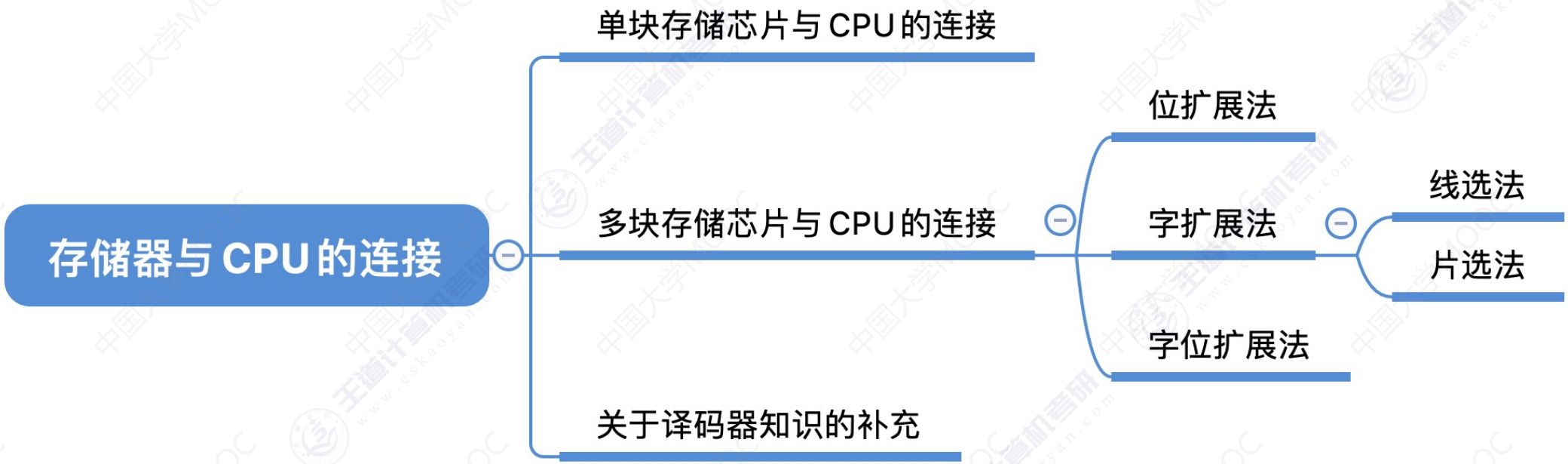
本节内容

主存储器与CPU的连接

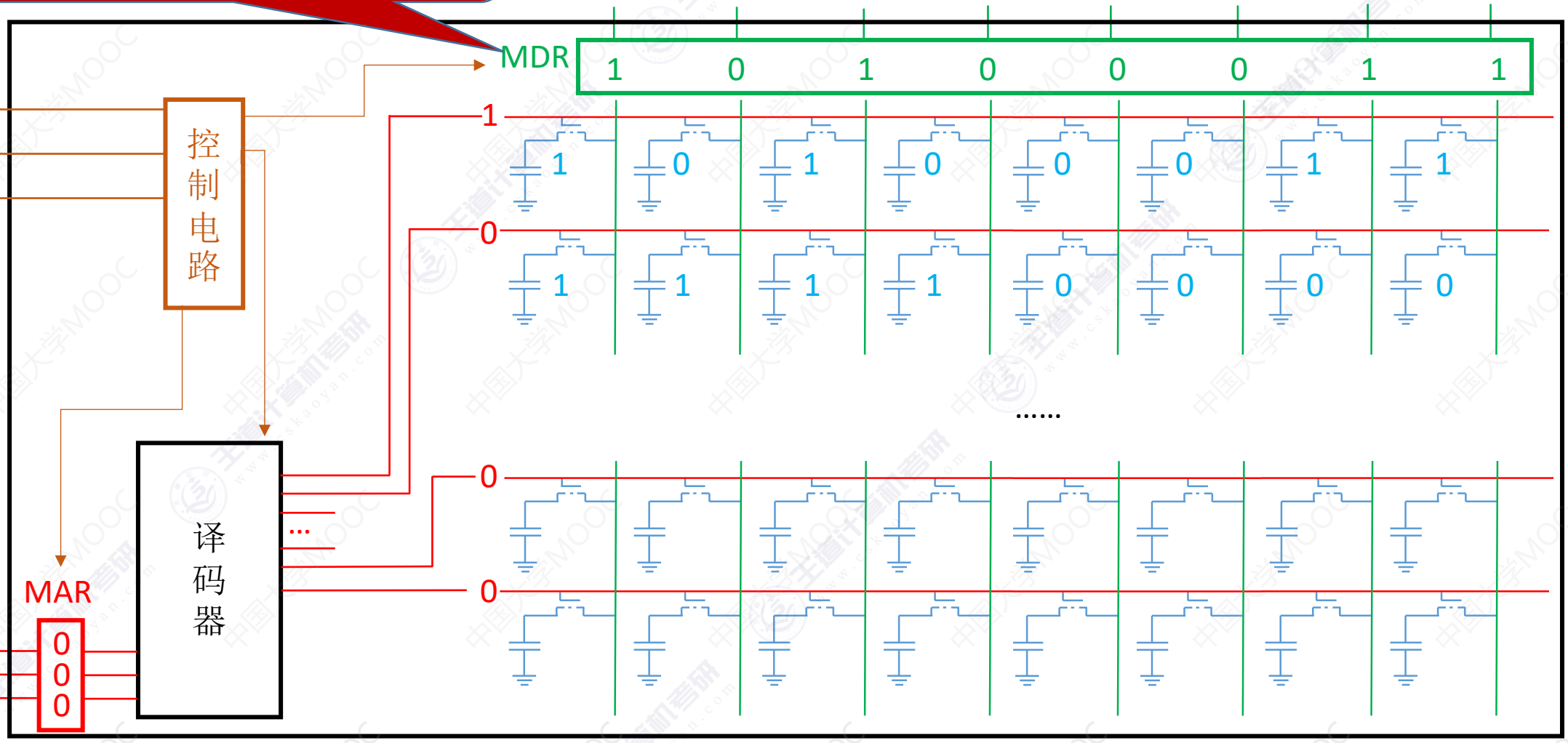
知识总览



注：现在的计算机MAR、MDR通常集成在CPU内部。存储芯片内只需一个普通的寄存器（暂存输入、输出数据）

数据总线宽度>存储芯片字长，怎么办？——位扩展

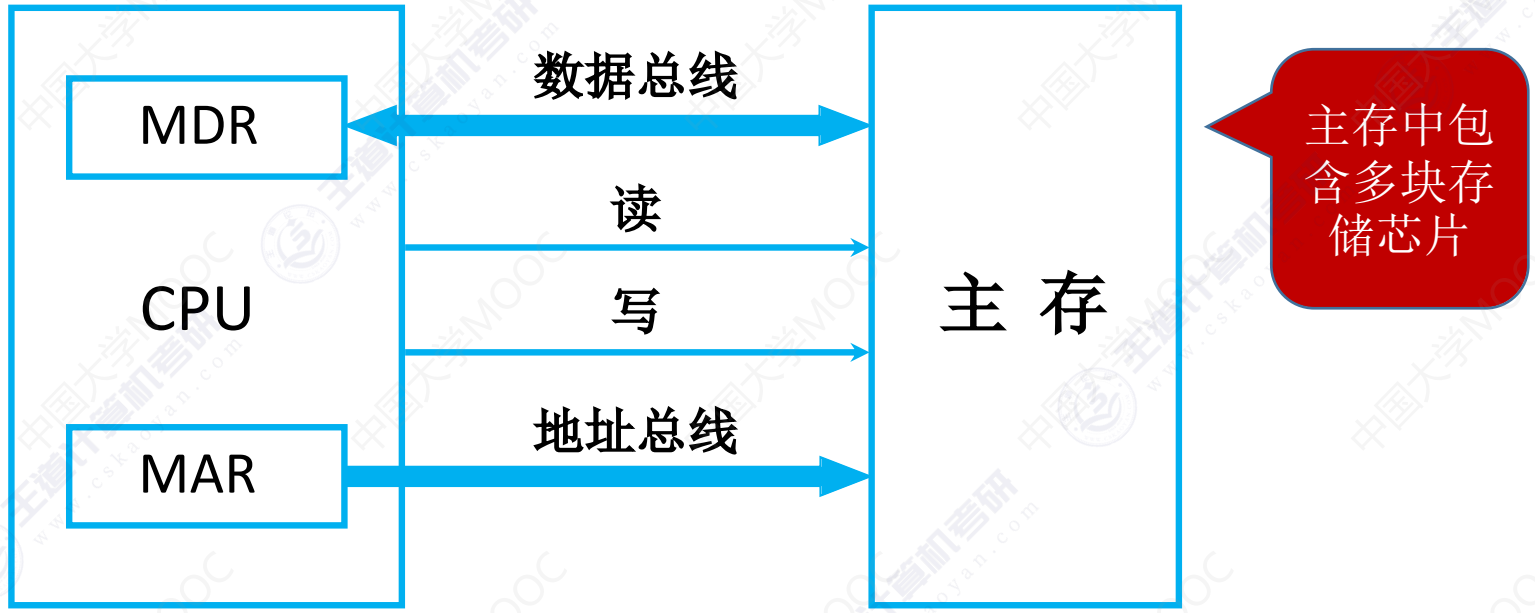
数据总线(宽度=存储字长)



想要扩展主存字数怎么办？——字扩展

8×8位的存储芯片

现在的计算机

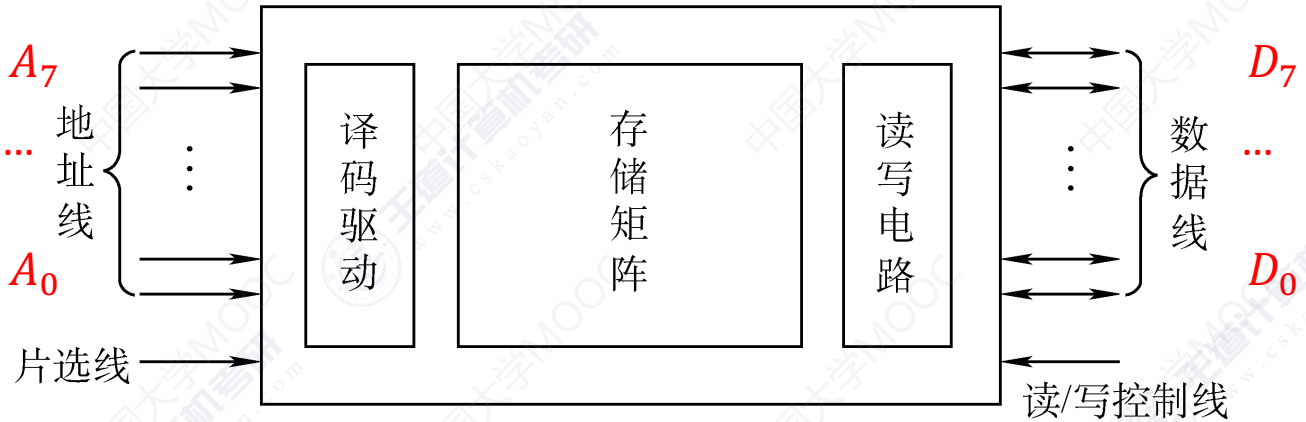


包含多块存储芯片

8GB

16GB

存储器芯片的输入输出信号



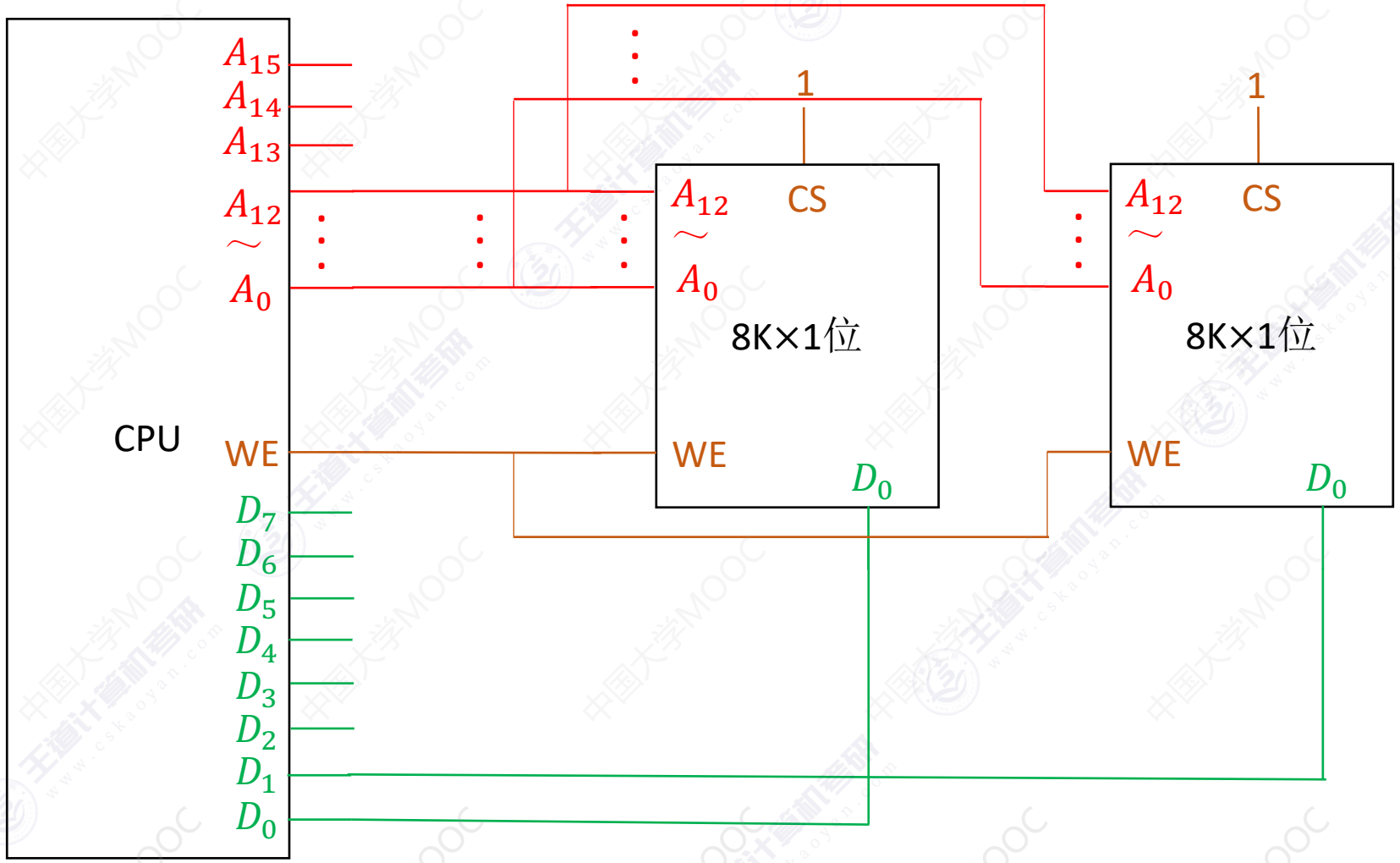
低电平有效（$\overline{\text{CS}}$ 或 $\overline{\text{CE}}$）

高电平有效（CS或 CE）

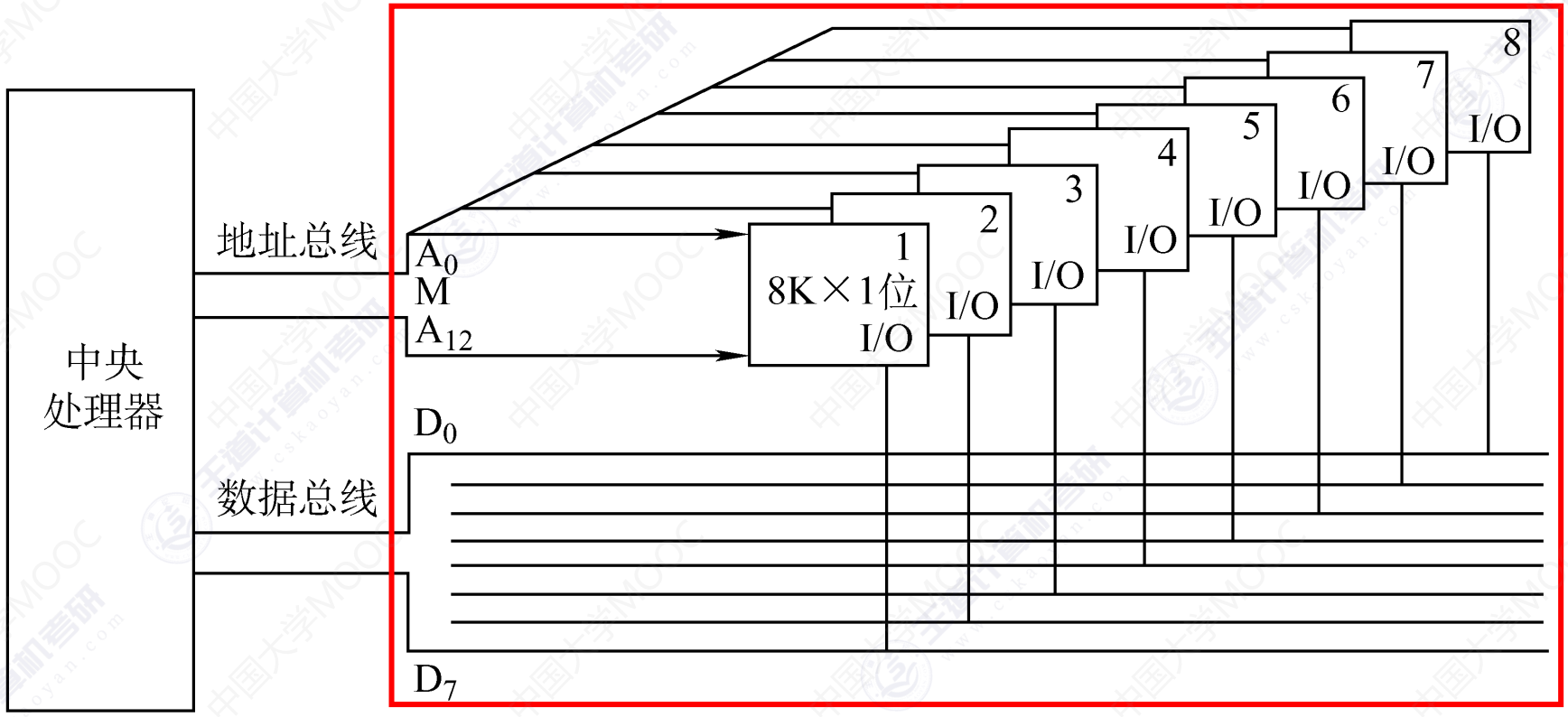
（$\overline{\text{WE}}$ 或 $\overline{WR}$）低电平表示写，高电平表示读

也可能分开为 $\overline{\text{WE}}$ 和 $\overline{\text{OE}}$ 两根读写线

增加主存的存储字长-位扩展



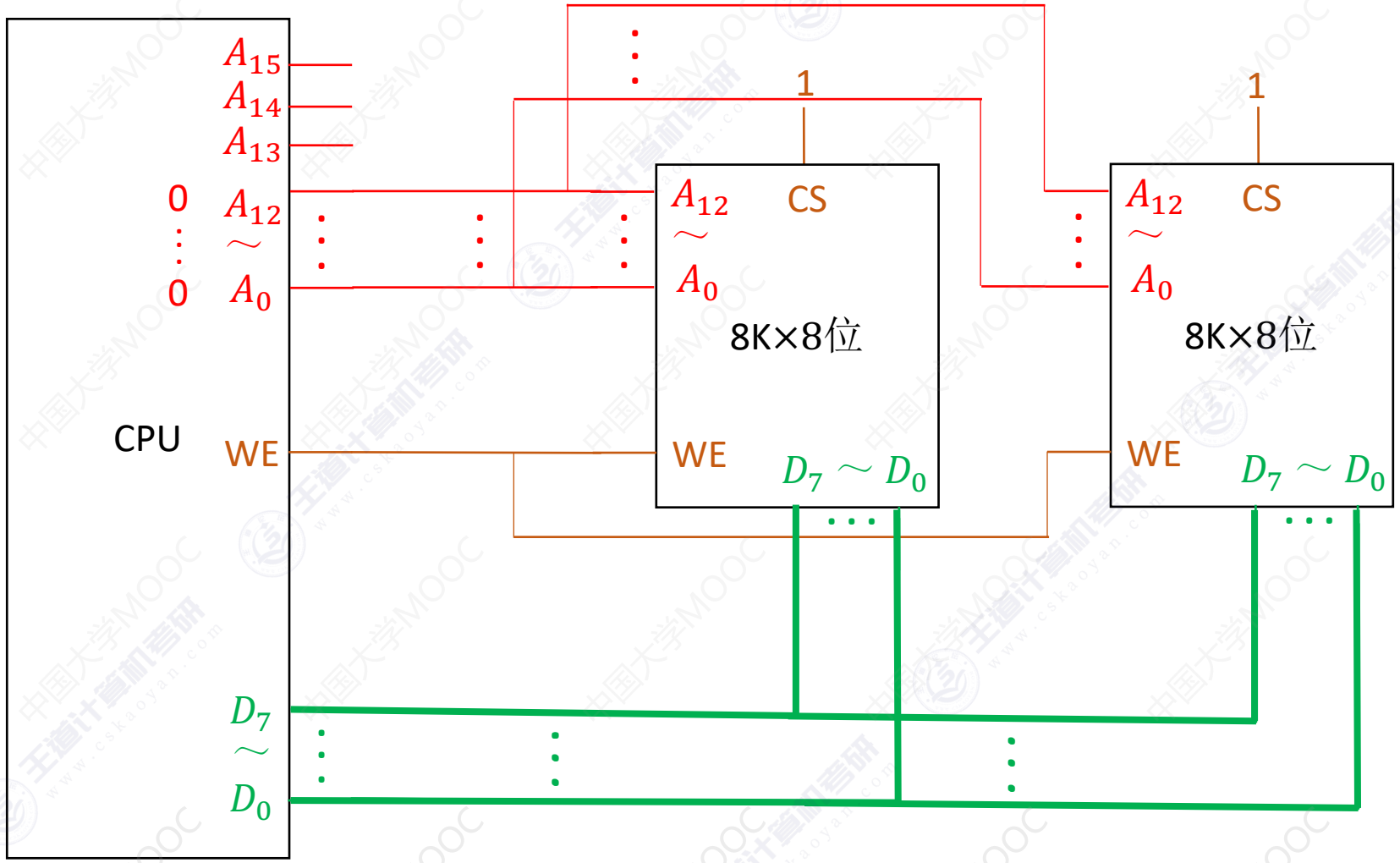
增加主存的存储字长-位扩展



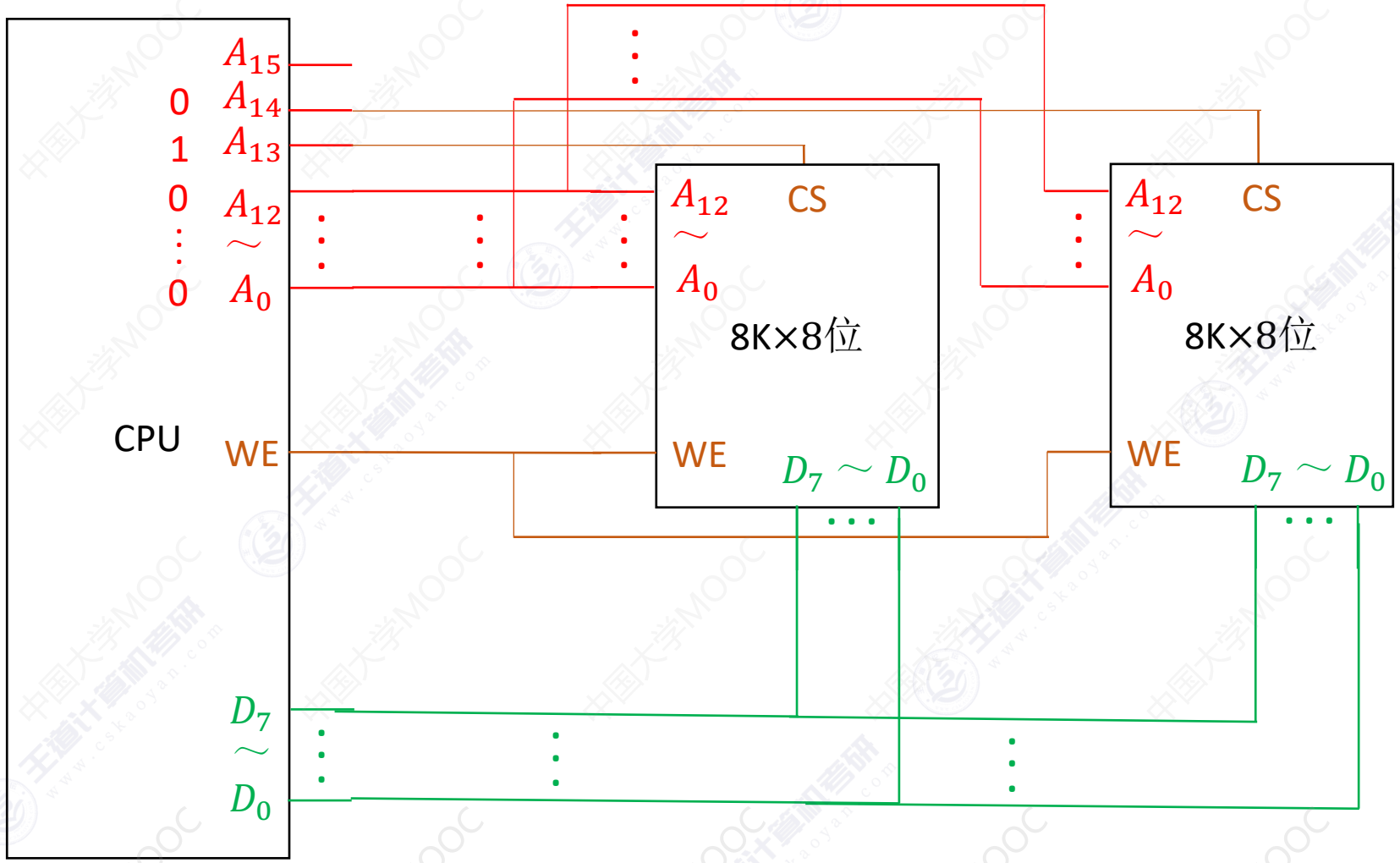
8片8K × 1位的存储芯片

→ 1个8K × 8位的存储器，容量8KB

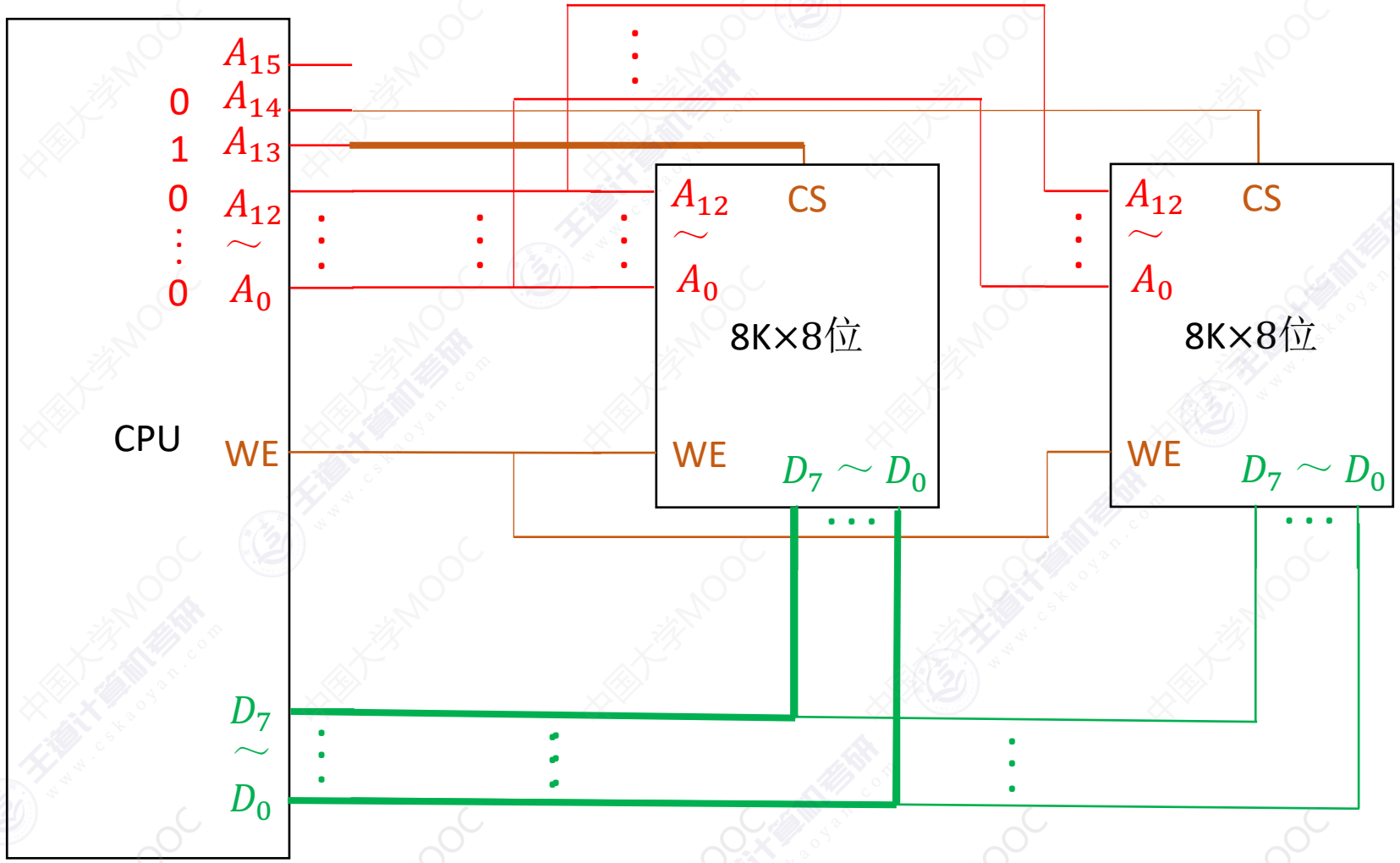
增加主存的存储字数-字扩展



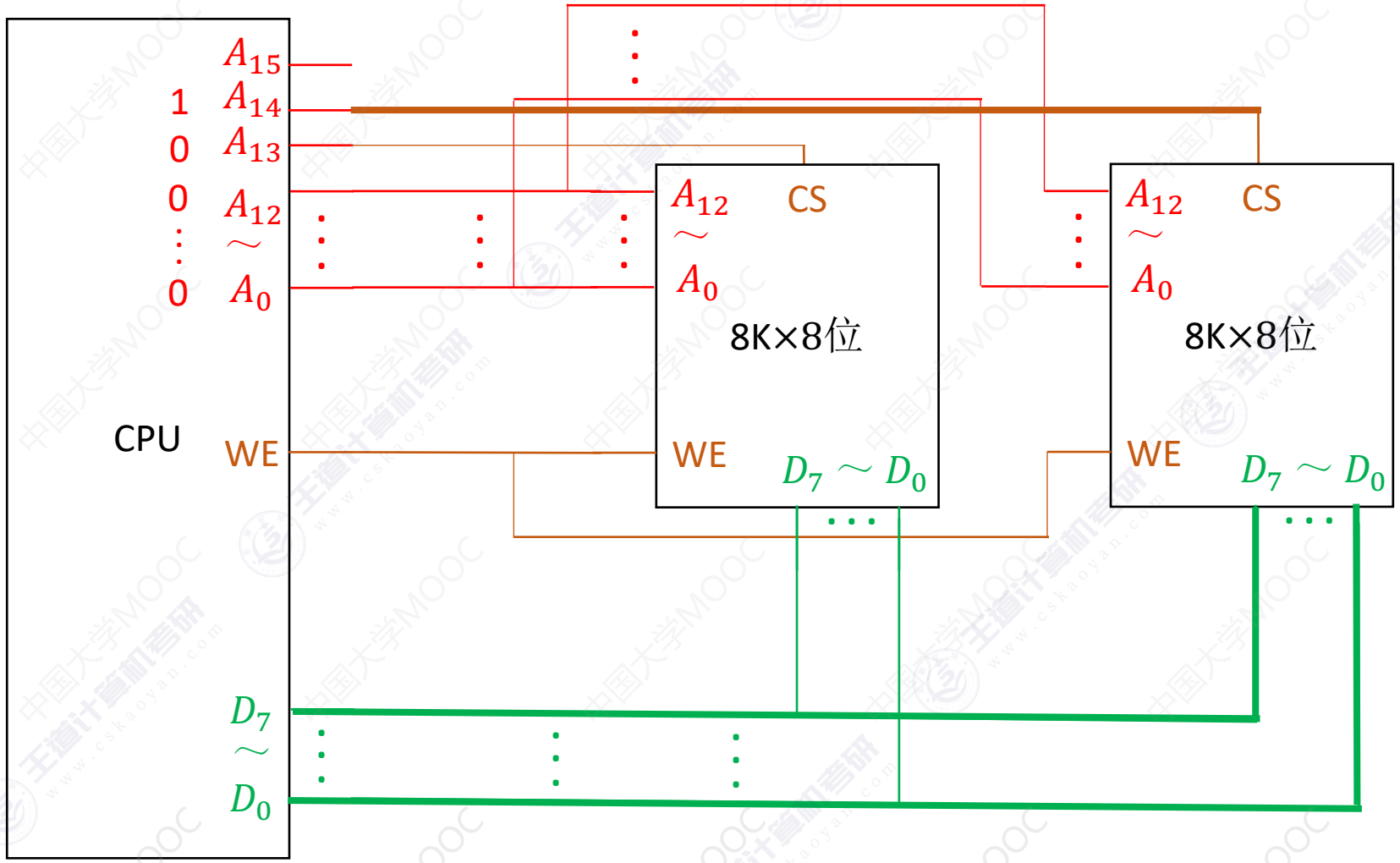
增加主存的存储字数-字扩展



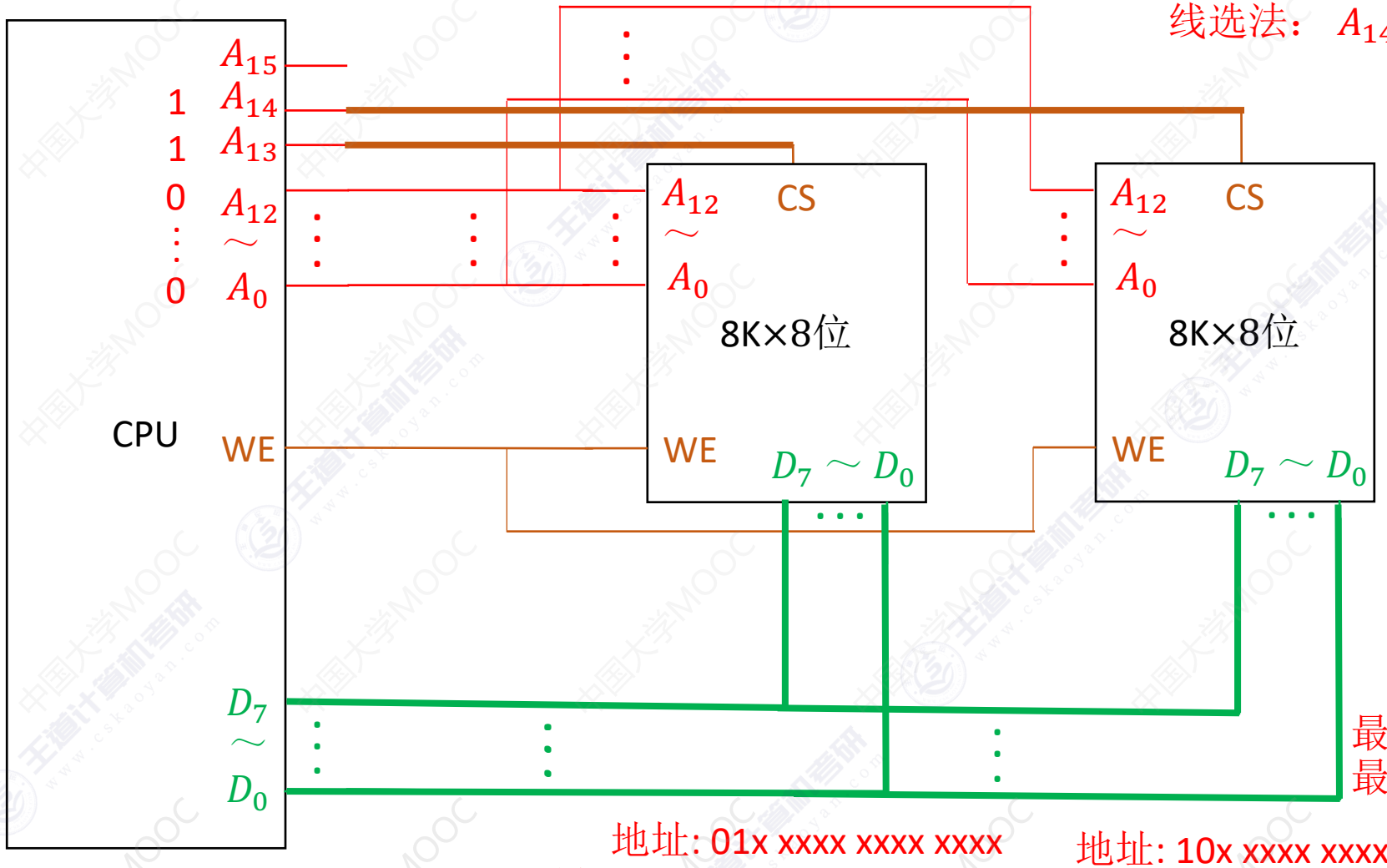
增加主存的存储字数-字扩展



增加主存的存储字数-字扩展



增加主存的存储字数-字扩展



线选法： A_{14} A_{13}只能为01或10

n条线

→ n个选片信号

最低地址: 100 0000 0000 0000

最高地址: 101 1111 1111 1111

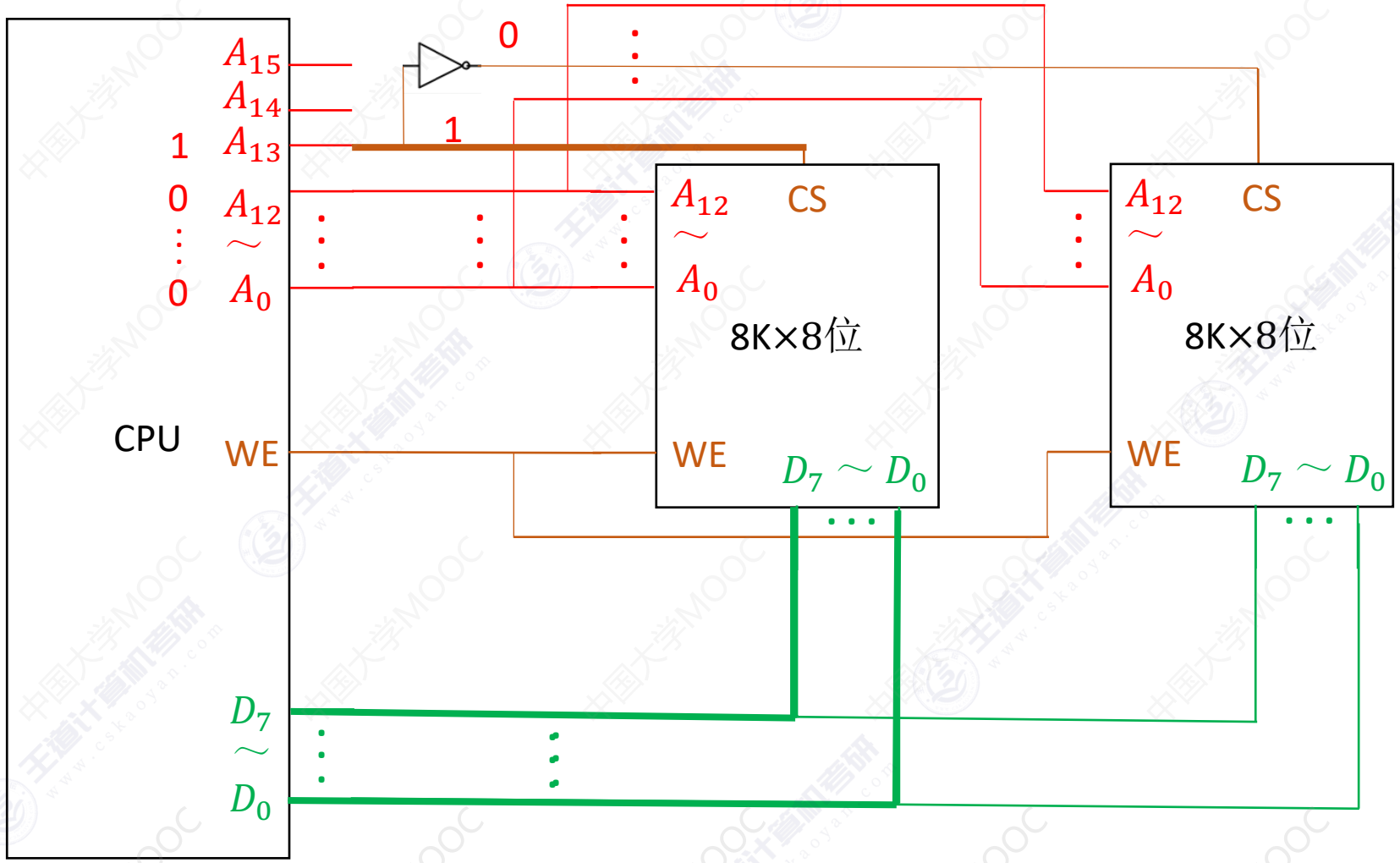
地址: 01x xxxx xxxx xxxx

最低地址: 010 0000 0000 0000

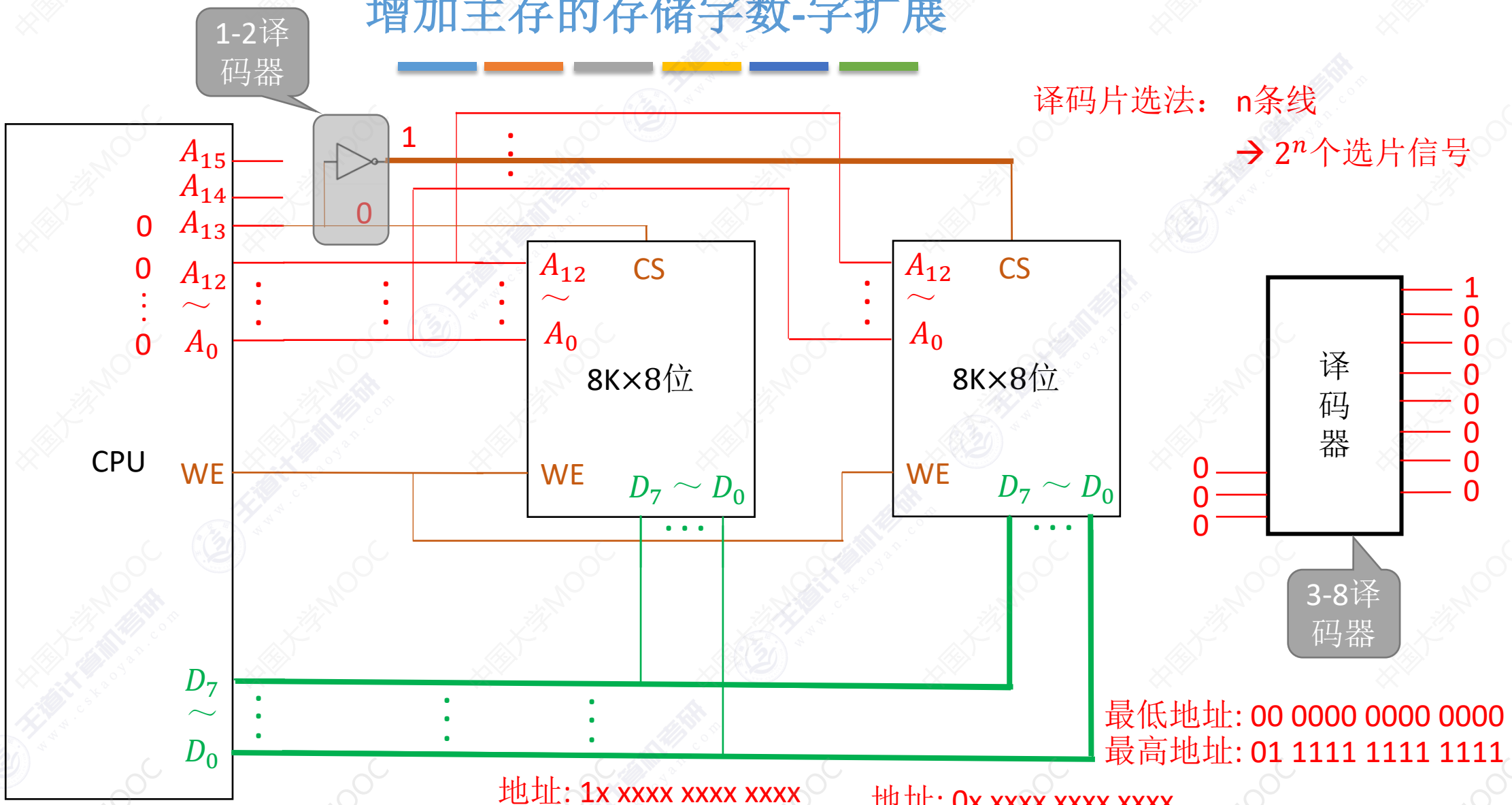
最高地址: 011 1111 1111 1111

地址: 10x xxxx xxxx xxxx

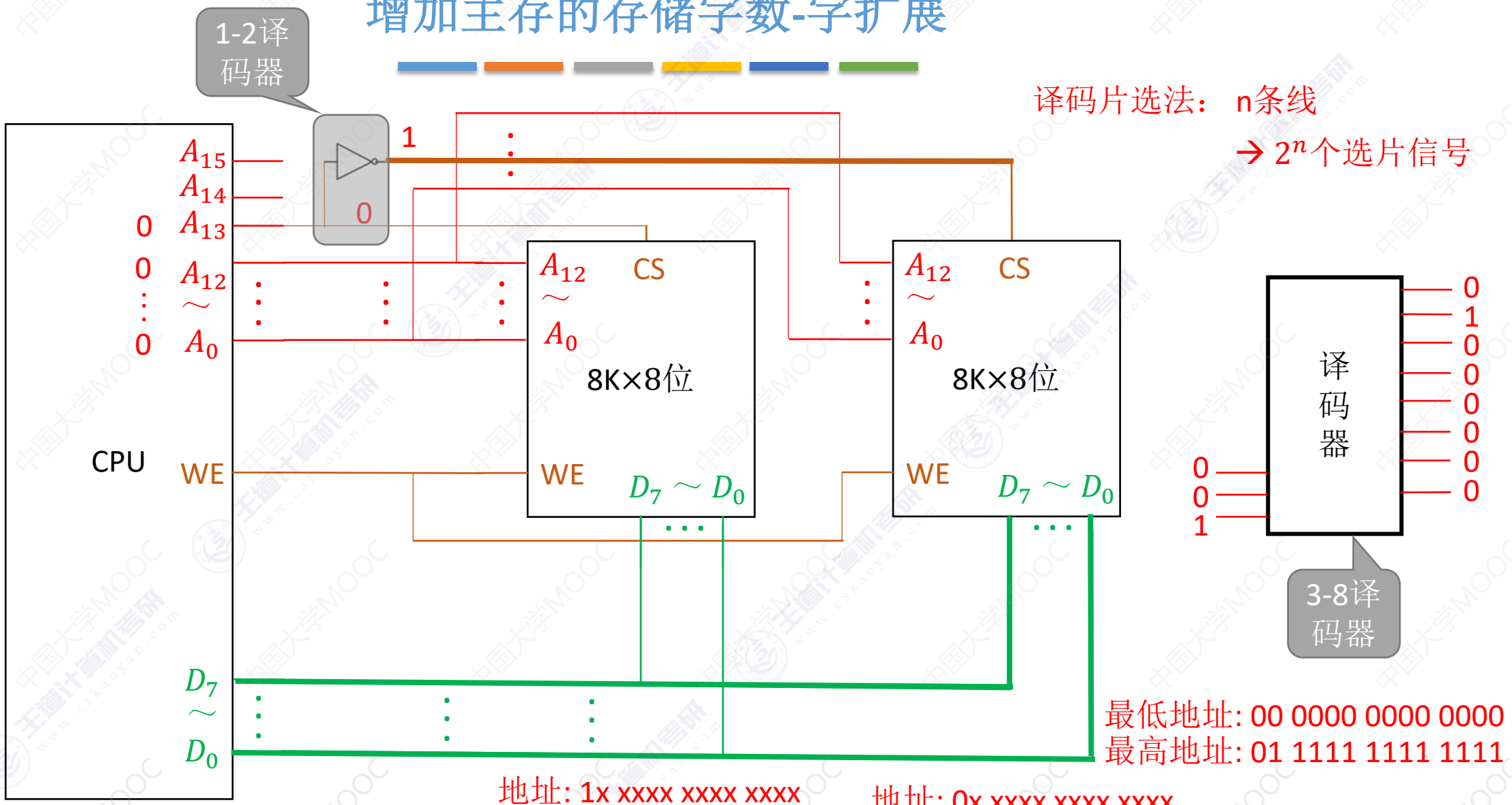
增加主存的存储字数-字扩展



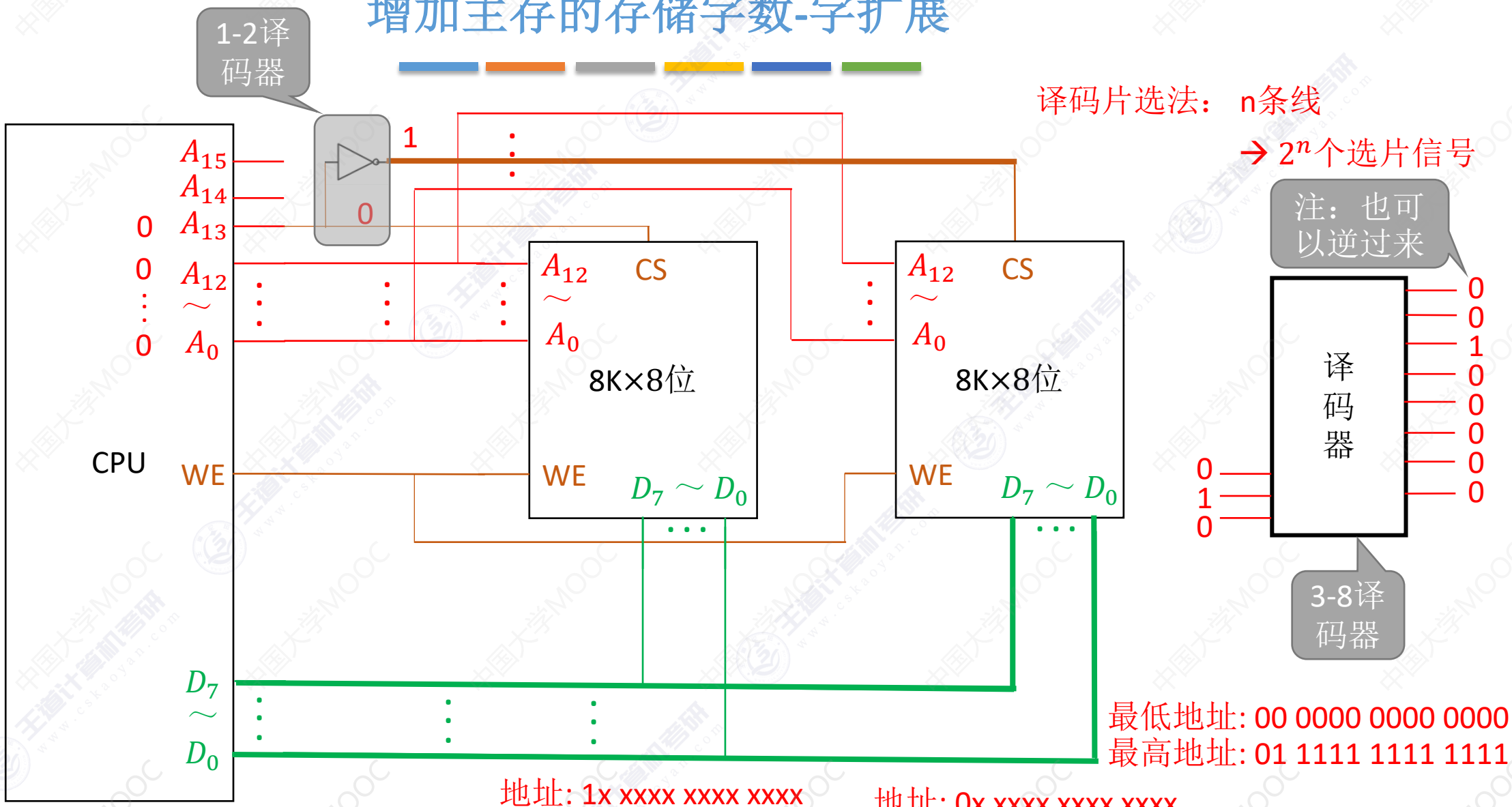
增加主存的存储字数-字扩展



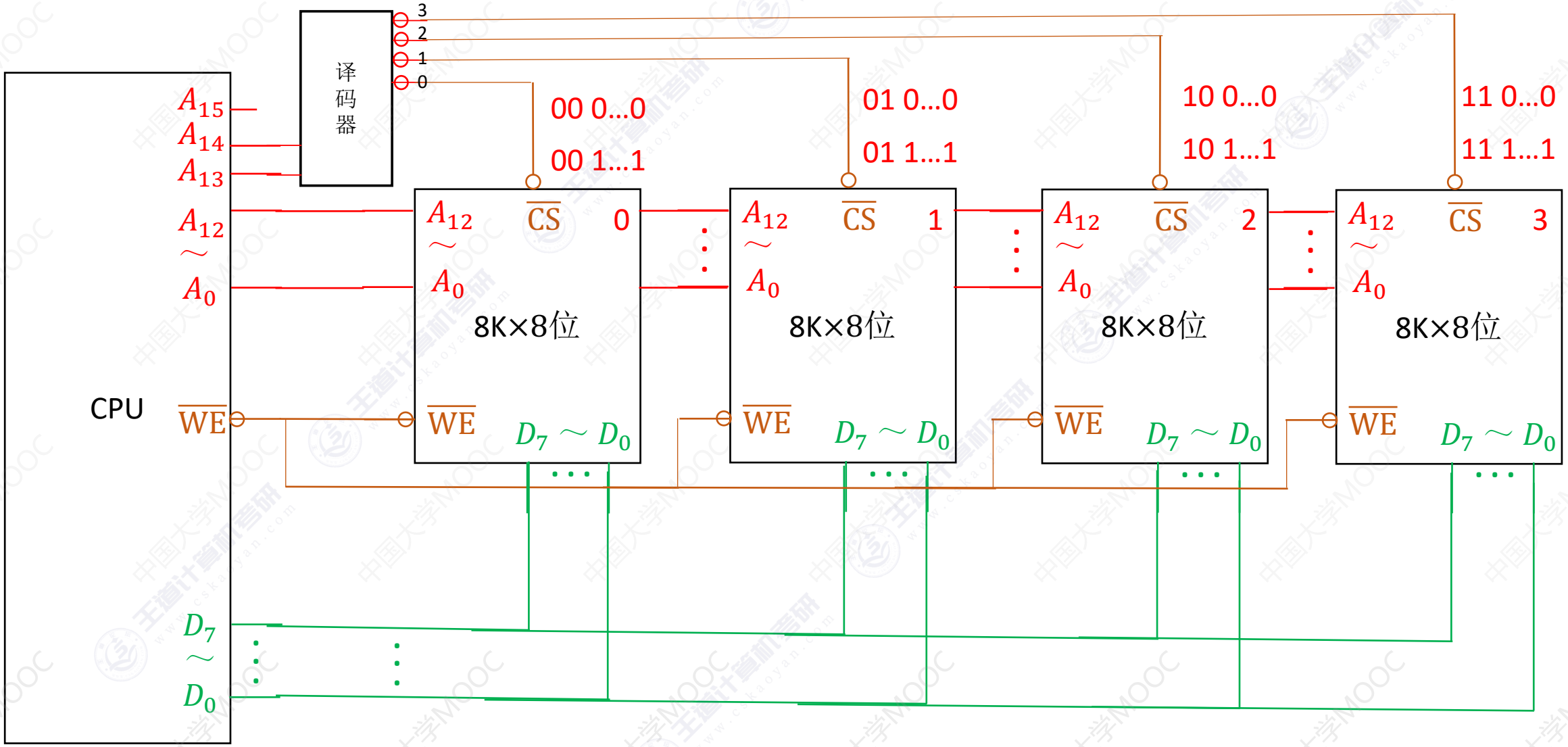
增加主存的存储字数-字扩展



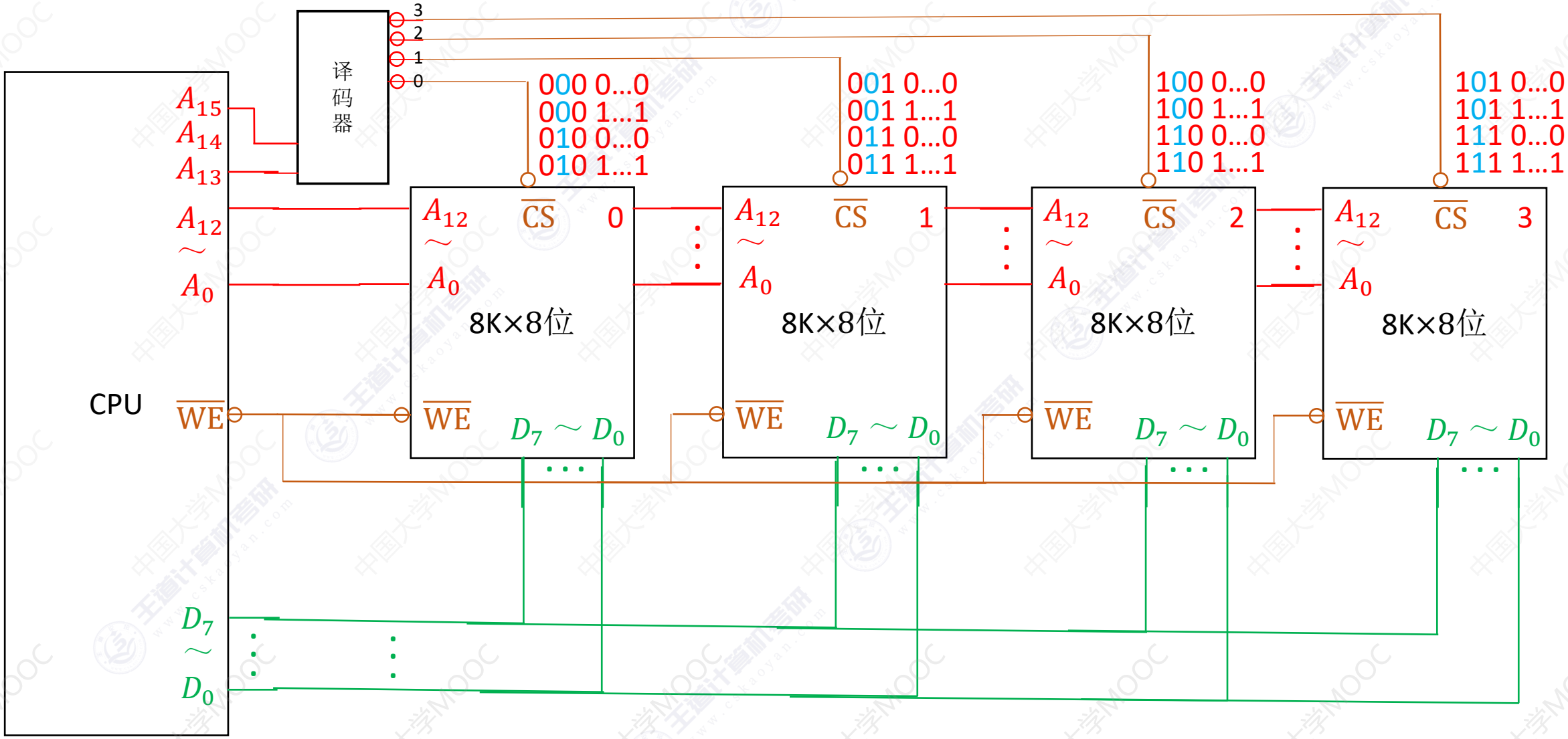
增加主存的存储字数-字扩展



主存容量扩展-字扩展



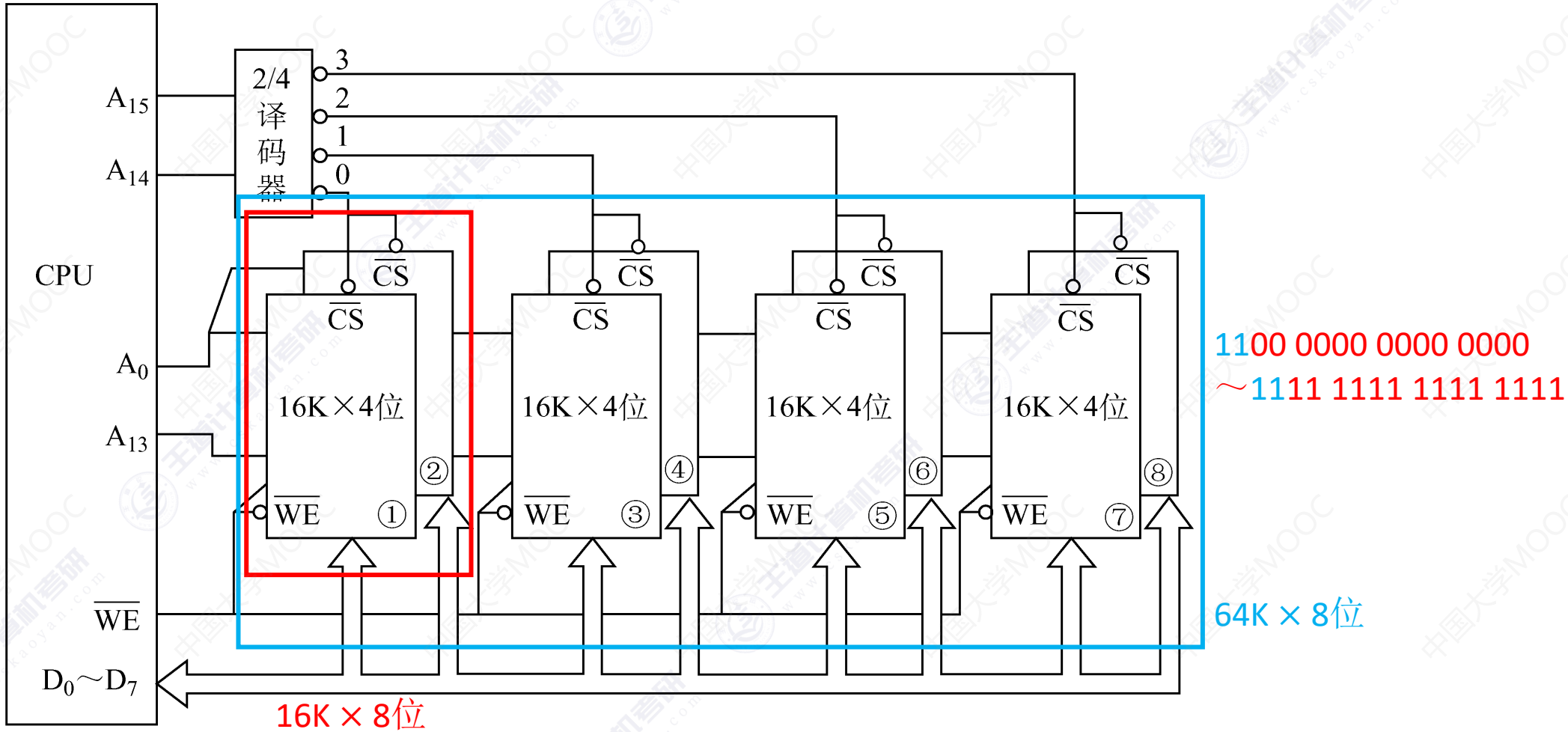
主存容量扩展-字扩展



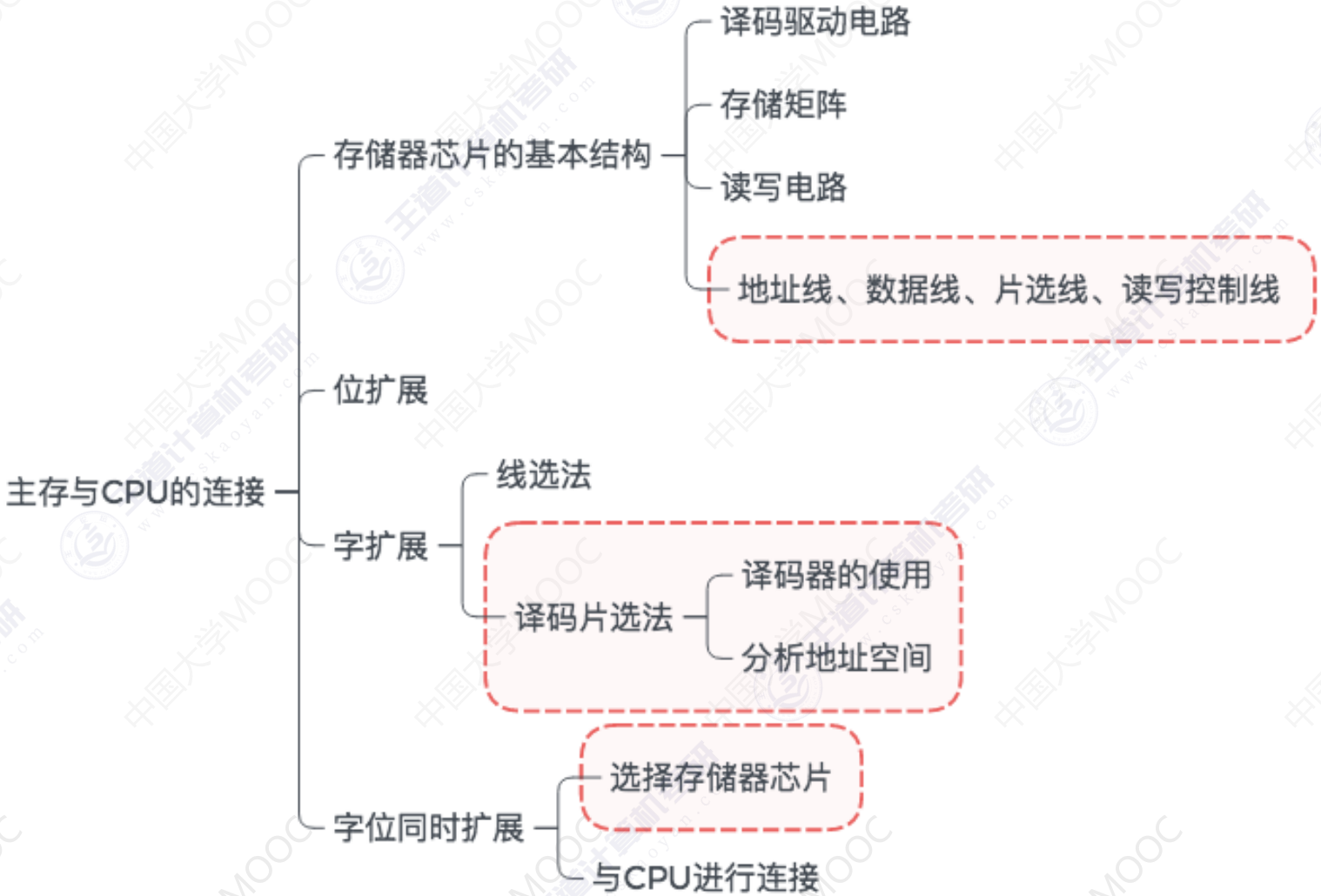
主存容量扩展-字扩展

线选法	译码片选法
n条线→n个选片信号	n条线→ 2^n个选片信号
电路简单	电路复杂
地址空间不连续	地址空间可连续

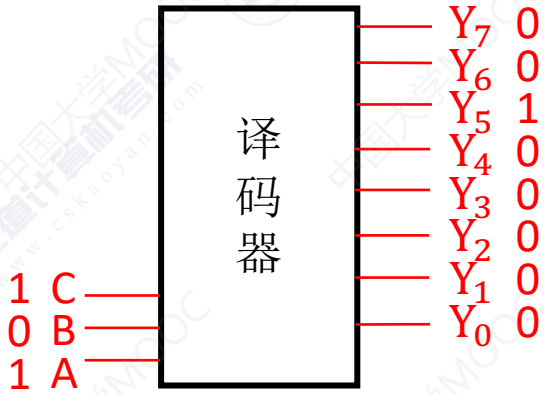
主存容量扩展-字位同时扩展

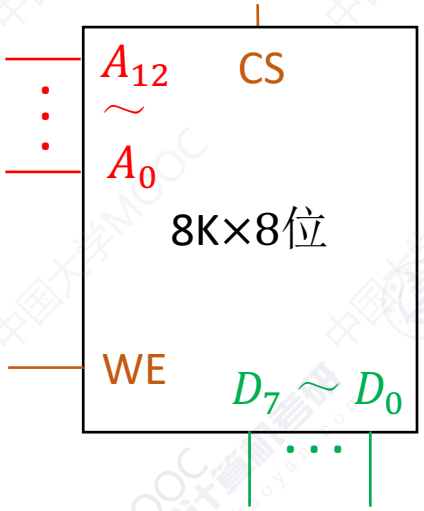


本节回顾



补充：译码器

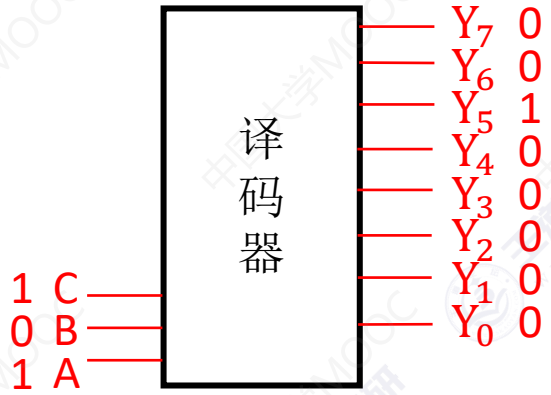


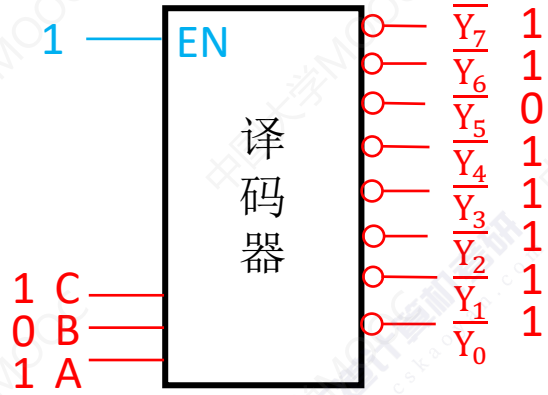


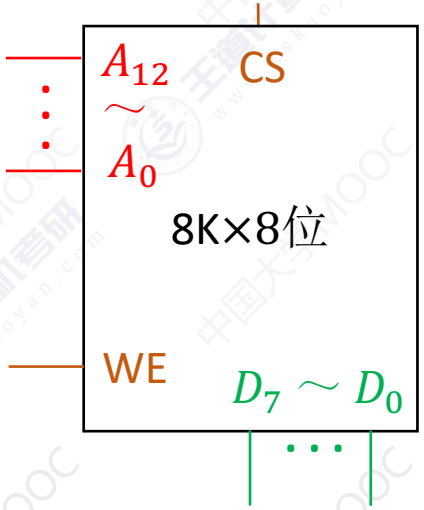
高电平有效

补充：译码器

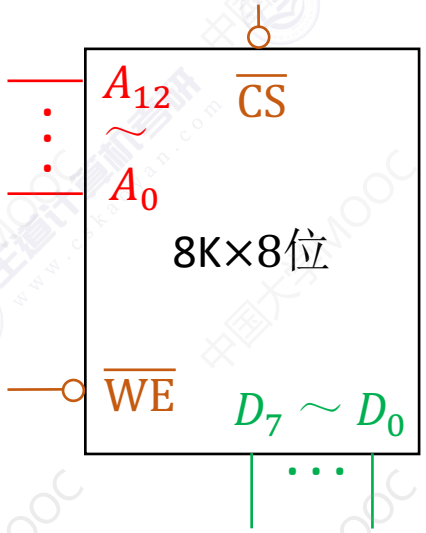
Enable，使能，类似于CS





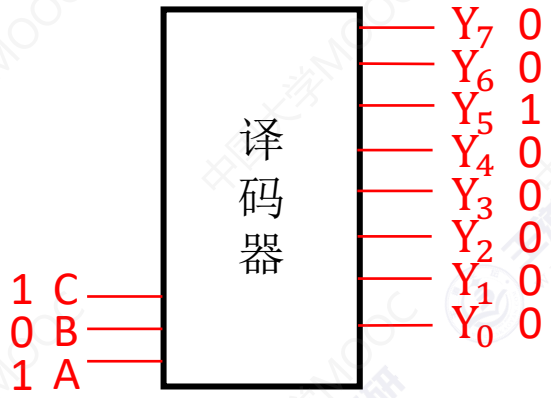


高电平有效



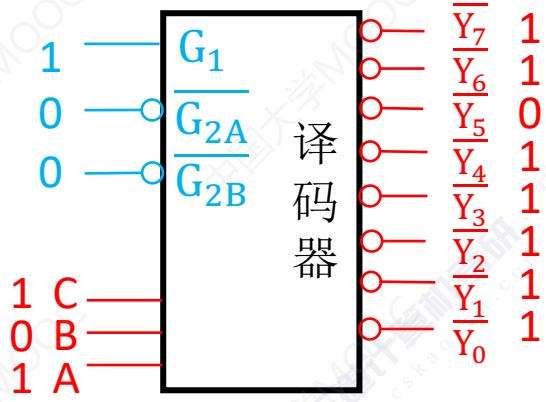
低电平有效

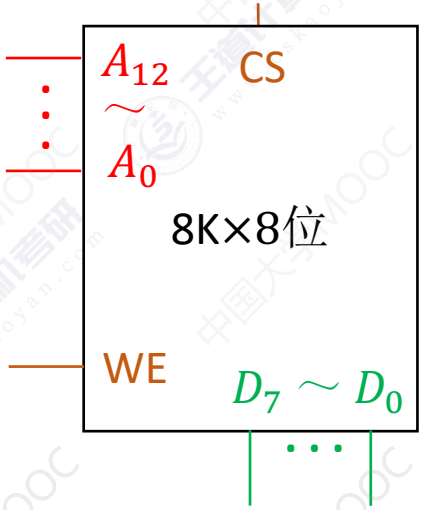
补充：译码器



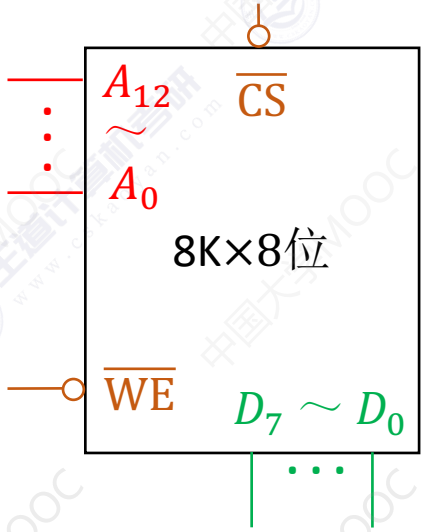
多个“使能”

型号 74ls138





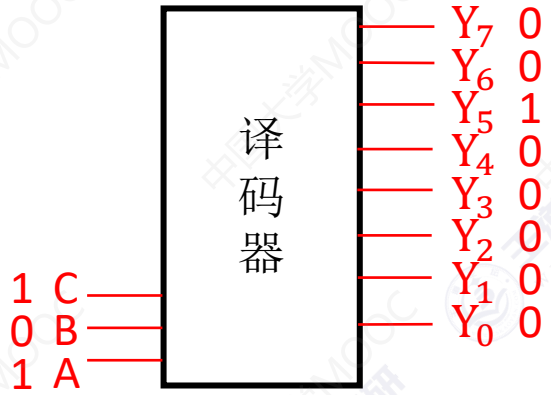
高电平有效



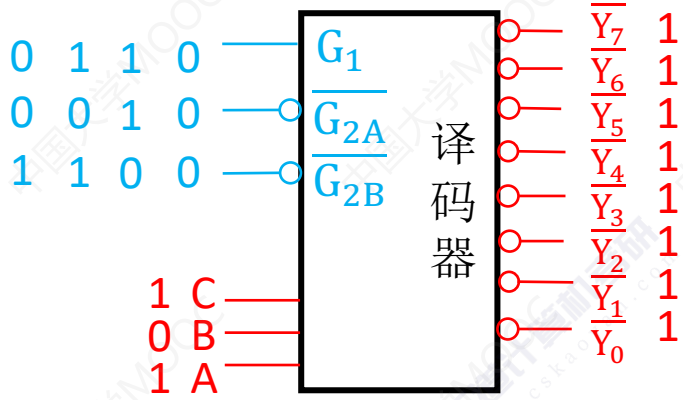
低电平有效

补充：译码器

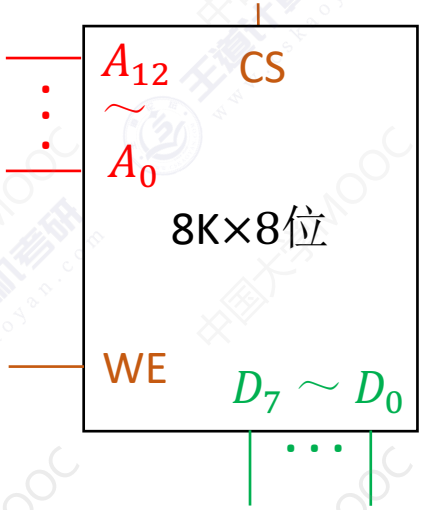
型号
74ls138



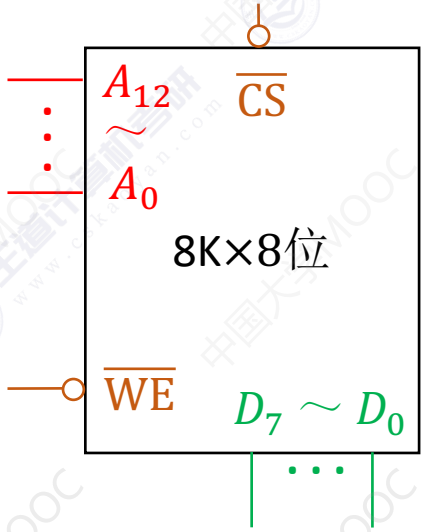
多个“使能”



注：CPU可使用译码器的使能端控制片选信号的生效时间



高电平有效

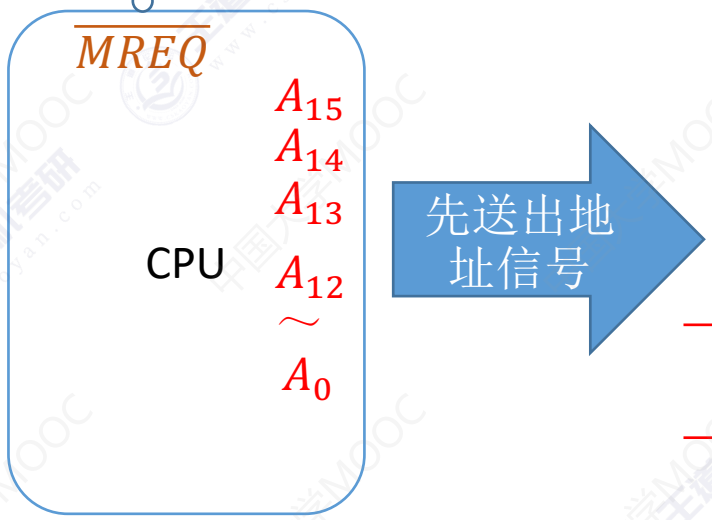


低电平有效

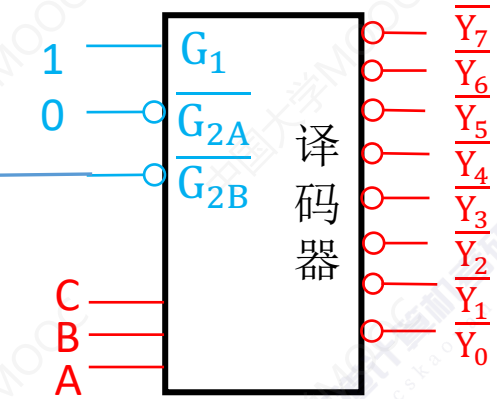
补充：译码器

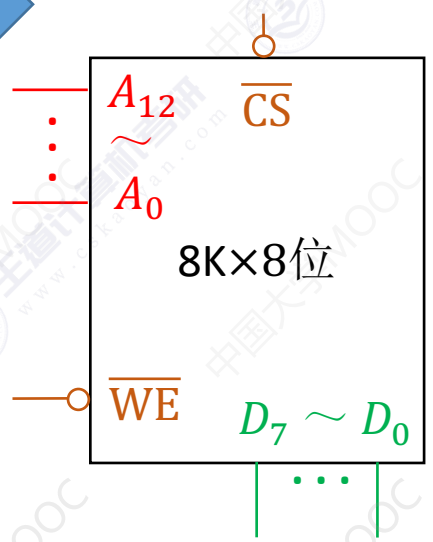
多个“使能”

地址信号稳定后发出存储器请求信号



先送出地址信号

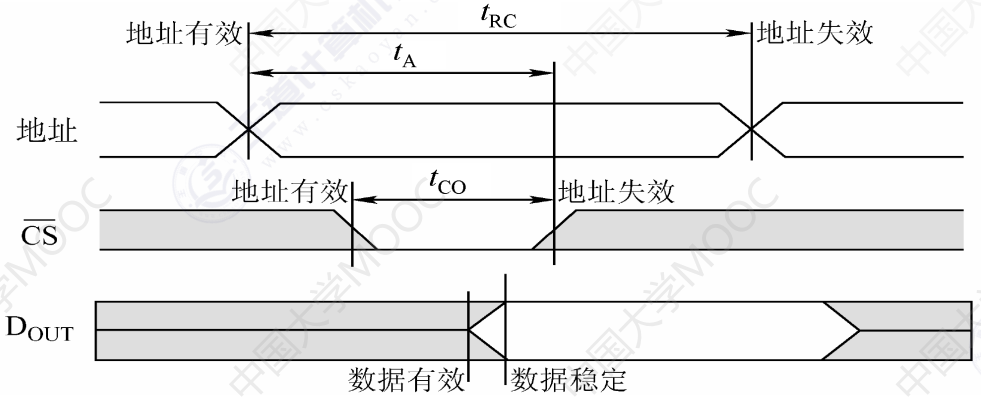




注：CPU可使用译码器的使能端控制片选信号的生效时间

低电平有效

RAM的读周期



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