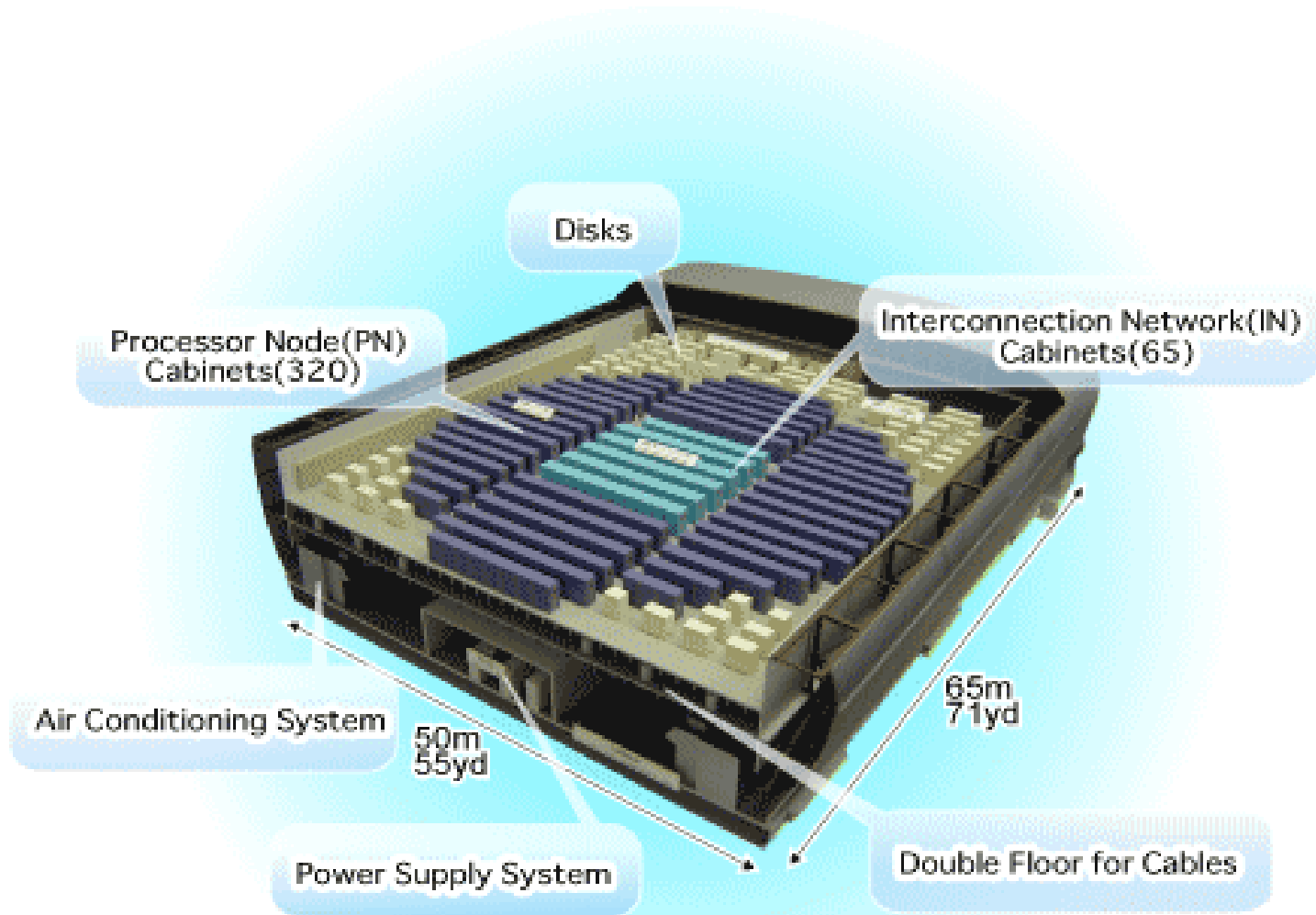# Introduction

- Reading
  - Papers
- Questions about project #1
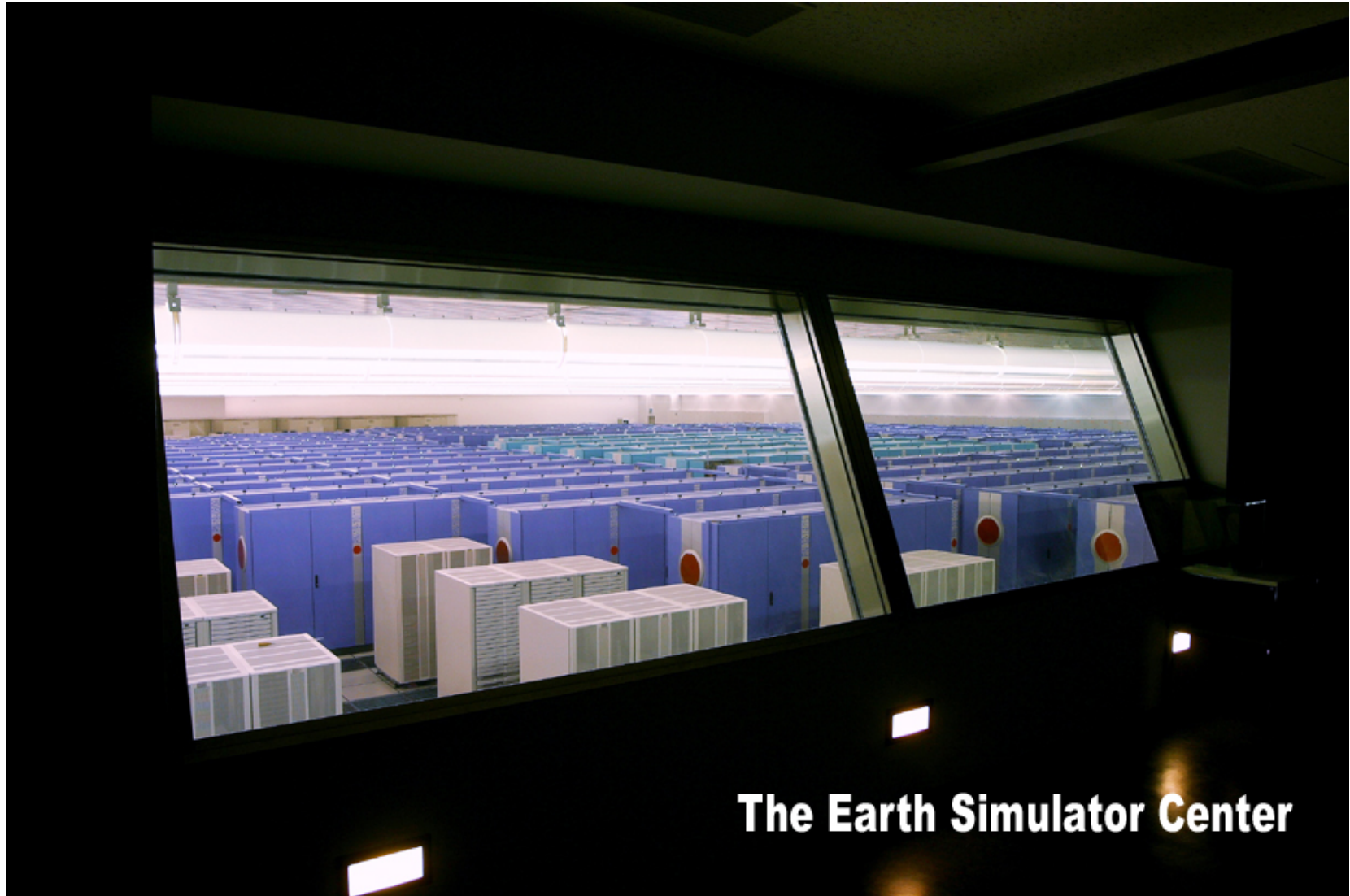
# Programming Assignment Notes

- **Assume that memory is limited**
  - don't replicate the board on all nodes
- **Need to provide load balancing**
  - goal is to speedup computation
  - must trade off
    - communication costs of load balancing
    - computation costs of making choices
    - benefit of having similar amounts of work for each processor
- **Consider "back of the envelop" calculations**
  - how fast can mpi move data?
  - what is the update time for local cells?
  - how big does the board need to be to see speedups?
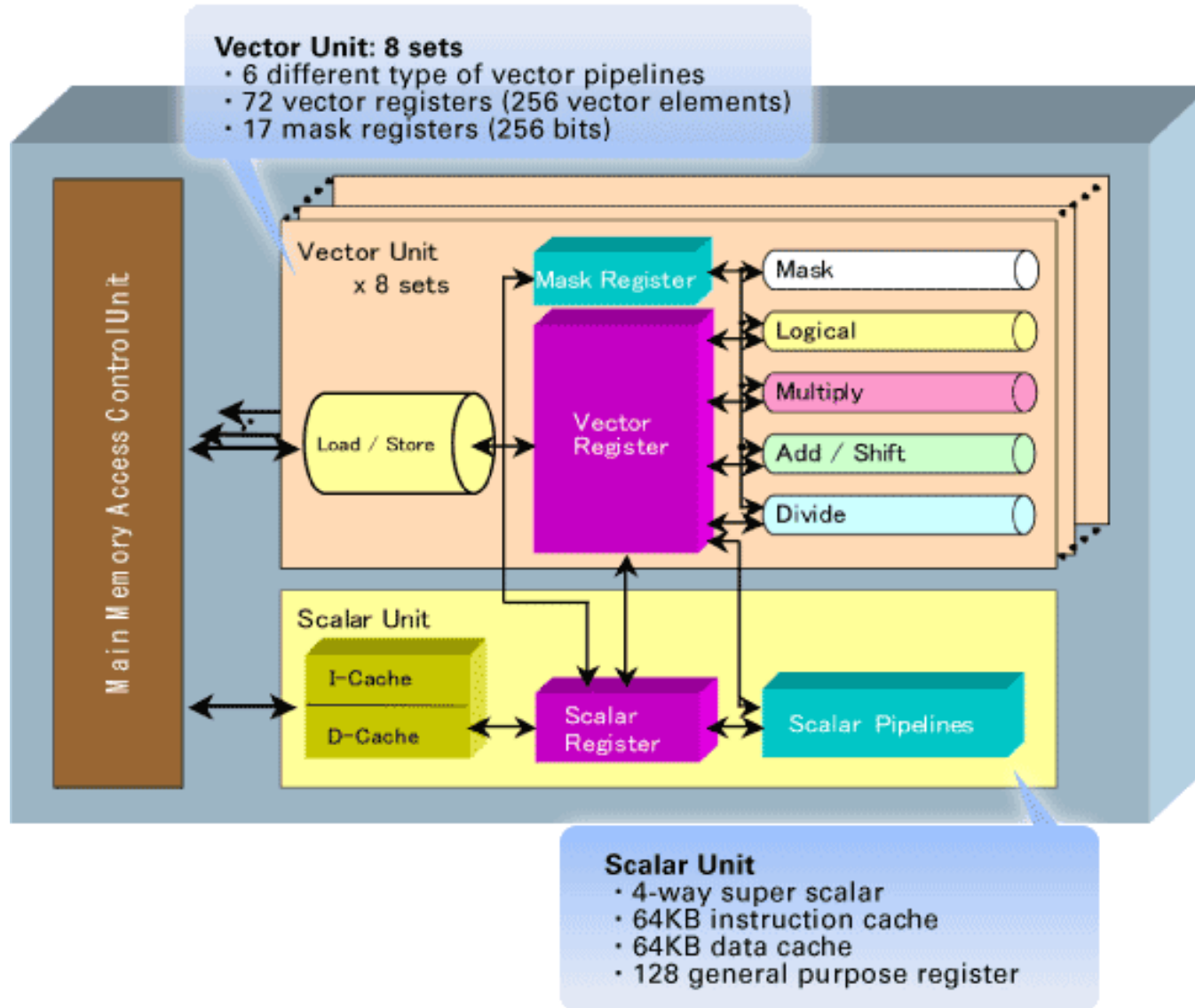
# Earth Simulator – The Building

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# Earth Simulator



The Earth Simulator Center

# Earth Simulator - Processor



**Vector Unit: 8 sets**
· 6 different type of vector pipelines
· 72 vector registers (256 vector elements)
· 17 mask registers (256 bits)

Vector Unit x 8 sets

Mask Register
Mask
Logical
Multiply
Add / Shift
Divide

Load / Store

Vector Register

Main Memory Access Control Unit

Scalar Unit
I-Cache
D-Cache

Scalar Register

Scalar Pipelines

**Scalar Unit**
· 4-way super scalar
· 64KB instruction cache
· 64KB data cache
· 128 general purpose register

# Earth Simulator

## Interconnection Network