模块 10

测验： 调试实时系统

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问题 1 调试转储

有两个 8 位数组：

```
#define SIZE 1000
uint8_t P2buf[SIZE];
uint8_t P3buf[SIZE];
```

编写将端口 2 输入和端口 3 输出的一个实例转储到这些数组中的 C 代码。 缓冲区已满时停止记录。 您可以使用指针或索引访问数组。 初始化不需要填充数组; 只是初始化索引/指针。 以下是您需要编写的函数的原型。

```
Void Debug_Init(void);
void Debug_Dump(void);
```

问题 2 侵入性

考虑下方的编译器为 **Buffer[I]=x** 生成的输出：

```
000004bc:  4817      ldr  r0, [pc, #0x5c]
000004be:  4A18      ldr  r2, [pc, #0x60]
000004c0:  9900      ldr  r1, [sp]
000004c2:  6800      ldr  r0, [r0]
000004c4:  F8421020  str  r1, [r2, r0, lsl #2]
```

考虑下方的编译器为 ***pt=x;** 生成的输出：

```
000004e4:  490F      ldr  r1, [pc, #0x3c]
000004e6:  9800      ldr  r0, [sp]
000004e8:  6809      ldr  r1, [r1]
000004ea:  6008      str  r0, [r1]
```

两段 C 代码都将一个 32 位数据存储到缓冲区中。 仅仅考虑这部分代码，哪种方法不那么具有侵入性？ 为什么？

问题 3 中断

列出要生成SysTick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 4 中断

在处理器暂停主程序并启动 ISR 时，列出上下文切换中发生的步骤。

问题 5 优先级

假设系统上有两个中断正在运行。 SysTick 中断优先级为 2，Timer32 中断优先级为 3。

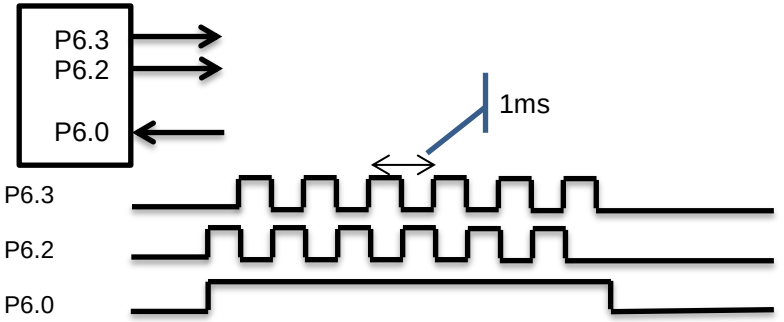
a) 如果两个请求同时发生会发生什么？

b) 如果首先发生 SysTick 会发生什么，并且在运行 SysTick ISR 时，会触发 Timer32?

c) 如果 Timer32 首先出现，并且在运行 Timer32 ISR 时会触发 SysTick 时会发生什么？

问题 6 SysTick

使 MSP432 端口 6 引脚 3，2 输出，引脚 0 输入。 设计一个软件系统，如果 P6.0 为高电平，则以 1 kHz 的频率从 P6.3 和 P6.2 创建方波。 振荡时，使 P6.3 与 P6.2 异相。 如果 P6.0 为低电平，则将 P6.3 和 P6.2 都清零。 必须以优先级 0 使用 SysTick 中断。假设微控制器以 3 MHz 运行。 主程序初始化端口和 SysTick，但系统的主循环可以自由地执行其它不相关的任务。



问题 7 Flash

对于以下每个操作，指定操作是快速（10ns 的顺序），中等（100µs 的顺序）还是慢（10s 的顺序）。 为每个选择最接近的答案

a) 擦除 Flash ROM

b) 编程，将位写入 0

c) 读取 0 的位

d) 读取 1 的位

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