



模块 9

活动: SysTick 定时器



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问题 1

编写一个等待整数秒的函数。您可以使用任何 SysTick 功能。这个功能可以等待的最长时间是多少？

问题 2

编写两个能实现秒表功能的函数。

Start() 将启动测量，Stop() 将返回总线周期中经过的时间。你可以假定经过的时间小于 349 ms。例如，考虑这个用例来测量执行 FunctionUnderTest () 所需的时间。

```
int main(void){ uint32_t time;
  Start();
  FunctionUnderTest();
  time = Stop(); // measures time to execute
  function
  while(1);
}
```

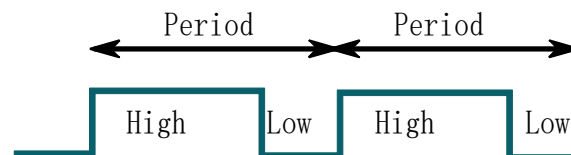
问题 3

如果用户在延迟等于 0 的情况下调用此函数会发生什么？ 如果用户在延迟等于 1 的情况下调用此函数会发生什么？

```
void SysTick_Wait(uint32_t delay){
  SysTick->LOAD = (delay - 1);
  SysTick->VAL = 0;
  while(( SysTick->CTRL&0x00010000) == 0){};
}
```

问题 4

PWM 系统使用 48MHZ 时钟产生 1KHZ 的方波。系统在可选和二进制位中的精度是多少？



问题 5

PWM 系统使用 48MHZ 时钟和 32 位定时器来产生方波。能产生的最长周期是多少？

问题 6

本模块中的实验使用 1-us SysTick 功能生成 100 Hz PWM 波，H 参数从 100 到 9900 不等。LaunchPad 上的 LED1 是 LTST-C190CKT Digkey 160-1181-1-ND，假设 P1.0 输出高电压为 3.3V。LED1 电路使用与 LED 串联的 470 欧姆电阻。假设 LED 的 V_F 、 I_F 设定点为 1.65V 和 3.5mA

部分 a) 推导出软件中的 H 参数与传递给 LED 以瓦为单位的电功率之间的关系。

部分 b) 假设 LED 是 100% 有效的 (LED 中的所有电源都被转换成光功率)，那么接口的总体效率是多少？即微控制器输出 P1.0 的电功率有多少转化为光？

部分 c) 你如何提高此界面的效率？提示：对“恒流 led 电路”进行互联网搜索。

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