Research Interests and/or Thesis Topics of Supervisors for CSE 400 (Project and Thesis)
Semester: August, 2011

1.	Supervisor's Name	Dr. M Kaykobad, Professor
	Research Area/ Specific Research Topics with details	Visit Personal Webpage: http://www.buet.ac.bd/cse/faculty/facdetail.php?id=kaykobad
2.	Supervisor's Name	Dr. Muhammad Masroor Ali, Professor

Research Area/ Specific Research Topics with details

(i) Title: Software Testing 1

Details: The topics are rather broad ones. All the three groups will start with the studies (text books and papers) on the broad field of software Testing. As time progresses, each group will move to narrow fields of their choices and will either implement methodologies on software testing or propose new techniques (or at least some improvements).

Max number of students: 3

(ii) Title: Software Testing 2

Details: -Same as above-

Max number of students: 3

(iii) Title: Software Testing 3

Name: Details: -Same as above-

Max number of students: 3

3.	Supervisor's Name	Dr. Md. Saidur Rahman, Professor
	Research Area/ Specific Research Topics with details	Graph Algorithms and Applications, Graph Drawing Algorithms, Computational Geometry, Bioinformatics, Generating Problems, VLSI Layout Algorithms, Routing in Wired and Wireless Networks, Geometric and Graph Modelings for Wireless Sensor Networks, Distributed Computing, Grid Computing, Graph Data Mining, Web Graphs and Social Network Analysis.

You may choose theoretical research topics as well as implementation
projects.

For detail about research field and previous works please visit

Department Webpage:
http://www.buet.ac.bd/cse/faculty/facdetail.php?id=saidurrahman

Personal Webpage:
http://teacher.buet.ac.bd/saidurrahman/

Graph Drawing Research Group:
http://www.buet.ac.bd/cse/research/group/gd/

gd-BUET:
http://www.buet.ac.bd/cse/research/group/gd/GDTool/GraphInputInterface.html

You are welcome to discuss about research topics.

4.	Supervisor's Name	Dr. Md. Monirul Islam, Professor
	Research Area/ Specific Research Topics with details	(i) Evolutionary Algorithms, (ii) Neural Networks, (iii) Data Mining, and (iv) Robotics.

5.	Supervisor's Name	Dr. Md. Mostofa Akbar, Professor
	Research Area/ Specific Research Topics with details	Software Development of practical problems, Testing Simulator for different USB devices, Modeling of effect of disease contamination through networks. The students who will work for these problems will be funded from local and international sources.

6.	Supervisor's Name	Dr. A. S. M. Latiful Hoque, Associate Professor
	Research Area/ Specific Research Topics with details	Visit Personal Webpage: http://www.buet.ac.bd/cse/faculty/facdetail.php?id=asmlatifulhoque
7.	Supervisor's Name	Dr. Md. Humayun Kabir, Associate Professor

Research Area/ Specific Research Topics with details

(i) Title: Next Generation Internet or Interplanetary Networks (IPN)
Details: Interplanetary Network (IPN) is a network of networks which deals with the architecture and protocols necessary to permit interoperation of the Internet residents on Earth with other remotely located internets resident on other planets or space satellites or spacecrafts in transit or landed rovers on other planets. Traditional communication protocols and algorithms fail to perform effectively in these challenged and diversified environments. New protocols and algorithms are evolving. Under this thesis topic, students will examine different IPN protocols and algorithms.
Max number of students: 2

(ii) Title: Delay Tolerant Networks (DTN)
Details: All the existing communication protocols and algorithms are based on traditional wired or wireless networks. They assume that there must be persistent end-to-end paths between hosts which are intended to transfer data between them. They also assume that data rate of this network is symmetric and error rate is relatively small. However, there are some challenged environments where deploying networks with always on connectivity is quiet impossible. Interplanetary Internet, satellite communication, terrestrial wireless networks are some typical examples of this type. This type of network suffers from intermittent connectivity, asymmetric data rate, long and variable delay, and high error rate. Contact between two nodes in this network can be either scheduled or opportunistic. Connectivity problems may also arise due to mobility of the devices. The absence of a constant path between two nodes or failure of a link on a particular path or very long delay is taken as a lack of connectivity and all the existing protocols fail. To overcome these problems, new network architecture and a new set of algorithms are required. Delay or disruption tolerant network is the newly proposed network architecture designed to adopt these challenged environments. Under this thesis topic, students will examine different DTN protocols and algorithms.
Max number of students: 2

(iii) Title: Opportunistic Networks (OpNets)
Details: Delay or disruption tolerant networks (DTNs) provide

reliable communications in intermittently connected environments. Opportunistic Networks (OpNets) are a special category of DTN where neither the meeting schedule nor the contact period is known in advance. OpNets demand for special protocols and algorithms. Under this thesis topic, students will examine different OpNet protocols and algorithms.
Max number of students: 2

(iv) Title: Vehicular Ad hoc Networks (VANET)
Details: A Vehicular Ad-Hoc Network, or VANET, is a technology that uses moving vehicles as nodes in a network to create a mobile ad-hoc network. VANET turns every participating vehicle into a wireless router or node. VANET integrates on multiple ad-hoc networking technologies such as WiFi IEEE 802.11 b/g, WiMAX IEEE 802.16, Bluetooth, IRA, ZigBee for easy, accurate, effective and simple communication between vehicles on dynamic mobility. Under this thesis topic, students will examine different VANET communication protocols and algorithms.
Max number of students: 2

(v) Title: Dynamic Bandwidth Allocation for QoS guarantees in WiMAX.
Details: In WiMAX network bandwidth to subscriber stations are allocated dynamically optimizing several factors. WiMAX supports some specific quality of service (QoS) classes, which are implemented through different bandwidth allocation schemes. Under this thesis topic, students will investigate the most popular bandwidth allocation schemes to ensure different QoS guarantees.
Max number of students: 2

(vi) Title: Datagram Congestion Control Protocol (DCCP)
Details: Datagram Congestion Control Protocol (DCCP) is a message-oriented Transport Layer protocol. DCCP implements reliable connection setup, teardown, Explicit Congestion Notification (ECN), congestion control, and feature negotiation. DCCP provides a way to gain access to congestion control mechanisms without having to implement them at the Application layer. It allows for flow-based semantics like in Transmission Control Protocol (TCP), but does not provide reliable in-order delivery. Sequenced delivery within multiple streams as in the Stream Control Transmission Protocol (SCTP) is not available in DCCP. DCCP is useful for applications with timing constraints on the delivery of data that may become useless to the receiver if reliable in-order delivery combined with network congestion avoidance is used. Such applications include streaming media, Multiplayer online games and Internet

telephony.
Max number of students: 2

(vii) Title: NAT traversal for VoIP.
Details: NAT is used in the enterprise network to enhance the security. However, it prevents VoIP caller to call a VoIP client behind the NAT. Under this thesis topic, students will investigate algorithms to traverse through NAT for VoIP application.
Max number of students: 2

(viii) Title: Video Streaming over peer-to peer network.
Details: Peer-to-peer network is very much popular for downloading. It is not that much successful yet in streaming. Under this thesis topic, students will investigate video streaming algorithms for P2P network.
Max number of students: 2

(ix) Title: Scalable and Interactive Video streaming.
Details: Video streaming is inherently non-scalable. Users want to be interactive while using a video streaming application. It is hard to make a video streaming system both scalable and interactive. Under this thesis topic, students will investigate video streaming algorithms to make it both interactive and scalable.
Max number of students: 2

(x) Title: Cloud Computing.
Details: Cloud computing is a term used to describe both a platform and type of application. A cloud computing platform dynamically provisions, configures, reconfigures, and deprovisions servers as needed. Servers in the cloud can be physical machines or virtual machines. Advanced clouds typically include other computing resources such as storage area networks (SANs), network equipment, firewall and other security devices. Cloud computing also describes applications that are extended to be accessible through the Internet. These cloud applications use large data centers and powerful servers that host Web applications and Web services. Anyone with a suitable Internet connection and a standard browser can access a cloud application. There are many challenges to meet to make the cloud computing successful. Under this thesis topic, students will investigate the challenges and their solutions.
Max number of students: 2

8.	Supervisor's Name	Dr. Mohammad Mahfuzul Islam, Associate Professor
	Research Area/ Specific Research Topics with details	Smart Card Security, Network Security, Security for online communications, Wireless Sensor Network, Cellular Network, Vertical Handover, eHealth Services,

9.	Supervisor's Name	Dr. Mahmuda Naznin, Associate Professor
	Research Area/ Specific Research Topics with details	(i) Study of Voronoi Diagram and Delaunay Triangle and Applications, student -2

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(ii) Study of Network Flow Problems and Applications, student -2

(iii) Study of Stenier Tree and applications, student -2

(iv) Study of Clustering methods and applications, student -2

(v) Study of Non-linear programming methods, models and applications, student -2

(vi) Study of Meta Heuristic Techniques, models and applications, student -2

10.	Supervisor's Name	Md. Abdus Sattar, Associate Professor
	Research Area/ Specific Research Topics with details	Visit Personal Webpage: http://www.buet.ac.bd/cse/faculty/facdetail.php?id=masattar

11.	Supervisor's Name	Dr. M. Sohel Rahman, Associate Professor

Research Area/
Specific Research
Topics with details

Possible Research Areas:
1. Algorithms (bioinformatics, string, graphs etc.)
2. Theory (graph structures like Hamiltonian Paths and cycles, string conbinatorics etc.)
3. Metaheuristics (in different areas like, network, vehicle routing, combinatorial optimization, bioinformatics etc.)
4. Any other state of the art area

Comments:
1. The interested students may choose any topic of his interest.
2. He will be part of the newly formed group called AℓEDA (Algorithm Engineering Development and Analysis) group.
3. He should be highly motivated to produce good results and aim for good quality research papers. The aim should be to do good research. Then, good grades will follow automatically.
4. Most of my students keep good contact with me even after the thesis grade is earned and continue to do research on areas (un)related to his thesis topic.

Some Statistics:
1. From the thesis work of 05batch, we have (alhamdulillah) published 4 journal papers and 4 conference papers. Another paper is under review for a journal now. We have also published 2 other journal papers on extension of their thesis work.
2. From the thesis work of 06batch, we have so far (alhamdulillah) published 1 journal paper and 2 conference papers. Another paper is under review for a journal now. We are also finalizing 2 manuscripts.
5. Thesis work of 07 batch is underway. We hope to do good progress soon.

12.	Supervisor's Name	Dr. Masud Hasan, Associate Professor
	Research Area/ Specific Research Topics with details	Topics, groups, and group capacity are not fixed now, but we shall work on the following broad areas: Approximation algorithms, Quantum computing, Computational geometry, and Structured web search. Among them, for the first three areas you can get an idea on possible topics from the publication list in webpage: http://teacher.buet.ac.bd/masudhasan/ About structured web search: In this topic we shall try to design user friendly web search techniques, that might be used on top of standard web search engines, like Google, Yahoo, Bing, etc. This will require study of existing structured search techniques, theoretical study and implementation.

13.	Supervisor's Name	Dr. Mohammed Eunus Ali, Assistant Professor
	Research Area/ Specific Research Topics with details	• Query Processing on Road Networks (e.g., Google maps) • Augmented Reality • Cloud Data Management • 3D Data Management (e.g., 3D animated data) • Spatial Data Mining • Location Based Services

14.	Supervisor's Name	Dr. Md. Monirul Islam, Assistant Professor
	Research Area/ Specific Research Topics with details	All state-of-the art branches of image processing, including low level feature extraction to semantic understanding, image segmentation, noise modeling, face/fingerprint/character recognition, computer vision, medical/Arial image processing. Be Careful: You must take CSE 433. Students from other groups are strongly discouraged to give options in this area.

15.	Supervisor's Name	Dr. Mohammad Tanvir Parvez, Lecturer

Research Area/
Specific Research
Topics with details

Area 1: Handwriting Recognition
Title 1: Structural Methods for Recognition of Handwritten Bangla Scripts
Max Number of Students: 3

Title 2: Language Models for Handwriting Recognition
Max Number of Students: 3

Title 3: Arabic Handwriting Recognition using Hidden Markov Models (HMM)
Max Number of Students: 3

Area 2: Image Processing
Title: Effective Tone Mapping Algorithms for HDR Images
Max Number of Students: 2

Area 3: Security
Title: Enhancing Security Through Image Steganography Algorithms
Max Number of Students: 2

For more details, contact at: tanvirparvez@cse.buet.ac.bd