

# **Coalitional Game Theory and Applications in Mobile Cloud Computing and Mobile Social Network**

**Lecturer: Dusit Niyato**

**30 May -1 June, 2012  
Lecture Room TS 128, Tietotalo I, University of Oulu**

## ***1. Abstract***

Coalitional game is a branch of game theory developed to analyze the cooperation behavior of the rational entities.

In this lecture, the applications of coalitional game theory to analyze the resource management problems in mobile cloud computing and mobile social network will be discussed.

First, the concept of the mobile cloud computing and mobile social network will be introduced. The research issues in these new mobile computing environments are presented. Then, the introduction to coalitional game theory will be given. The coalitional game models developed for the mobile cloud computing and mobile social network will be presented afterwards. To this end, the open research issues will be discussed.

## ***2. Biography***

Dusit Niyato is currently an Assistant Professor in the Division of Computer Communications, School of Computer Engineering, Nanyang Technological University, Singapore. His current research interests include design, analysis, and optimization of wireless communication and vehicular networks for ITS applications, mobile cloud computing, smart grid systems, and green radio communications.

He is coauthor of the books *Dynamic Spectrum Access and Management in Cognitive Radio Networks* (Cambridge University Press, 2009) and *Game Theory in Wireless and Communication Networks: Theory, Models, and Applications* (Cambridge University Press, 2009, ISBN: 978-0-521-89847-8).

Dr. Niyato serves as an Editor for the *IEEE Transactions on Wireless Communications*, *IEEE Wireless Communications Letter*, *Wireless Communications and Mobile Computing (WCMC) Journal*, and *Journal of Communications and Networks (JCN)*.

### 3. Outline

<b>Wednesday 30.5.2012</b>	
<b>Lecture 1: Introduction to Mobile Cloud Computing (3 h)</b>	
09:00 - 12:00	<ul style="list-style-type: none"> <li>• Overview of Mobile Cloud Computing (MCC)</li> <li>• Mobile Cloud Computing Applications</li> </ul>
<b>Lecture 2: Resource Management in Mobile Cloud Computing (3 h)</b>	
13:00 - 16:00	<ul style="list-style-type: none"> <li>• Resource Allocation and Revenue Sharing</li> <li>• Mobility-based Dynamic Offloading Algorithm</li> <li>• Admission Control of Mobile Cloud Computing Services</li> </ul>
<b>Thursday 31.5.2012</b>	
<b>Lecture 3: Introduction to Mobile Social Network (3 h)</b>	
09:00 - 12:00	<ul style="list-style-type: none"> <li>• Architecture of Mobile Social Network</li> <li>• Mobile Social Network Applications</li> <li>• Access Infrastructure for Mobile Social Network</li> <li>• Protocol Design and Resource Management Issues in Mobile Social Network</li> </ul>
<b>Lecture 4: Introduction to Coalitional Game Theory and Applications (3 h)</b>	
13:00 - 16:00	<ul style="list-style-type: none"> <li>• Brief introduction to Game Theory</li> <li>• Introduction to Noncooperative Game Theory</li> <li>• Preliminaries of Coalitional Games</li> <li>• Canonical Coalitional Games</li> <li>• Coalition Formation Games</li> <li>• Coalitional Graph Games</li> </ul>
<b>Friday 1.6.2012</b>	
<b>Lecture 5 Application of Coalitional Game Theory (4 h)</b>	
08:00 - 12:00	<ul style="list-style-type: none"> <li>• Cooperation of Service Providers in Mobile Cloud Computing</li> <li>• Cooperative virtual machine management for multi-organization cloud computing environment</li> <li>• Controlled coalitional games for cooperative mobile social networks</li> <li>• Future Research Directions</li> </ul>

### 4. Conduction

Homework assignment, to be confirmed

### 5. Amount of credits

2-3 credits, to be confirmed

### 6. Contact Person

Mehdi Bennis, [bennis@ee.oulu.fi](mailto:bennis@ee.oulu.fi)

### 7. Registration <http://www.webropolsurveys.com/S/66FA9965280DF640.par>