



模块 7

活动：有限状态机



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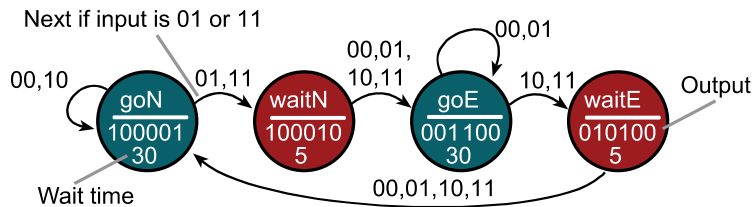
问题 1

编写C代码来定义一个结构体，该结构体包含3个带符号的16位数字（x, y, z），包含以cm为单位的位置，以及3个带符号的16位数字（vx, vy, vz）和以cm / sec为单位的速度。使用该结构在RAM中定义对象类型，使用该对象类型定义对象，编写一个每秒调用一次的函数，这个函数使用速度来更新位置。

```
x = x+vx
y = y+vy
z = z+vz
```

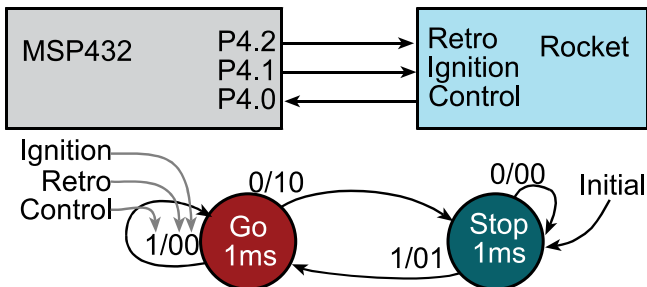
问题 2

思考这个交通信号灯 FSM。如果你处于 goN 状态会发生什么，因为输入是 10，输入变为 11，所以你移动到 waitN 状态，当你处于 waitN 状态时，输入恢复到 10（因为汽车不再在东边路上）会怎么样？



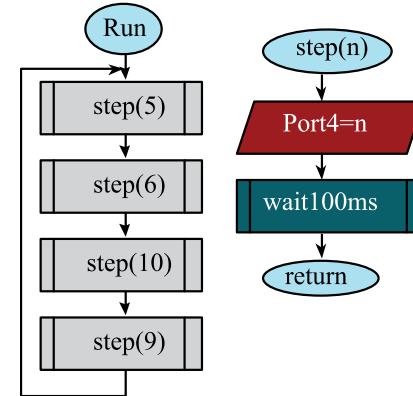
问题 3

编写 C 代码以实现此 FSM。



问题 4

设计了一种实现步进电机控制器的 FSM 解决方案的算法。显示状态转换图（不需要 C 代码）。



这个马达顺时针旋转输出模式 5, 6, 10, 9 一遍又一遍。当在另一方向（5, 9, 10, 6）输出图案时，它逆时针旋转。如果在任何有效模式 5, 6, 10 或 9 中留下它的输出，马达将停止。扩展 FSM 有两个输入。如果电机输入 0 或 1 停止，如果输入为 2，电机顺时针旋转，如果输入为 3，则逆时针旋转。

问题 5

考虑问题 4 中描述的步进电机算法。考虑一个具有四个输出（步进 5、6、10、9）和两个输入的系统。如果输入是 0 或 1，电机应该停止。如果输入是 2，电机应该顺时针旋转（100 毫秒的延迟）。如果输入是 3，电机应该顺时针旋转两倍快（延迟 = 50ms）。显示状态转换图（不需要 C 代码）。

问题 6

如果系统有 5 个二进制输入，每个状态将有多少个下一个状态箭头？

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