Exercise
for Lecture “P2P Systems”

TECHNISCHE UNIVERSITÄT DARMSTADT

Prof. Dr. David Hausheer
Dipl.-Wirtsch.-Inform. Matthias Wichtlhuber, Leonhard Nobach, M. Sc., Dipl.-Ing. Fabian Kaup, Christian Koch, M. Sc., Dipl.-Wirtsch.-Inform. Jeremias Blendin

Summer Term 2015
Exercise No. 6
Published at: 02.06.2015, Submission date: 09.06.2015
Submission only via the Moodle platform in PDF, plain text, or JPG/PNG.
Contact: [mwichtlh|lnobach|fkaup|ckoch|jblendin]@ps.tu-darmstadt.de
Web: http://www.ps.tu-darmstadt.de/teaching/p2p/

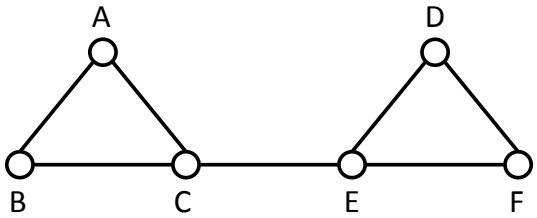
Surname (Nachname):	
First name (Vorname):	
ID# (Matrikelnummer):	

Problem 6.1 - Ad hoc On Demand Distance Vector Routing (AODV)

For this assignment, a topology of AODV nodes is given. Fill in the routing tables of each node for the given subtasks based on the sheet below.

A) A sends a Route Request asking for a route to node D. What do the routing tables look like after the Route Reply has arrived at node A?

B) Additionally, B sends a Route Request asking for a route to node D. What do the routing tables look like after the Route Reply has arrived at node B?



Node A			
Req-ID: 2		Loc. Seq. #: 5	
Dest.	Link	Hops	Seq. #
B	B	1	8
C	C	1	3

Node B			
Req-ID: 5		Loc. Seq. #: 8	
Dest.	Link	Hops	Seq. #
A	A	1	5
C	C	1	3

Node C			
Req-ID: 1		Loc. Seq. #: 3	
Dest.	Link	Hops	Seq. #
A	A	1	5
B	B	1	8
E	E	1	4

Node D			
Req-ID: 6		Loc. Seq. #: 12	
Dest.	Link	Hops	Seq. #
E	E	1	4
F	F	1	7

Node E			
Req-ID: 2		Loc. Seq. #: 4	
Dest.	Link	Hops	Seq. #
C	C	1	3
D	D	1	12
F	F	1	7

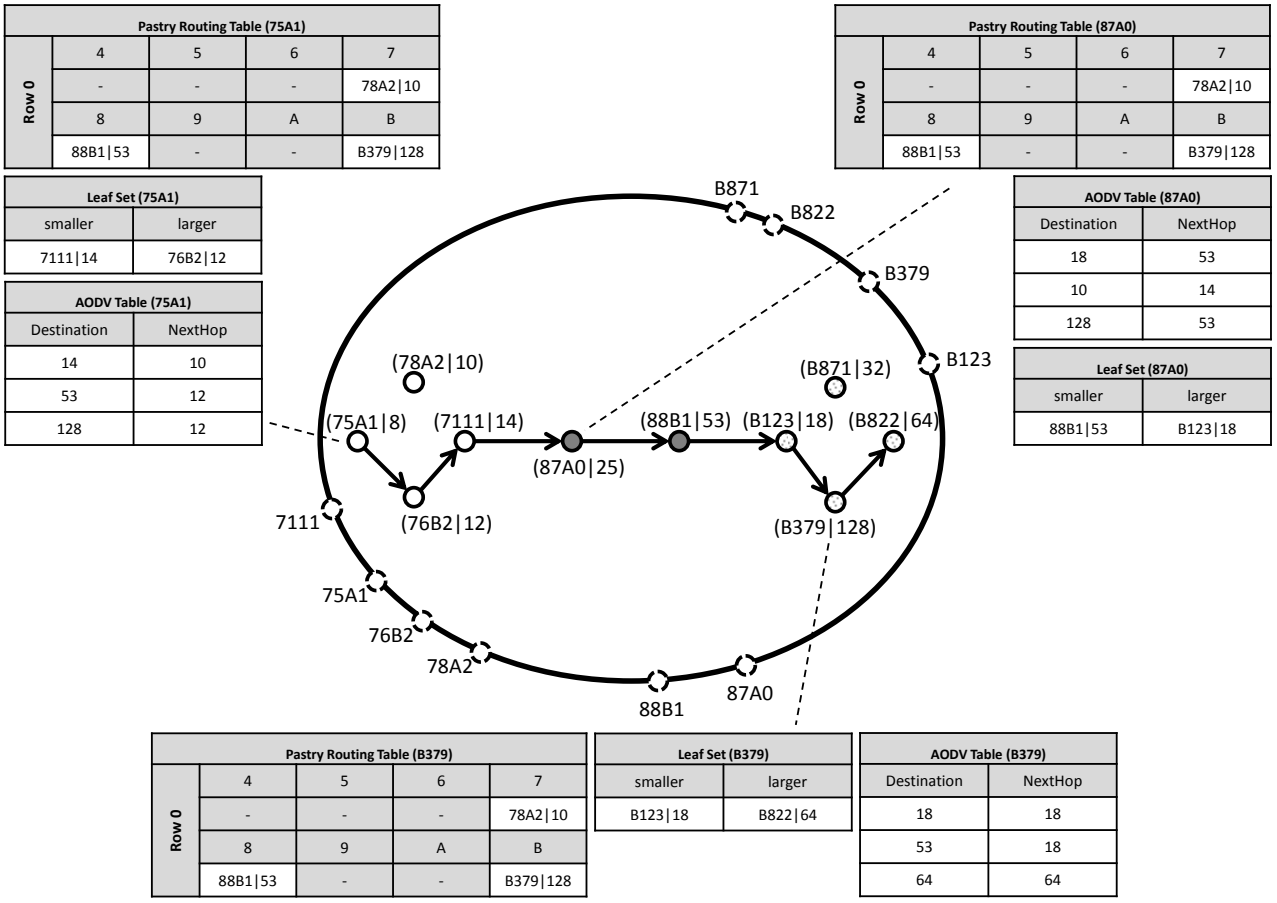
Node F			
Req-ID: 3		Loc. Seq. #: 7	
Dest.	Link	Hops	Seq. #
D	D	1	12
E	E	1	4

Problem 6.2 - MADPastry

Given is a MADPastry network as shown below. The outer ring shows the Pastry ring, the inner nodes represent the physical topology of the network. Every node has an identifier (A|B), where A is the Pastry overlay ID (base 16) and B is the AODV ID (base 10) of the node. Nodes filled with equal patterns belong to the same cluster.

A) Mark the landmark nodes in the network shown below.

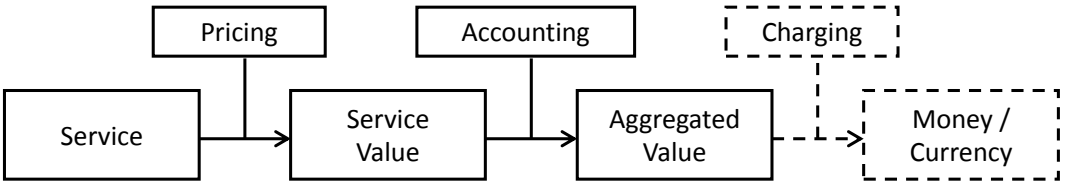
B) In the network, node 75A1 sends a message to node B822. The route taken by the message is marked with arrows. Mark the relevant routing table entries needed by node 75A1, B379, and 87A0 to determine the next hop.



Problem 6.3 - Incentive Patterns

A) Discuss advantages and disadvantages of barter trade patterns compared to bond based patterns with respect to trust and scalability.

B) Describe the economic mechanisms depicted below. What is their respective purpose, how do they interact with each other.



Problem 6.4 - P2P Economics

In the lecture you learned about the *Prisoner's Dilemma* and how defective behavior might be the most rational choice to maximize a peer's own benefit under certain conditions.

Hint: For a prisoner's dilemma, the following condition holds: $T > R > P > S$ (T,R,P,S were defined in the lecture).

A) Consider a two peer scenario as introduced in the lecture. Assume a peer's utility $U_F = 5$ and costs $C_F = 2$.

   A) What would be the payoff matrix in this case?

   B) What would be the dominant strategy?

B) Consider a scenario where a peer is paid from some third party for sharing/uploading a file. In this case, the costs could be negative if the third party pays enough. Assume the following values for a peer's utility and costs: $U_F = 2$ and $C_F = -1$.

   A) What would be the payoff matrix in this case?

B) What would be the dominant strategy?

C) Can this example be classified as prisoner's dilemma?