EAPoster: NSF/IEEE-TCPP Early Adopter Experience and Efforts at Computer Science and Technology Department of GUPT

Shanyu Wu, Yunhe Li, Wende Ke
Computer Science and Technology Department, Guangdong University of Petrochemical Technology, China
FengGu
Department of Computer Science, College of Staten Island, NY, USA 10314

Abstract_ Since the fall of 2014, we have been integrating NSF/IEEE-TCPP Curriculum Initiative on Parallel and Distributed Computing (PDC for short) modules into several courses of the Computer Science and Technology Department at Guangdong University of Petrochemical Technology (GUPT for short). Based on experiences revising and updating the first five courses-Fundamentals of Programming, Data Structures, Principles of Operating Systems, Embedded System Architecture, Application and Design of Embedded Systems, we added another two courses this semester-Computer Networks and Computer Architecture.

BACKGROUND

GUPT is the only one university characterized by petrochemical engineering in Southern China area.

There are more than 20 faculty members and approximately 800 students in The Computer Science and Technology Department at GUPT which offers a bachelor's degree in computer science & technology and a bachelor's degree in network engineering respectively. This major is based on the demand of market, centers on application ability training and takes "knowledge-ability-quality" as the main line. It actives for training engineering application technology students who can meet needs of computer software and embedded software system development and application jobs in enterprises or institutions, especially in petrochemical industry. According to our several surveys, a majority of our students wanted to learn about PDC topics. NSF/IEEE-TCPP Curriculum Initiative award helped integrating PDC topics into the computer science curriculum at GUPT.

ALL ADOPTING COURSES

The courses we have adopted the TCPP curriculum Initiative on PDC so far are listed in the first column of table 1. As a first step, we have redesigned the first five courses in the Fall of 2014 to introduce the ideas related to PDC into them. Then we integrated PDC topics into another two computer major courses-Computer Networks and Computer Architecture in the Spring semester of 2016. Next year, we will revise two or three computer fundamental courses for non-computer majors to include some PDC topics, too.

EARLY EFFORTS AND RESULTS

In order to incorporate the related parallel and distributed concepts into the existing courses we have revised and updated the teaching materials, including lecture notes, reference textbooks, assignments and exam questions.

The third column of table 1 shows the proportion of number of hours spent on PDC topics to total hours of the corresponding course (N/T). And the fourth column displays the proportion of questions of PDC topics to total ones in the final exam (S/T). The fifth column lists average scoring rates in questions of PDC topics of

some courses which are all apparently higher than those of total questions.

FUTURE PLANS

The shortage of current experimental resources and backward of experimental conditions are important factors restricting integrating more PDC topics into existing courses. So, we will focus on Lab Promotion Reconstruction Plans next two years. And we expect to implement more topics of TCPP curriculum after the corresponding experiment conditions are improved.

TRAVEL BUDGET

We need the full budget of $1,500 to support the travel. The funds will be used for two main aspects including one-way International flights about $1300and registration fee $200.

Table 1: Early efforts

Courses	Integrated PDC Topics	N /T	S/T	Scoring rate
Fundamentals of Programming	Basic concept of parallel computing, characteristics of modern multi-core processor, concept of thread and the basics of multi-threaded program organization, and basis of OpenMP	10/98	10/100	80%
Data Structures	Programming for systems with sharing memory and distributed memory	8/64	15/100	72%
Principles of Operating Systems	OS on multi-core processors, including threads scheduling mechanisms, locks and semaphores implementation mechanisms, and memory management mechanisms.	12/66	20/100	83%
Embedded System Architecture	Structure of embedded multi-core system and the basic idea of implementing parallel computing on embedded SMP system	6/46	10/100	76%
Application and Design of Embedded Systems		6/48	15/100	78%
Computer Networks	Protocols and communication principles of distributed network systems	8/64	15/100	-
Computer Architecture	Data and task parallelism, latency and bandwidth, stream-based architectures	8/54	15/100	-