Memory Interleaving

A single memory module can perform 1 read or 1 write at a time

This limits performance, especially for narrow widths

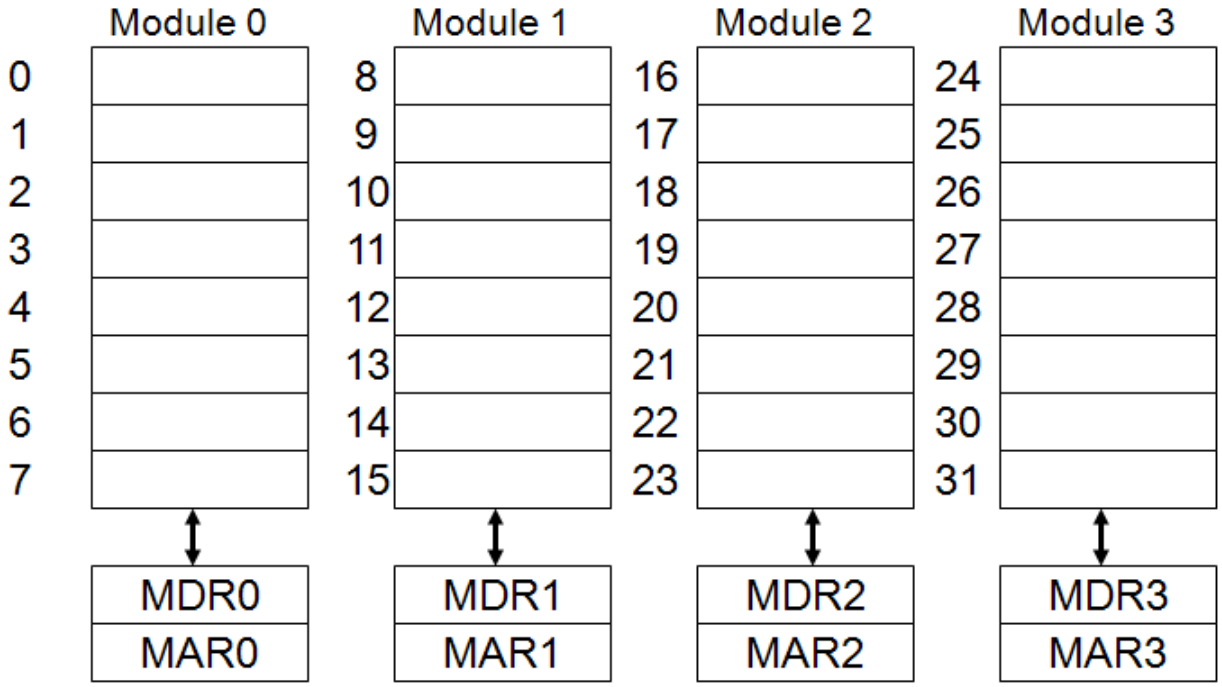
Interleaving refers to how consecutive locations are distributed

High order interleaving
- consecutive locations are in the same module
- the high order address bits indicate the module number

Consecutive locations must be accessed sequentially

Memory Interleaving

Example: if each module is 8 bits wide, reading a 4-byte word could require 4 separate reads from the same module.



MAR is memory address register.

MDR is memory data register.

Memory Interleaving

Low order interleaving

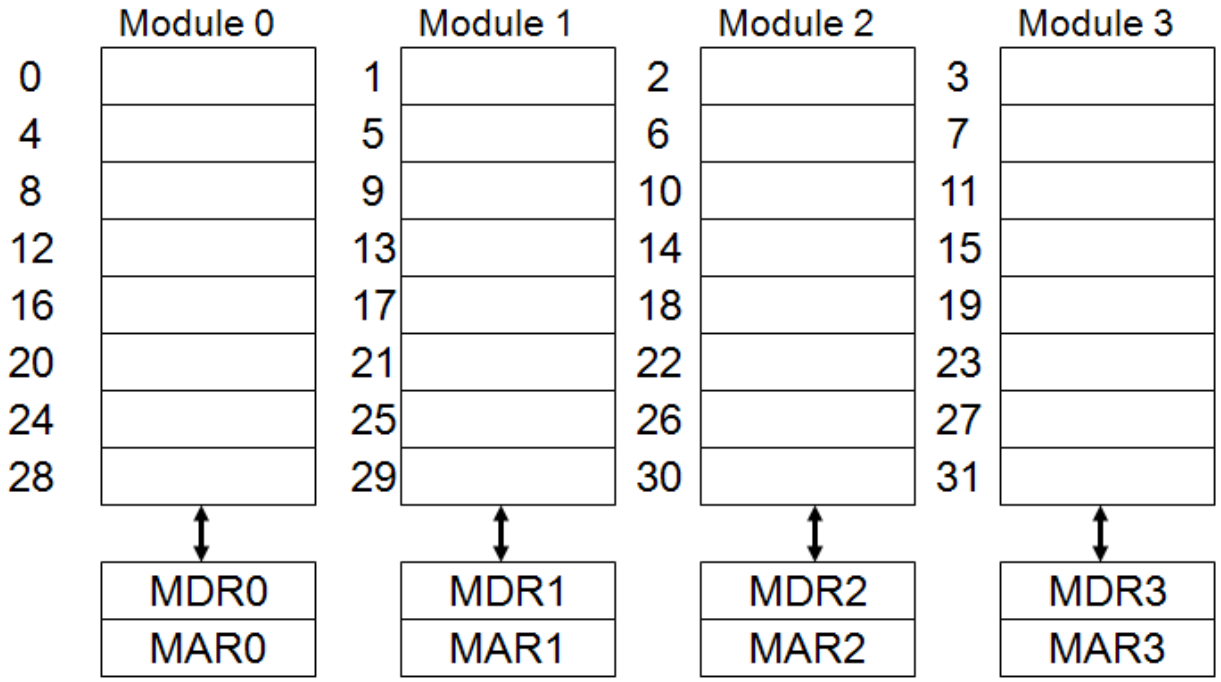
- consecutive locations are in different modules
- low order address bits indicate the module number
- high order address bits give offset into module

Consecutive locations can be accessed in parallel

High performance systems favor low order interleaving

Memory Interleaving

Low order interleaving example:



Bytes within each word have the same offset

All four modules are read in parallel to obtain the word