



模块 8

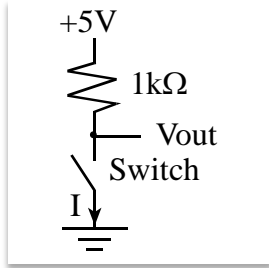
测验：连接输入和输出



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问题 1 开关接口

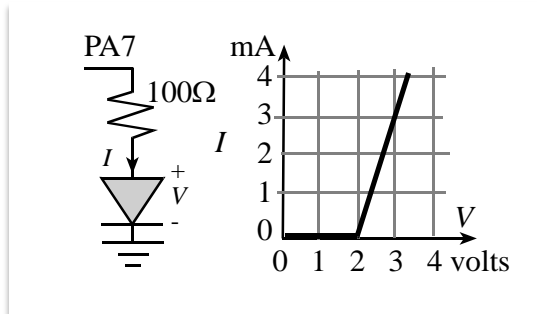
考虑在+5V 数字系统中使用的负逻辑开关电路。不要认为开关是理想的，然而，假设开关打开时开关的电阻为 $1M\Omega$ ，开关闭合时开关的电阻为 1Ω 。未按下开关时，通过开关流过多少电流？



当开关被按下时，有多少 mA 电流流过开关？

问题 2 LED 接口

P1.7 上的输出控制这个 LED。对于小于 2 伏的 LED 电压，LED 电流为 0。假定 P1.7 的输出高电压为 3.3V。对于高于 2 伏的电压，LED 电流为 $I = 3 * (V - 2)$ ， I 是 mA， V 是伏特。

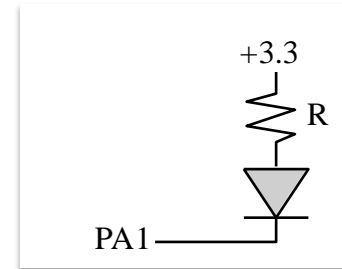


LED 开启时的电流，电压和功率是多少？

问题 3 LED 接口

考虑具有期望操作点 (I_d , V_d) 的 LED。让 VOL VOH IOL 和 IOH 成为 P1.1 上数字输出的操作参数。计算该电路所需电阻 R 所需的设计公式是什么？

P1

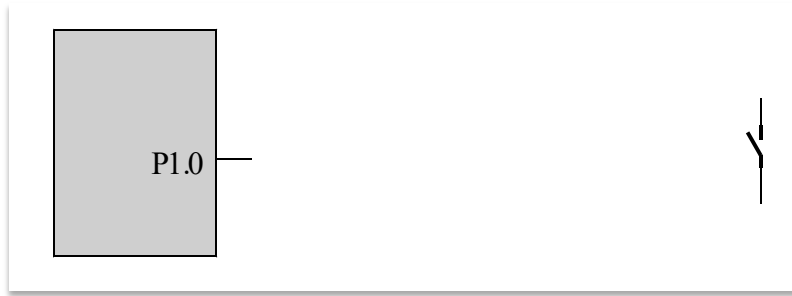




测验：连接输入和输出

问题 4 开关接口

连接一个开关到 P1.0。在负逻辑中实现接口。假设端口引脚初始化为带内部上拉的输入。最大限度地降低接口成本。显示硬件连接；不需要软件。



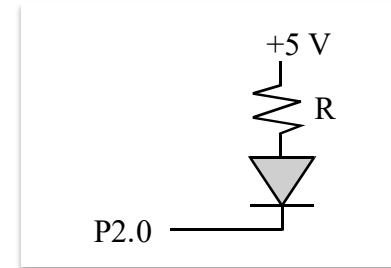
问题 5 LED 接口

将多色 LED 连接到微控制器。每种颜色由一个单独的二极管控制，工作点为 2V, 25mA。您可以使用任意数量的 7406 逆变器 and 任意数量的电阻器。假设 7406 的 VOL 为 0.5V。假设微控制器输出电压为 VOH = 3.0V 且 VOL = 0.1V。指定所需的任何电阻的值。显示用于选择电阻值的计算公式，使每个输出控制一种颜色，正逻辑。



问题 6

这不是 MSP432，而是假设这是另一个以 5V 电源运行的微控制器。以下接口用于连接低电流 LED。假设 LED 电压降为 2 V。电阻为 1000Ω。当软件输出高电平时，P2.0 上的电压变为 4.9 V，当软件输出低电平时，P2.0 上的电压变为 0.5 V，当 LED 亮时，LED 电流是多少？这是正逻辑还是负逻辑？



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