-2)
    temp |= 0 << 8; // Selection Generic clock generator 0
    GCLK->CLKCTRL.reg=temp; // Setup in the CLKCTRL register
    GCLK->CLKCTRL.reg |= 0x1u << 14; // enable it.
}
/* Configure the basic timer/counter to have a period of _____ or a
frequency of _____ */
void enable_tc(int dutycycle)
{

```

```
enable_port();
enable_tc_clocks();
```

```
TCptr->COUNT8.CTRLA.bit.MODE=0x1;
TCptr->COUNT8.CTRLA.bit.PRESCALER=0x0; //no prescaler
TCptr->COUNT8.CTRLA.bit.PRESCSYNC=0x1;
TCptr->COUNT8.CTRLA.bit.WAVEGEN=0x2; //normal PWM mode
TCptr->COUNT8.CC[1].reg = dutycycle; // for 100% duty cycle 1017/4
TCptr->COUNT8.PER.reg = 125; //1017 period for 0x5 prescaler for 500 Hz
while(TCptr->COUNT8.STATUS.reg & TC_STATUS_SYNCBUSY) {}
```

```
TCptr->COUNT8.CTRLA.reg |= 0x2;
```

```
}
```

```
int main (void)
```

```
{
```

```
    float arrayvalue;
```

```
    int arraynumb;
```

```
    int rawvalue [80] ={63,67,72,77,82,86,91,95, //sin wave value array with values set up
to scale between 0 & 125
```

```
    99,103,107,110,113,116,118,120,          // sin(0) = 63, sin(pi) = 125, sin(2pi) =
0
```

```
    122,123,124,125,125,125,124,123,
```

```
    122,120,118,116,113,110,107,103,
```

```
    99,95,91,86,82,77,72,67,
```

```
    63,58,53,48,43,39,34,30,
```

```
    26,22,18,15,12,9,7,5,
```

```
    3,2,1,0,0,0,1,2,
```

```
    3,5,7,9,12,15,18,22,
```

```
    26,30,34,39,43,48,53,58};
```

```
    int valuez [200];
```

```
    system_clock_init();
```

```
    while(1)
```

```
    {
```

```
        for(int i=0;i<=80;i++){
            k=rawvalue[i]; //imports the raw values from the array and inserts it
into the TC register as a duty cycle
            enable_tc(k);
        }
    }
}
```