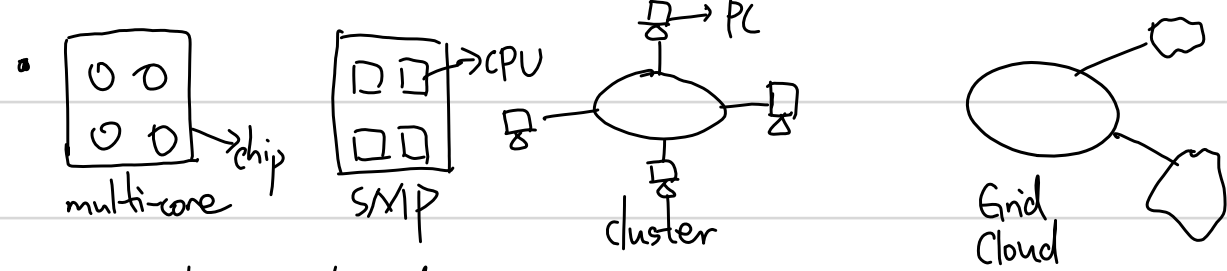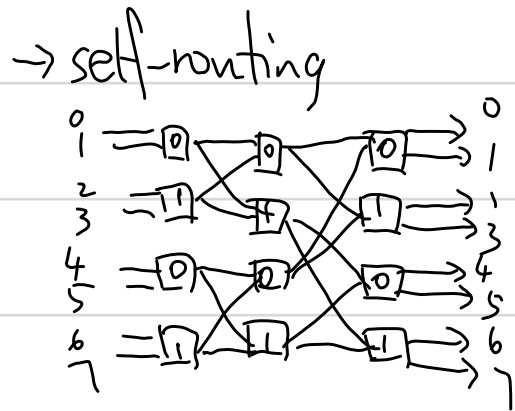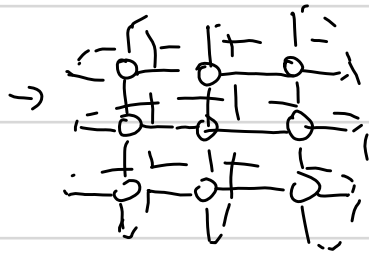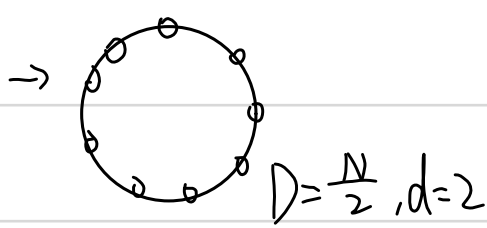# Multiprocessor

- Flynn categories { SISD: Single Instruction Single Data: Uniprocessor

  MISD: Multiple - - - - - - - - : multiple processor on a single data stream

  SIMD: Single · · - Multiple · · · · : vector processor

  MIMD: _____ : multiprocessor (multi-core)

multi-core   SMP   cluster   Grid Cloud

- { centralized shared memory

  { decentralized memory (memory module with CPU)
    └→ { memory bandwidth ↑, memory latency ↓

       { communication latency ↑, software model more complex

- 分布式系统

$D = \frac{N}{2}, d = 2$ → self-routing

- Coherence & consistency
    ↑   ↑
   MESI   intel TSX

coherence: 不同核对同一位置的读写, 不出错

consistency: sequential ~: 不同进程的操作,
总顺序, 进程间 sequential order
保持原顺序不变