Thesis Topics for L-4/T-1

Sl No	Topic	Description	Students no	ID
Dr. M. Kaykobad				
1	Divide and conquer based Algorithms- Optimal Partition Number			
2	A study on Systems and Linear Equations			
3	A study on linear Programming Problems			0805009 0805019
4	Huffman coding with unequal letter cost			0805035 0805111
5	AKS Algorithm for primality testing			0805068
6	A study on Karmarkar's Algorithm			0805062
7	Graph Isomorphic problem			
8	Graceful Labeling of Trees			
9	Hamiltonicity			
Dr. Muhammad Masroor Ali				
1	Web Service Testing		2/3	0805103 0805043 0805120
2	Web Service Testing		2/3	0405016 0705056 0605110
Dr. Md. Abul Kashem Mia				
1	Algorithms for the Prediction of Protein Folding		2 or 3	0805029 0805093 0805027
2	Algorithms for the Multiple Longest Common Subsequence Problem		2 or 3	
3	Algorithms for Retrieval of Protein Tertiary Structure		2 or 3	0805036 0105031 0805061
Dr. Md. SaidurRahman				
1	Graph Drawing, Graph Algorithms, Bioinformatics, VLSI Layout Algorithms, Software Restructuring, Social Network Analysis	. Exact topics will be fixed after discussing with students based on their interest and aptitude after assignment of students to me. For theoretical problems two students may form a group. To get idea about research area visit http://teacher.buet.ac.bd/sa	Maximum 9 students	0805085, 0805108, 0805060, 0805088, 0805074, 0805050

		idurrahman/index.htm http://www.buet.ac.bd/cse/research/group/gd/		
2	Design of a Surveillance system of Dhaka City	Implementation based thesis.	Max 3, Min 2	
Dr. Md. Monirul Islam				
1	Devising computational intelligence techniques for solving bio-informatics problems			0805038,
2	Devising population based algorithms for finding good solutions of complex optimization problems			0805030, 0805047, 0805010
3	Use of computational intelligence techniques for data mining.			0805116, 0805053
Dr. Md. Mostofa Akbar				
1	Asterik Based IP Telephony system (3 students)			0805080, 0805015, 0805119
2	Android based Patient Care Application using sensors (3 students)			0805078, 0805099, 0805072
3	Reconfigurable Stock Trading Application maintaining Software Quality			
Dr. Abu Sayed Md. LatifulHoque				
1	e-Learning in Mobile Environment		2	0805014 0805109
2	Knowledge Discovery from Academic Data		2	0805097 0805020
3	Data Mining in Health Informatics		2	08050105 0805110
4	Problem-based e-Learning of Programming Language		2	
Dr. Mohammad Mahfuzul Islam				
1.	Steganography	Securing multimedia contents is inevitable during communications. Cryptography transmits multimedia signals though changing its formats so that no one can recover the original text when the	2	

		contents are in the path of transmission. However, the ill-motive users not only want to capture the theme of contents and alter, but target to destroy the data, if they could find the existence of any data in the channel. Steganography keeps data intact through hiding its existence. This is one of the hot-topic in current research domains.		
2.	Biometric Security using fingerprint	Security is becoming the most important issue in the coming IT Era. All the information of the world is stored inside the computer. Information theft or unauthorized access to information is going to be the main crime in the time to come. So, access control is inevitable. Biometric security ensures the security of information by limiting its access through using Biometric organs like face, finger-print, retina, Body signals like ECG.	2	0805025, 0805046
3.	Biometric Security using contactless hand verification		2	0805089, 0805055
4.	Biometric Security using ECG		2	0805034, 0805067
Dr. Masud Hasan				
1	Handling NP-complete problems (Group 1)	The main limitation of today's computers is that they cannot solve NP-complete problems in polynomial time. In many ways people tried to handle them, including approximation and parameterized algorithms, unconventional computing, etc. In this thesis we shall study those techniques and try to find related new results.	2	0805079, 0805065
2	Handling NP-complete problems (Group 2)	Same as above	2	0805073 0805031
3	Algorithms (Group 1)	We shall work on	2	0805082,

		algorithms. Exact topic will be fixed after looking into the interest of the students.		0805107
4	Algorithms (Group 2)	Same as above	2	
Dr. MahmudaNaznin				
1	Challenges in Information Retrieval in Social Sensor Network	Blogs, Twitter, Facebook all are examples social networks. If any event occurs blog, twitter, facebook postings identify the event . But too much data may create confusion to find the level of intensity of the event. In this thesis we will study those issues.	2 or 3	0805013, 0805075
2	Security Issues in Social Sensing	Social sensing sometimes suffers from different security challenges including finding the authenticated sources and reliable data. We will study those challenges.	2 or 3	0805091 0805084
3	Architecture of Social Sensor Network	We will study some existing Social Sensor Network Models and will identify the different components of a social sensor network.	2 or 3	0805087 0805106
Dr. A.K.M. AshikurRahman				
1.	On coverage heuristics for target monitoring in visual sensor networks.	Visual sensor networks are becoming extremely popular in a number of application domains due to their ability to self-configure. One of the areas of self-configuration is camera coverage control: how should cameras adjust their field-of-views to cover maximum targets? This is an NP-hard problem. Although several heuristics have been proposed, a little is known about the performance bounds of the existing heuristics. Moreover, there	3	0805113, 0805095, 0805017

		exist a number of weaknesses that influence both their coverage and overhead. In this research work, our goal is to develop analytical expressions devising worst case performance bounds of the existing heuristics. Then, we plan to propose computationally efficient centralized/distributed heuristic(s) that can provide near-optimal coverage for both under-provisioned and over-provisioned small-scale networks.		
2.	Estimating topology size of *r*-neighborhood graph structures for wireless ad hoc networks.	Several graph theoretic analysis on design and evaluation of tunable topology control algorithms have been proposed recently for wireless ad hoc networks. The main idea of such tunable graph structures is to trade sparsity (or node degree) for creating graphs with better properties in other dimensions (such as energy, delay, etc). One of the important graph structures, known as *r-neighborhood* graph, is a set of graphs that trade between energy and node degree in a tunable manner. However estimating graph size (and sparsity) of such structures has remained unexplored. The target of this research work is to fill this notable gap by proposing analytic models for estimating graph sizes.	3	0805096, 0805100, 0805028
Dr. M. SohelRahman				
1.	Topics in Bioinformatics	Here the goal is to consider	No Limit.	0805069,

		different topics in Bioinfirmatics and try to study and solve them. Such topics include, but are not limited to, DNA Fragment assembly, Aligner, Microarray Hybridization, protein folding, Sequence analysis etc. Huge programming will be involved. Some theoretical topic (less or no programming) may also be available (e.g., sorting by transposition/reversal etc.).	Groups are allowed	0805071, 0805077, 0805005, 0805044, 0805057
2.	Metaheuristics for Hard Combinatorial Optimization Problems	Metaheuristic techniques will be employed to solve hard combinatorial problems. These problems are mostly NP-Hard and hence exact algorithms are not useful/feasible. These problems may come from any domain (networks, Bioinformatics, transportation, climate etc.). Huge programming will be involved.	No Limit. Groups are allowed	
3	Problems on Strings and Sequences	Here the problems span from simple pattern matching to different variants of pattern matching, longest common subsequence to different variants thereof as well as string combinatorics. Here we can have pure theoretical work and we can have a mix of theory and programming.	No Limit. Groups are allowed	
Dr. Mohammed Eunus Ali				
1	Social Network Data Analysis	From Tahrir Square to Shahbagh Square, social media (e.g., Facebook, Twitter) played a vital role in all major movements in recent days. In this thesis, we will investigate the evolution of such events in social media and see how	2	0805011

		these social media activities translate into real world movement. Through analysis, we will try to understand people's emotion of such movement, growth of such campaign, and identifying influential individual in such movement. (In Collaboration with Dr. Jalal Mahmud, IBM Research, Almaden USA)		
2	Visibility Queries on 3D Data	Recent advances in large-scale 3D modeling have enabled capturing of urban environments into 3D models (e.g., a virtual 3D city model). These 3D models give photo-realistic resembling of urban objects, i.e., the visual appearance of a virtual 3D model and its physical counterpart is verisimilar. The widespread availability of these realistic 3D datasets provide us an opportunity to answer many real-life user queries involving these datasets. In this thesis, we will build a system that will answer queries such as "what is the best position for a billboard?"and "which hotel room gives the best view?". (In Collaboration with Prof Dr. YunjunGao, ZheijiangUni, China)	2	0805001, 0805021
3	Consensus Queries on Location Based Social Network	The development of location based social computing (e.g., FourSquare) has introduced a new platform for accessing information collaboratively based on the current locations of	2	0805002, 0805059

		participating users. Related social networking applications allow users to share their locations with others which enable a group of users to collaboratively search for an object of interest (e.g., a meeting place) that best suits the group. Depending on the circumstances, the group may opt for an answer that may not be optimal for all group members but suits most of them. In this thesis, we will focus on finding an efficient solution for finding the best subgroup of all possible groups, a generalization of spatial combinatorial search. (In Collaboration with Dr. SaranaNutanong, Jons Hopkins University, USA		
4	Trajectory Data Mining	Mining GPS traces or user location histories have been active research areas in recent years. These GPC traces provide vital information regarding users' behavior and travel patterns, which can be utilized in many useful applications such as friend recommendation, travel place recommendation, etc. Similarly, GPC traces of public transports such as taxis' trajectories have been used effectively in urban transport planning. In this thesis, we will develop techniques that will identify activities going on around us from the GPS traces of users/taxis. (In Collaboration with University of Melbourne)	2	0805048, 0805041

Dr. Md. Yusuf SarwarUddin				
1.	Communication networks exploit social networks	Exploiting the relationship among humans for effective content dissemination in a very large scale human-centric networks	2	0805008
2.	Disruption-tolerant networking for disaster response	Protocols for highly resource constrained edge networks formed by mobile people/vehicles	2	0805115, 0805112
3.	Media crowd-sourcing for traffic behavior estimation	Developing a data acquisition toolkit for capturing pictures/videos for analyzing driving behavior in a busy traffic lane	3	0805007, 0805039, 0805058
4.	Prioritizing named content in constrained networks	Named data is a new communication paradigm for the Internet, which gives names to data objects rather than end hosts as in IP. This thesis studies the opportunities for content prioritization in the presence of resource constraints in such networks	2/3	0805023,
Dr. TanzimaHashem				
1	Privacy Preserving Location-based Services.	The accesses of location-based services (LBSs) via mobile devices such as iPhones and Androids have become an essential part of our daily lives. Although, these services make our lives more convenient, their access also enables a location-based service provider (LSP) to infer over time a comprehensive user profile with high degree of precision, which in turn creates a significant potential for privacy invasions. In this project, we will develop approaches that allow users to enjoy high quality LBSs in a privacy	2	0805042, 0805049

		preserving manner.		
2	Time Dependent Group Nearest Neighbor Queries in Road Networks.	Location-based services (LBSs) have been originally tailored for requests of a single user, for example, asking for the closest gas station or the positions of traffic jams along a route. The advancement of LBSs has led to a new range of real-time services such as location-based social networking that enable a group of users to be involved in a single location-based query, for example, a group of friends may want to meet at a place such as restaurant that minimizes the total travel time for them. To avoid the rush hour of the traffic, the group may also want to know the best departure time that minimizes the total travel time for them. Given a time interval, a time- dependent group nearest neighbour query finds the best departure time and the location of the meeting place that minimize the total travel time for the group. In this project, we will develop efficient algorithms to evaluate time-dependent group nearest neighbour queries in road networks.	2	0805066, 0805004
3	Is Social Networking Site Stealing Your Family Time?	The advent of social networks such as Facebook, Google+ and Loopt allow a group of friends to remain connected from virtually	2	0805064, 0805083

		anywhere at any time. The large varieties of social-networking applications are continuously attracting an increasing number of people to use social networking sites. Social networking sites have also changed our life style. Are we becoming unsocial in our family life by using social networking services? For example, now-a-days young generation are spending a major portion of their time at social networking sites and spending less time with their parents then before. Similarly, young parents are giving less time to their children and using that extra time at social networking sites. It seems that social networking sites are disturbing our personal space. It becomes more prominent if all family members do not equally use the social networking sites. Why is it happening? Is the attraction to social networking sites is turning to an addiction? Is the effect is more pronounced in developing countries due to digital divide? What could be the possible remedies to address this important concern? In this research project, we will investigate the impact of social networking activities on family lives and propose remedies to mitigate the effect.		
4	Privacy Preserving Trajectory Data Publishing.	The advancement and widespread use of location	2	0805102

		aware devices (e.g., GPS equipped mobile phone or vehicle) have enabled users to share their trajectories with others. Such trajectory data allows organizations and researchers to perform useful analyses for many applications such as urban planning, traffic monitoring, and mining human behavior. In this research project, we will develop anonymization methods for publishing trajectory data so that both user privacy and data utility are maintained.		
Dr. Md. ShohrabHossain				
1	Security Issues and protection mechanisms of IP mobility protocols		2	0805114, 0805086
2	Study of Network-based localized mobility solutions and Dual Stack Mobile IPv6		2	0805040, 0805018
3	Study of WiMAX and LTE technologies and their issues		2	0805016, 0805022, 0805118
Dr. S. M. Farhad				
1	Orchestration of Stream Programs on GPUs	Introduction: While multicore hardware has become the industry standard, parallel programming models for exploiting parallelism have lagged. Stream processing is one programming model that expresses a computation in the form of actors that interact through data channels. Stream processing is suitable for applications that exhibit regular sequences of data, including multimedia, graphics, signal processing and networking applications. It is challenging to execute the stream programs	2	0805045 0805032

		efficiently on multicores, due to the existence of bottlenecks in stream programs and the hardness of assigning actors of stream programs on available cores. Hence, it is essential to orchestrate the execution of stream programs. Orchestration of stream programs on graphics processing units (GPUs) has many challenges as GPUs have many levels of parallelism. Efficient execution of stream programs on GPUs is an interesting problem. For more information please visit http://sydney.edu.au/engineering/it/~smfarhad/Presentation.html		
2	Design and implement TCP Offload Engine in GPGPU	**TCP offload engine** or **TOE** is a technology used in network interface cards (NIC) to offload processing of the entire TCP/IP stack to the network controller. It is primarily used with high-speed network interfaces, such as gigabit Ethernet and 10 Gigabit Ethernet, where processing overhead of the network stack becomes significant. The term, TOE, is often used to refer to the NIC itself, although circuit board engineers may use it to refer only to the integrated circuit included on the card which processes the TCP headers. TOEs are	2	0805033 0805037 0805117

		often suggested as a way to reduce the overhead associated with IP storage protocols such as iSCSI and NFS. The problem is to optimize the operating system is design and implementation of efficient tcp and udp offload engine using GPGPU. For information follow the links http://en.wikipedia.org/wiki/TCP_offload_engine		
3	Human Health Monitoring and Reporting System in Android	Human health monitoring by mobile device is an interesting area in recent technology trend. Interfacing such a sensing and reporting system with the mobile system is a demanding technology as found in the following link.	2	0805081 0805070
Dr. Md. Monirul Islam				
1	Image Resolution Enhancement in Wavelet Domain	Students must take CSE 433	1-2	0805101, 0805090
2	Recognition of Handwritten Bangla Script	Students must take CSE 433	1-2	0805052, 0805024
3	Vehicle License Plate Recognition in Hazardous Condition	Students must take CSE 433	1-2	0805026,
4	Fingerprint Analysis/Recognition/Enhancement	Students must take CSE 433	1-2	0805051, 0805012
Dr. A. B. M. Alim Al Islam				
1	Road traffic simulator	Bangladesh, in particular its capital Dhaka, is widely known for traffic jam. Analytical studies on such traffic jam has the potential to lead towards a solution, which can significantly diminish the extent of sufferings resulted from the jam. In this thesis, we will explore the viability of such analytical study	2	0805063 0805076

		through investigating applicability of currently-used road traffic simulator in the context of Bangladesh. If the currently-used road traffic simulators are not applicable, which may happen due to various phenomena observed over the roads in Bangladesh, we will develop our own simulator. Subsequently, on the basis of our simulation outcomes, we will attempt to lead towards a probable solution for the traffic jam in Dhaka.		
2	Pollution detection using sensor networks	Bangladesh is one of the countries in the world, which are under severe threat of sufferings from different consequences of environmental pollutions. To battle against such sufferings, the first task is to judiciously detect the extent of the pollutions. Keeping this in mind, in this thesis, we will attempt to assess the viability of utilizing wireless sensor networks for detecting three different types of pollutions: water pollution, soil pollution, and air pollution.	2	0805054, 0805092
3	Wireless underground sensor networks	Wireless underground sensor networks have come under wide investigation in recent times due to their different applications, while having a number of research challenges. In this thesis, we will specifically focus on three of the challenges - energy efficiency, throughput optimization,	2	0805003, 0805006

		and reliable topology management.		
4	Fault tolerance in wireless mesh networks	In the last few years, the effort in researches on wireless mesh networks has grown significantly high due to numerous contemporary and future applications of such kind of networks. However, reliability of the networks is one of the few areas, which are little explored. Therefore, in this thesis, we will investigate reliability of the wireless mesh networks, considering their different types of architectures. We mainly focus on simulation-based (preferably in ns-2) studies. We will also explore testbed-based evaluation, if possible.	2	0805056