STUDENT CLUSTER COMPETITION (SCC)
學生叢集競賽

What is SCC

- **比賽團隊**運用一個**叢集電腦**, 在有限的時間及電量之下, 完成越多的計算工作執行數量(Throughput), 或是達到越快的工作執行時間(Performance)

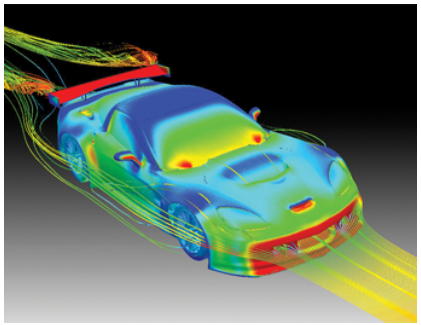
What are the Competitions

	Since	Date	Location	Event	Organizer
ASC	2013	April	China	Supercomputer center tour	Inspur
ISC	2012	June	Germany	ISC Conf. & Show	Academia/ National Lab
SCC	2006	November	US	SC Conf. & Show	Academia/ National Lab
*TSCC	2012	May	Taiwan		台灣國網中心

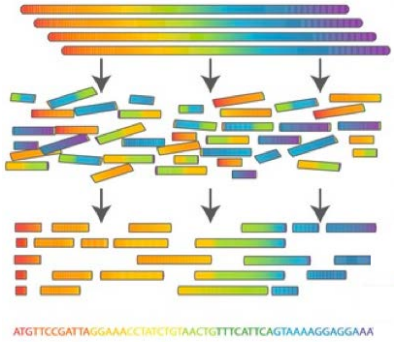
- ASC: 一半是中國大陸的參賽隊伍, 會**使用全世界最快的超級電腦**
- ISC: 與ISC學術會議共同舉辦, 也有結合歐洲的電腦公司產品展示
- SC: 與主導高效能計算(HPC)的學術會議共同舉辦, 結合全世界電腦公司產品展示, 也是第一個比賽的舉辦單位. **24 hours non-stop**.
- TSCC:僅限台灣的大專院校參加

What Types of Computing Tasks

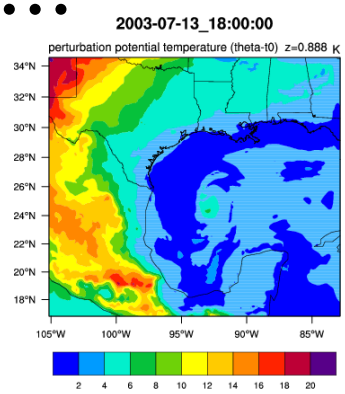
- Scientific Computing
- Deep Learning
- Others: Matlab, Decryptions…



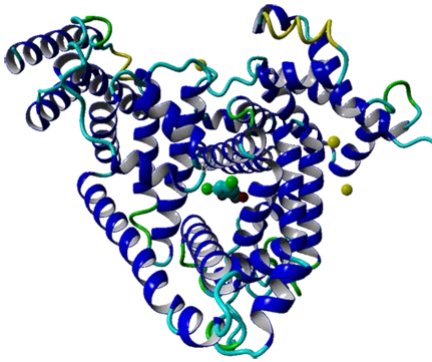
流體力學



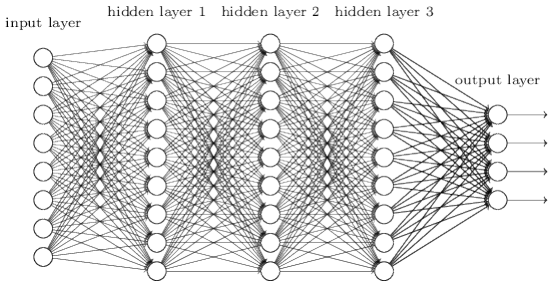
基因定序



氣象模擬

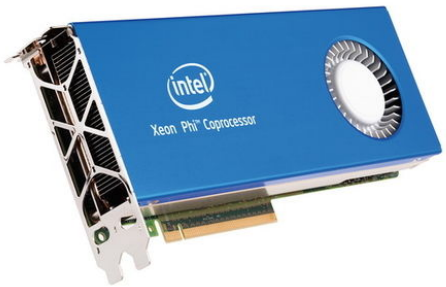


分子模擬



ANYTHING THAT TAKES TIME

What are the Computer Systems



What You Have to Do

- Build a system from the ground up
  - Pick your hardware
    - How many nodes?
    - GPU, Xeon Phi, FPGA?
  - Install OS, compilers, libraries, and applications
  - Be familiar with system administrator commands, like controlling the **fan speed** and **CPU/GPU frequency**

- Study applications
  - How to run it?
  - Can it use accelerator?
  - How is its scalability?
  - How much power it consumes?

What You Have to Do

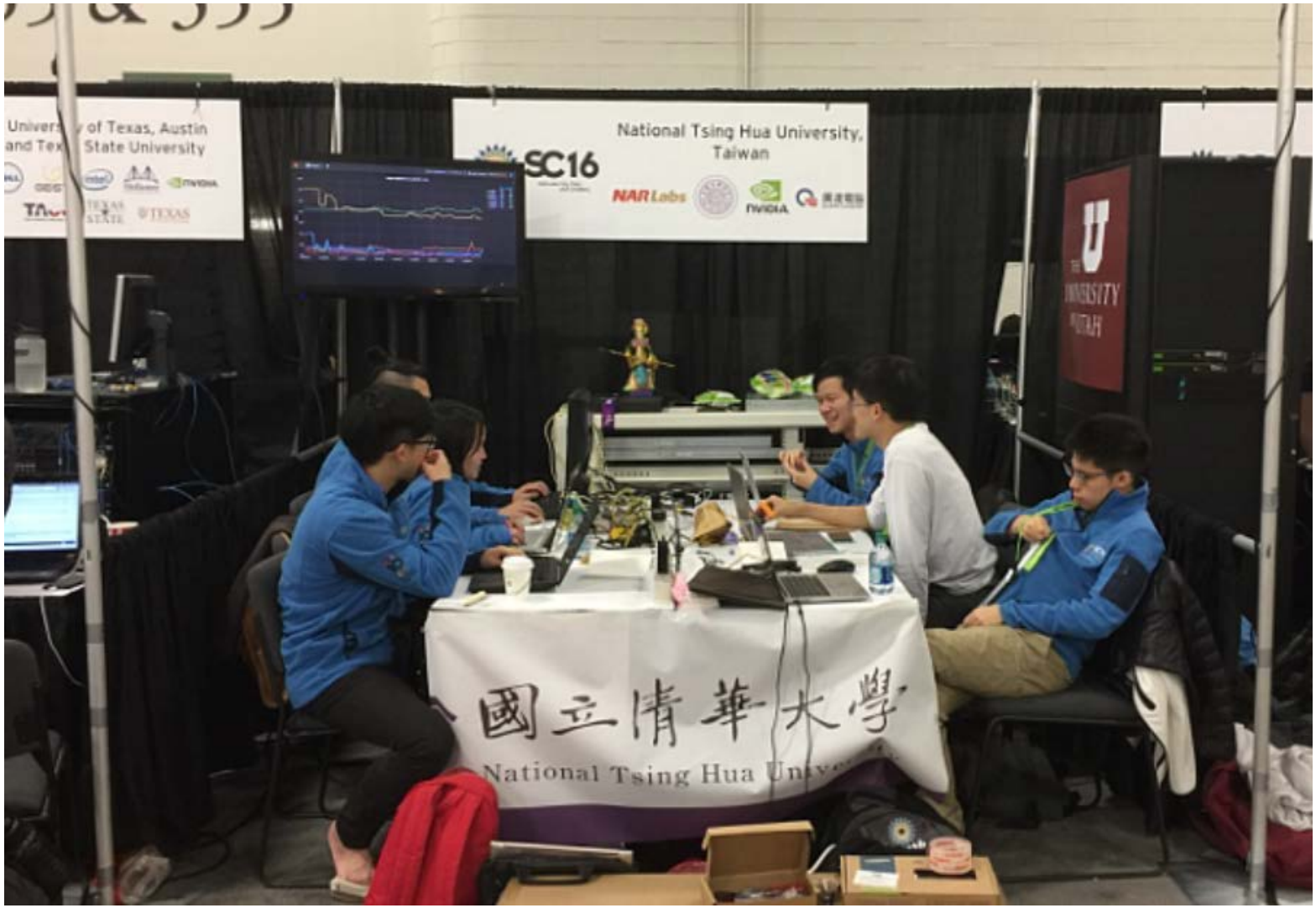
- Modify codes (if possible or if required)
  - Profile program to find performance bottleneck
  - Port to GPU or other new computer architecture
  - Rewrite algorithm
  - Implement parallel computing techniques, like scheduler, pipeline computation, asynchronous I/O, etc.
- Solve problems by **teamwork** under pressure
  - Time scheduling and resource allocation
  - Unexpected application behaviors
  - **Mystery application**

Why It is Exciting

- You will have hands-on experience in computer systems from hardware to software
- You will have a chance to touch those expensive and cutting edge technologies
- You will know what are the computing problems in real life, and solve them by yourself
- You will learn parallel computing, performance benchmarking, and advanced knowledge

組裝電腦

進行比賽


National Tsing Hua University,
Taiwan
SC16
NARLabs
NVIDIA
國立清華大學
National Tsing Hua Univ

進行比賽


SC16
University of Texas, Austin and Texas State University
National Tsing Hua University Taiwan
THE UNIVERSITY OF UTAH
國立清華大學
National Tsing Hua Univ

The “Show”

The “Show”


XILINX
SUPERMICR
SUPERMICR
intel
INVENTING TOMORROW TOGETHER
FUEL YOUR

The “Show”


XILINX
SUPERMICRO
NetApp
Innovation in Storage
and Data Management
extreme
networks
VIN# 6N427080
USDOT 896198

頒獎典禮

Make Friends

Salt Lake City

Denver

Fly Home…

- Take home the experience, the knowledge, and the award

Team Advisors

- 台灣清華
  - 周志遠: LSALAB(https://lsalab.cs.nthu.edu.tw/home/)
  - 研究領域: 分散式系統、大數據處理、雲端計算
- 北京清華
  - 翟季東: PCAMAN(http://pacman.cs.tsinghua.edu.cn)
  - 研究領域: 高性能计算和大数据处理的系统软件

Hope everyone enjoy the class & the summer!

Parallel Computing

Programming Models & Skills

Performance & Optimization