



**Department of Electrical and Computer Engineering
Computer Architecture and Parallel Systems Laboratory – CAPSL**

CPEG852 - Advanced Topics in Computing Systems Fall 2015

Group Presentation – Round 1

Each group can download topic-related references in the course webpage.

Should you have any questions about the first round of presentations, contact Pouya Fotouhi (pfotouhi@udel.edu).

General questions for all groups:

- What is threading model? (Please note that in the case of CHARM++ and MPI, there are 2 different model.)
 - a) How do we create threads?
 - b) How do we terminate threads?
 - c) How do we schedule threads?

- What is the synchronization and scheduling model?
 - a) How do we make threads wait for each other?
 - b) Overall, how do we orchestrate thread execution?

Topic A1 — Cilk

Students: Gongyuan He, Jinghe Huang

Questions for topic A1:

1. Explain what Cilk is.
 - Keywords (cilk, spawn, sync)
 - What is the programming model (e.g., are there parallel loops? How do you write a program with Cilk? etc.)
2. Describe the Fibonacci example.
 - Make pictures!
3. What is Cilk's synchronization and scheduling model?
 - When are threads scheduled? What data do they take as input? etc.
4. Explain how Cilk has a provably space-efficient work-stealing algorithm.
 - Busy leaves property, etc.

Topic A2 — MPI, CHARM++

Students: Haochen Xiong, Siyao Zhang

Questions for topic A2:

1. Describe the MPI programming model.
 - What is MPI used for?
 - Does it provide a full language?
2. Describe the CHARM++ programming model.
 - What is CHARM++ used for?
 - Does it provide a full language?
3. What is the synchronization and scheduling model of MPI? Of CHARM++?
 - When are threads scheduled? What data do they take as input? etc.
 - When are communications issued? When are they committed? etc.
4. What are the differences between MPI and CHARM++?

Topic A3 — OpenMP, C++, Java

Students: Hui Ding, Xin Song

Questions for topic A3:

1. Describe OpenMP's base programming model.
2. How do tasks change OpenMP's programming model?
3. What is the synchronization and scheduling model of OpenMP?
 - When are threads scheduled? What data do they take as input? etc.
 - Differentiate between "tasks" and "threads" (in parallel for loops, in sections, etc.)

Topic A4 — PGAS

Students: Yifeng Cong, Junpeng Zhu

Questions for topic A4:

1. Describe Chapel's base programming model.
2. Describe the threading/tasking model of Chapel.
3. Describe the Chapel's communication mechanisms.
4. Describe Chapel's synchronization & scheduling mechanisms.
 - When are threads scheduled? What data do they take as input? etc.