模块 14

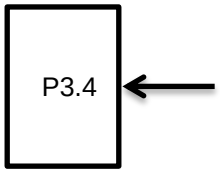
测验：实时系统

测验：实时系统

问题 1 边沿触发中断

编写C代码，计算P3.4上的输入从1变为0的次数。您可以假设输入没有反弹。 将优先级设置为4级。您可以假设这是端口3上的唯一中断。但是端口3上的其它引脚可用于输入或输出。 所以，编写友好的代码， 显示初始化和ISR。

```
uint32_t Count; // number of falling edges
void Input_Init(void);
void PORT3_IRQHandler (void);
```



这导致**计数**变为 2.

问题 2 中断

列出要生成端口1 GPIO中断必须为true的所有条件？ 这些情况发生的顺序是否重要？

问题 3 优先级

假设系统上有两个中断正在运行。 P1.6 上有一个中断，P1.5 上有第二个中断。如果两个请求同时发生，会发生什么？

A) 两者都提供服务，但P1.5在P1.6之前
B) 两者都提供服务，但P1.6在P1.5之前
C) P1.5提供服务，但P1.6丢失
D) P1.6提供服务，但P1.5丢失
E) 两者都丢失了
F) 以上都不是

问题 4 优先级

假设系统上有两个中断正在运行。 端口 1 上有一个中断，端口 2 上有第二个中断。端口 1 中断优先级为 2，端口 2 中断优先级为 7

a) 如果两个请求同时发生会发生什么？
b) 如果端口 1 首先出现，并且在运行端口 1 ISR 时触发端口 2，会发生什么？
c) 如果端口 2 首先出现，并且在运行端口 2 ISR 时触发端口 1，会发生什么？

问题 5 应答

以下是在同一端口上为两个中断提供服务的正确方法。 如果触发 P6.2，则设置信号量 **SW1**。 如果触发 P6.3，则设置信号量 **SW2**。 如果引脚 x 已被触发，则 **P6->IV** 返回一个数字 2*(x+1)，并自动清除该位。

```
void PORT6_IRQHandler(void){
uint8_t status;
  status = P6->IV;
  if(status==0x06){ // check for P6.2
    SW1 = 1;        // signal semaphore
    status = P6->IV;
  }
  if(status==0x08){
    SW2 = 1;        // signal semaphore
  }
}
Consider is alternate solution, which does have a bug.
void PORT6_IRQHandler(void){
  if(P6->IFG&0x04){   // check for P6.2
    P6->IFG &= ~0x04; // acknowledge, clear flag bit 2
    SW1 = 1;          // signal semaphore
  }
  if(P6->IFG&0x08){   // check for P6.8
    P6->IFG &= ~0x08; // acknowledge, clear flag bit 3
    SW2 = 1;          // signal semaphore
  }
}
```

这种备选解决方案大部分时间都有效。 但是，很少会丢失中断（边缘发生但信号量永远不会被设置）。 为什么？ 解释此备选解决方案中的错误。

IMPORTANT NOTICE FOR TI DESIGN INFORMATION AND RESOURCES

Texas Instruments Incorporated ('TI") technical, application or other design advice, services or information, including, but not limited to, reference designs and materials relating to evaluation modules, (collectively, "TI Resources") are intended to assist designers who are developing applications that incorporate TI products; by downloading, accessing or using any particular TI Resource in any way, you (individually or, if you are acting on behalf of a company, your company) agree to use it solely for this purpose and subject to the terms of this Notice.

TI's provision of TI Resources does not expand or otherwise alter TI's applicable published warranties or warranty disclaimers for TI products, and no additional obligations or liabilities arise from TI providing such TI Resources. TI reserves the right to make corrections, enhancements, improvements and other changes to its TI Resources.

You understand and agree that you remain responsible for using your independent analysis, evaluation and judgment in designing your applications and that you have full and exclusive responsibility to assure the safety of your applications and compliance of your applications (and of all TI products used in or for your applications) with all applicable regulations, laws and other applicable requirements. You represent that, with respect to your applications, you have all the necessary expertise to create and implement safeguards that (1) anticipate dangerous consequences of failures, (2) monitor failures and their consequences, and (3) lessen the likelihood of failures that might cause harm and take appropriate actions. You agree that prior to using or distributing any applications that include TI products, you will thoroughly test such applications and the functionality of such TI products as used in such applications. TI has not conducted any testing other than that specifically described in the published documentation for a particular TI Resource.

You are authorized to use, copy and modify any individual TI Resource only in connection with the development of applications that include the TI product(s) identified in such TI Resource. NO OTHER LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE TO ANY OTHER TI INTELLECTUAL PROPERTY RIGHT, AND NO LICENSE TO ANY TECHNOLOGY OR INTELLECTUAL PROPERTY RIGHT OF TI OR ANY THIRD PARTY IS GRANTED HEREIN, including but not limited to any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information regarding or referencing third-party products or services does not constitute a license to use such products or services, or a warranty or endorsement thereof. Use of TI Resources may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

TI RESOURCES ARE PROVIDED "AS IS" AND WITH ALL FAULTS. TI DISCLAIMS ALL OTHER WARRANTIES OR REPRESENTATIONS, EXPRESS OR IMPLIED, REGARDING TI RESOURCES OR USE THEREOF, INCLUDING BUT NOT LIMITED TO ACCURACY OR COMPLETENESS, TITLE, ANY EPIDEMIC FAILURE WARRANTY AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT OF ANY THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

TI SHALL NOT BE LIABLE FOR AND SHALL NOT DEFEND OR INDEMNIFY YOU AGAINST ANY CLAIM, INCLUDING BUT NOT LIMITED TO ANY INFRINGEMENT CLAIM THAT RELATES TO OR IS BASED ON ANY COMBINATION OF PRODUCTS EVEN IF DESCRIBED IN TI RESOURCES OR OTHERWISE. IN NO EVENT SHALL TI BE LIABLE FOR ANY ACTUAL, DIRECT, SPECIAL, COLLATERAL, INDIRECT, PUNITIVE, INCIDENTAL, CONSEQUENTIAL OR EXEMPLARY DAMAGES IN CONNECTION WITH OR ARISING OUT OF TI RESOURCES OR USE THEREOF, AND REGARDLESS OF WHETHER TI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

You agree to fully indemnify TI and its representatives against any damages, costs, losses, and/or liabilities arising out of your non-compliance with the terms and provisions of this Notice.

This Notice applies to TI Resources. Additional terms apply to the use and purchase of certain types of materials, TI products and services. These include; without limitation, TI's standard terms for semiconductor products http://www.ti.com/sc/docs/stdterms.htm), evaluation modules, and samples (http://www.ti.com/sc/docs/sampterms.htm).

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265