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SysTick_Wait Question from C10 Quiz

Longest Delay?

Tried: 2**32 (for longword) * (12.5 **-9) (the 12.5 ns) * 800000 = 461169 (incorrect)
Does anyone know what I'm doing wrong here? Thanks.

SysTick_Wait

(1 point possible)

Assume we are calling SysTick_Wait as defined in Program 10.2. The bus period is 12.5 ns (80 MHz). What is the longest delay in seconds that we can create by calling this function just once?

```
#define NVIC_ST_CTRL_R      (*((volatile unsigned long *)0xE000E010))
#define NVIC_ST_RELOAD_R    (*((volatile unsigned long *)0xE000E014))
#define NVIC_ST_CURRENT_R   (*((volatile unsigned long *)0xE000E018))
void SysTick_Init(void){
  NVIC_ST_CTRL_R = 0;               // disable SysTick during setup
  NVIC_ST_CTRL_R = 0x00000005;      // enable SysTick with core clock
}
// The delay parameter is in units of the 80 MHz core clock. (12.5 ns)
void SysTick_Wait(unsigned long delay){
  NVIC_ST_RELOAD_R = delay-1;  // number of counts to wait
  NVIC_ST_CURRENT_R = 0;       // any value written to CURRENT clears
  while((NVIC_ST_CTRL_R&0x00010000)==0){ // wait for count flag
  }
}
// 800000*12.5ns equals 10ms
void SysTick_Wait10ms(unsigned long delay){
  unsigned long i;
  for(i=0; i<delay; i++){
    SysTick_Wait(800000);  // wait 10ms
  }
}
```

Program 10.2. Use of SysTick to delay for a specified amount of time (SysTick_Wait_xxx.zip).

461169 - incorrect

461169

c10

16 hours ago by Karen West

the students' answer, *where students collectively construct a single answer*

can you elaborate the (12.5 **-9) (the 12.5 ns) part better?

7 hours ago by gilhad

followup discussions *for lingering questions and comments*

Resolved

Unresolved

Karen West 3 hours ago
It's between 4:30-5:00am for me here so if I'm half asleep as I respond - please forgive me!

I thought during the SysTick lecture (week of C9 video series) they said the bus clock ran at 16 MHz so:
(1 / 16 MHz) = 62.5 ns = every time the counter counts one tick it takes 62.5 ns

In this case, the bus clock is said to run at 80 MHz so each count = 12.5 ns.

So for delay = 1 passed to SysTick_Wait10ms, you go through the for-loop once, so SysTick_Wait is called once:
800000 * 12.5 ns = 10ms
(800000 = 0xC3500 = delay parameter passed to SysTick each time its called, so SysTick will make
800000 counts at 12.5ns each count before setting the flag bit in the CTRL register, wrapping around and
starting over again. I know that only 24 bits are used in the largest counter for SysTick but 0xC3500 fits into
24 bits).

If a long has 32 bits in it (or is this architecture 64 bits for a long? I thought it was 32 bits).

(2**32 - 1) (2 to the power of 32 bits minus 1) = 4294967295 = largest delay you can fit in a long word

The delay variable passed to SysTick_Wait10ms for the largest delay you can fit in a long word calls
SysTick_Wait 4294967295 times.

So 4294967295 * (12.5**-9) * 800000 =
461168.601735 approximately = 461169

Any help appreciated! ;-)

I'm behind in this class - just starting C11 videos later today, and have yet to do Lab C10!
I also admit to having worked in this area (embedded systems with C) and took classes in it in ancient times, so
it should be a bit of a review for me, but I got this incorrect, and I'm also behind for various reasons! ;-)

So I have some catching up to do.
Thanks.

Anonymous 1 hour ago 4294967295 * (12.5**-9) * 800000 = 42949672.95

gilhad 37 minutes ago I am behind too (just working on lesson 7 and I do not have the board yet), but I see problem here:

(12.5 ns ** -9) is nonsence in this context, why do you power to -9 the 12.5, when you want have it in seconds, not in seconds^-9 ?

You probabelly was thinking along the lines, that 12.5 ns = 12.5s * 10^-9, but you skipped to write the step correctly, so you powered to -9 the number 12.5, not 10, in your calculations. Which resulted to totally different number, than you wanted ...

Karen West Just now Thank you! ;-)