id	topicstitle	numberofstudent	details	fac_name
1	Online Advertisement Fraud Detection Analyzing Ad-server Data	1	In the online marketplace, page views, form submissions, clicks have a revenue model between advertisers, ad-servers, and web site publishers. Publishers may be incentivized to commit such frauds since ad networks pay them based on impression count, click count, or more commonly, combinations of both. Often the motivation of consuming competitors' advertisement budget leads to these type of activities. In recent times, fraud detection and prevention, the goal of this project, is therefore considered a very significant practical research problem. This project has collaboration with Widespace, a Swedish Ad-serving software company with development centre in Bangladesh. Hence, it will receive real-world data and practical application.	Dr. Anindya Iqbal
2	4. Automatic Topic Extraction and Key-word Generation for News-sites to Facilitate Recommendation Modeling	1	To recommend news to an audience that would suite her interest, the topic and key-words need to be generated appropriately. When comes to millions of news, this generation has to be automatic, i.e., using machine learning techniques. This project has collaboration with Newscred, a USA based software company with development center in Bangladesh. Hence, it will receive real-world data and practical application.	Dr. Anindya Iqbal
3	Sentiment Analysis of Social Media Data	2	Automatic detection of positive, negative or neutral tone of social media posts such as in twitter or facebook is widely used for predicting/analysing different socio-economic phenomena. Advance machine learning techniques along with some natural language processing tools are used for this purpose. This is in collaboration with Dr. Amiangshu Bosu, Assistant Professor in the Department of Computer Science at Southern Illinois University.	Dr. Anindya Iqbal

4	Optimization Modeling for Multiproduct Advertising Budgeting	1	Companies produce a multiple range of products and advertise those using available media options. The budget constraint forms the major restriction. The existing research in media allocation of multiple products ignores the market segmentation and formulates the media plan assuming all segments alike. The goal of this project is to formulate a media planning problem for allocating the available budget that maximizes the total reach in all the segments.	Dr. Anindya Iqbal
5	Data Gathering Tree for Wireless Sensor Network	2	The application of wireless sensor network is increasing day by day. People are now placing wireless sensor networks inside different machines, animals and sensitive places hiddenly for monitoring them. Data collection methodologies and power are the key problems for such network. I have a good number of publications in this area, two masters students have completed their Masters degree and one full PhD student is currently working in this area.	Dr. Mohammad Mahfuzul Islam
6	Digitisation of Maps	2	This is a real life problem and have greater possibility for commercialisation in Bangladesh and abroad. All the maps of land and other infrastructure was drawn on paper those can be scanned. After scanning we shall get pixel based raster graphics with lots of noises. Currently people use ArcGIS or AutoCAD to convert the raster maps to vector manually and no significant research work have been observed in this area to convert raster maps to vector automatically.	Dr. Mohammad Mahfuzul Islam
7	Trust Model for Social Network	2	We are all engaging around the world under social networks like Facebook, twitter, LinkedIn without having knowledge about the security of our personal information. Cyber criminals are now using those sensitive personal information for their personal gain like theft of money from bank and so on. Developing a trust model for social network is the key problem for this research. We have an IEEE transaction publication on trust model and one PhD student is working in this area.	Dr. Mohammad Mahfuzul Islam

8	Biometric Security	2	This is a real life research and has many methodologies in some areas like fingerprint. However, some areas like voice, Iris, Vein, ear are new research areas for identification of a person and ensuring security. Bangladesh government is trying to use biometric extensively for security purposes. The problem of this research is to find out a robust and better biometric security system. Several Masters students are working in this area.	Dr. Mohammad Mahfuzul Islam
9	Security for Software-Driven Network	2	Computer networks are now switching from hardware-driven to software-driven (SDN). More than 90% of the networking cost will be the cost of software. The main objective of such SDN is to provide network services at cheaper cost. However, security becomes the key issue for such SDN. This is an emerging area and people has started to explore this area.	Dr. Mohammad Mahfuzul Islam
10	Detecting copy number variations in genomes	2	Copy number variations (CNVs) are variations in the number of times some sections in the genome are present in different individuals. CNVs have been associated with cancer and other diseases. Moreover, presence of repeats is the main challenge in genome assembly. The goal of this project will be to devise and implement a method for estimating copy numbers using generative models for sequencing. * For some background on genome assembly please see http://escholarship.org/uc/item/6hx4q2g m ** No prior knowledge of biology is necessary	Dr. Atif Hasan Rahman
11	Detecting and correcting errors in genome assembly	2	In the last decade the emergence of next-generation sequencing has led to assembly of genomes of many organisms. However, many of these assemblies have errors in them making downstream genetic analysis difficult or inaccurate. In this project we will devise and implement methods to detect and correct errors by computing likelihood of genome assemblies. The methods may also be applied to detect sequence and structural variations in genomes. * For some background on genome assembly please see http://escholarship.org/uc/item/6hx4q2g m ** No prior knowledge of biology is necessary	Dr. Atif Hasan Rahman

12	Genome assembly using third generation sequencing	1	Genome assembly is the process of merging short 'reads' generated by sequencing technologies to construct the original genome. Third generation sequencing technologies including Pacific Biosciences and Oxford Nanopore can generate longer reads compared to earlier technologies at the expense of higher sequencing error rates. In this project we will explore ways third generation sequencing can be utilized to improve genome assembly process. * For some background on genome assembly and sequencing technologies please see http://escholarship.org/uc/item/6hx4q2gm ** No prior knowledge of biology is necessary	Dr. Atif Hasan Rahman
13	Internet of Things (IoT) for environment monitoring (2 students)	2	This is a collaborative research project with University of California, Irvine. Using SCALE, an IoT enabled mobile sensing platform (courtesy of UCI), we will investigate potential research questions in the direction of environmental monitoring applications in our local contexts. Knowing Python and Linux is required.	Dr. Md. Yusuf Sarwar Uddin
14	Internet of Things (IoT) for distant healthcare (2 students)	2	Distant healthcare attempts to decouple patient and doctors in space and time and still enables functional healthcare in certain aspects. In this research, we will substantiate this promise by instrumenting IoT/wearable devices on patients with certain health concerns (for example, insulin meter/fitbit for diabetic patients), collecting evidence and thereby assisting remote doctors in assessing cases and monitoring progress.	Dr. Md. Yusuf Sarwar Uddin
15	Multi-party content ingestion and routing for big "active" data (2 students)	2	In this work, we shall use Asterixdb, a BDMS (Bigdata management system), to leverage publish-subscribe paradigm for bigdata. In this system, interested parties would subscribe to certain "items" that are published by some publishers. Once contents get published, they are routed to appropriate subscribers. We will investigate efficient data ingestion and routing techniques for this system.	Dr. Md. Yusuf Sarwar Uddin

16	Worker Privacy		1	Protecting user privacy has become an important research area in recent years. In this research project, we will develop an approach for collecting feedback from workers in a privacy preserving manner and empower them at their workplaces. Our system will protect workers from facing troubles and losing jobs for sharing their sufferings to the public. For example, the garment and textile industry is one of the major source of economic growth for rapidly developing countries like Bangladesh. However, the garment workers are victim of gender inequality, harassment and low salary. This kind of disasters would never happen if the condition of garment factories could be monitored. The revealed feedback can motivate the management authority to improve the quality of their workplaces in the fear of losing trust and reputation. In this research project, in addition to developing the approach, we will implement the prototype application for the proposed system. 1 student with the familiarity/expertise to work in developing Android mobile applications is required to work in this research project.	Dr. Tanzima Hashem
17	Location Based Services		2	Consider a tourist who is taking a scenic walk and may want to have her dinner in a restaurant. In this scenario, a tourist may want to know a set of clustered restaurants so that the tourist can easily go to more than one restaurant if she is not satisfied with the current one. A Nearest Neighborhood Search enables a tourist to know the nearest cluster of restaurants from her current location. In the existing literature, researchers have developed an efficient approach for the nearest neighborhood search in the Euclidean space, which measures the distance between two locations using a straight line. However, a pedestrian's walking path is obstructed with obstacles like buildings, fence and vehicles. In this research project, we will develop an efficient approach for the nearest neighborhood search in the obstructed space.	Dr. Tanzima Hashem

18	Big Data Analysis and Applications	2	The advancement of technology in generating, capturing and storing data at enormous speed and volume has opened the door for novel applications in different domains of urban computing for the development of a smart city. In this research project, we will develop an efficient technique to analyze historical trajectory data to identify the appropriate routes for recommending the setup of new public transport networks.	Dr. Tanzima Hashem
19	Tracking Your Emotions from Social Media Usage	1	With the extensive usage of social networking sites (SNS), users ex-press their thoughts and emotions with their friends, family and acquaintances through these sites. SNS provide promising resources to identify and predict users' emotions, since they share self-descriptive emotional and personal contents in these sites. People experience frequent shifting of their emotional states due to various factors such as events (e.g., winning a cricket match), reading news article, watching a photograph and communicating a childhood friend after longtime. In this project, we plan to track the evolution of human emotions in social networks from didifferent features such as visual and textual contents, analyzing intrinsic signals (i.e., comments by other users) and interaction patterns with other users in a time varying scale. (Collaborator: Jalal Mahmud, IBM Research, USA)	Dr. Mohammed Eunus Ali

20	Maximizing Range-Sum Queries over Sensor Networks	2	In recent times, the focus of the spatial database research community has shifted towards optimization/maximization queries, i.e., finding the best location to optimize a certain objective. One such example is Maximizing Range-Sum (MaxRS) Query. Formally, given a set of objects O and a rectangle R (of size d1 x d2), MaxRS query finds a position of R within the specified space that maximizes the sum of the weights of all the objects covered by R. The MaxRS query has a range of applications in various fields and real-world scenarios, e.g., a tourist who wants to find the most representative spot in a city; finding the region of a city where traffic is densest during a particular time; facility location selection to optimize service reach; extracting hotspot from a massive dataset of points; determining the area where the crime is happening most frequently; etc. In this project, we will focus on developing techniques to solve MaxRS problem for a dynamic scenario, e.g., in a sensor network environment where sensor data or location (or both) changes constantly. Collaborator: Goce Trajcevski, Northwestern University, USA	Dr. Mohammed Eunus Ali

22	Trip Planning with Events and Keywords	2	Consider a scenario where a traveler wants to spend a half-day in exploring a big zoo in Melbourne. The zoo opens at 9.30am and closes at 4pm. The zoo has different types of animals that are tagged with their names (e.g., "kangaroo", "tiger", "elephant", "butterflies", etc.) located at different cages (zones). Also, based on the days of the week and the weather of the day, the zoo authority plans different activities at different times of the day. For example, kangaroo show happens twice a day: 9.30am-9.45am and 3.30pm-3.45pm, Dolphin show starts at 1.30pm and ends at 2.30pm, tiger feeding starts at 1.30pm and ends at 2.00pm, and so on. If the user visits an animal during its activity time she will be more satisfied than that of her visit during non-activity time. So each POI has associated time-dependent weights that denote a user satisfaction if she visits the POI at different times of the day. Given a user location in the zoo, a time of the visit, and a set of keywords (e.g., "tiger", "dolphin", and "elephant) as her preferences, the user may want to find a trip that maximizes her satisfaction. The user may want to put other constraints such as budget (e.g., time), and priorities of visiting different places. A slight variant of the problem is where a user also gives her destination location where she wants to end her trip. We can also extend this query for trajectory database instead of POI database. Collaborator: Prof Timos Sellis	Dr. Mohammed Eunus Ali
23	Searching Influential Communities in a Large Social Network	1	Community search in a large social networks has been an active research topic in the the last decade. In this project, we will introduce the concept of keyword-based communities where each user/node can be described as a set of keywords (e.g., machine learning, databases) and associated weights denoting her expertise and her influence in a particular topic, respectively. So for a given (set of) keywords, our focus is to identify top-r communities that match with the query keywords. Collaborator: Dr Jianxin Li, RMIT, Australia	Dr. Mohammed Eunus Ali

26	Ontology Based Access Control System for Online Social Networks (2 or 3 students)	2	Loosely speaking, an ontology is a vocabulary of the classes (types), properties (roles), and interrelationships of the entities that really or fundamentally exist for a particular domain of discourse. It is thus a practical application of philosophical ontology, with a taxonomy. We are going to use ontology to control how information is distributed through the Online Social Networks and decide who can access it.	Dr. Muhammad Masroor Ali
27	Ontology Based News Recommendation (2 or 3 students)	2	Loosely speaking, an ontology is a vocabulary of the classes (types), properties (roles), and interrelationships of the entities that really or fundamentally exist for a particular domain of discourse. It is thus a practical application of philosophical ontology, with a taxonomy. We are going to represent a news item using ontology and then create further recommendation of similar news items.	Dr. Muhammad Masroor Ali
32	On Wi-Fi signal based employee tracking system (2 or 3 students)	3	Imagine a situation where the head of the CSE department is very much eager to know about his employees. He wants to know each and every details of his employees (including teachers), for example, when they arrive at their workplace, when they leave from the department, how long they take their classes, how long they stay in the lab, even how much time they spend at their office room etc. With so many smart phones (with wi-fi access) these days, his demand is not a fairy tale any more! In this research project you will be developing a state-of-the-art wi-fi signal based solution for employee tracking within an organization.	Dr. A.K.M. Ashikur Rahman

34	Performance analysis of different approaches for k-coverage in visual sensor (2 or 3 students)	2	Visual sensor networks (VSN) have drawn much attentions from the research community. VSNs are normally used to monitor a set of targets using directional visual sensors. For such monitoring tasks fault tolerance is an important and critical issue. Two common approaches for providing fault tolerance are based on the so-called set multi-cover problem and multi-set cover problem. In this research project, we will provide a closer insight to these two techniques and compare their performance both theoretically and experimentally under various networking condition.	Dr. A.K.M. Ashikur Rahman
35	Collaborative Computing across Mobile Platforms and Cloud	2	Collaborative computing for energy conservation has recently been proposed in the hybrid model of Mobile Platforms and Cloud. To address the challenges in response time and communication overhead across cloud and mobile end devices, data and computation are brought close to each other by adding an intermediate layer of surrogate servers (cloudlets) which are in logical proximity (within WiFi) of the end nodes. In this project, we intend to build tools for runtime support on mobile devices to partition, migrate and concurrently execute subtasks at nearby surrogate servers. Pre-Requisite: coding in java/python and mobile platforms. Research Area: Mobile Cloud Computing	Dr. Muhammad Abdullah Adnan

36	Probabilistic Principal Component Analysis for Big Data on Distributed Platforms	2	Both computational complexity and communication complexity are important aspects for processing large-scale datasets on distributed platforms. Stochastic SVD (SSVD) and Probabilistic PCA are two potential candidates for performing PCA on large datasets, since they have the best (low) computational complexity. However, SSVD suffers from high communication complexity. Therefore, the most promising PCA approach for large datasets is the probabilistic PCA. In this research project, we intend to design a distributed principal component analysis algorithm based on probabilistic PCA. The algorithms will be compared against current PCA algorithms implemented in Mahout/MapReduce and MLlib/Spark. Pre-requisite: strong background in linear algebra and math. Research Area: Big Data Analytics.	Dr. Muhammad Abdullah Adnan
37	Smart Controller for Household Energy	1	Intelligent management of energy consumption is one of the key issues for future energy distribution systems, smart buildings and consumer appliances. The goal of this research is to build an embedded system for household load scheduling, power source selection and develop a cloud-based controller to enable variable power pricing for the national power grid. Pre-requisite: low level coding in embedded systems e.g. micro-controllers. Research Area: Smart Grid.	Dr. Muhammad Abdullah Adnan
38	Information Technologies in Education	2	Digital Divide; e-Learning Methods and Case Studies; Mobile and Pervasive Technologies; Informal Learning; New Classroom Technologies (PDAs, Interactive Whiteboards, etc.); Personal Learning Environments; Visual Media (Videoconference; Digital Photography); e-Portfolios and Social Software (Wikis, Blogs, Podcasting, etc.).	Dr. Sadia Sharmin
39	Health Informatics	2	Electronic Health Record; Clinical Decision Support Systems; Knowledge Management for Healthcare; Evidence-based Health Services; Telemedicine and eHealth; Mobile Computing in Healthcare; Integration and Interoperability; Health Portals; Standards; Ethic, Privacy and Security; Legislation;	Dr. Sadia Sharmin

40	Heuristics for solving NP-hard problems on graphs	2	Independent set, Dominating set, Max Clique.	Dr. Sadia Sharmin
41	Smart Cities	1	• Information systems in the public sector • Mobile information systems • Eco-informatics, • E-commerce • E-health, Embedded Systems, • Emerging Mobile Technologies, • Emotion Aware Systems, • Energy Efficiency for ICT, • Enriched Interfaces • Virtual Organizations • E-Business; E-Portals • Social Aspects of Information Systems • Geographic Information Systems	Dr. Sadia Sharmin
42	Empowerment of females (males) through technology	1	Bridging the Internet gap and creating new global opportunities in low and middle-income countries. Application, Innovation etc. (a) Non-formal primary education for rural girls. (b) Science and technology for rural women. (c) Promoting health, family welfare, and community development with focus on women and girls. (d) Training of rural women as Animators for women's empowerment and community development.	Dr. Sadia Sharmin
43	Models of complex networks	1	The Internet and many other complex networks have not been 'planned' or 'engineered' in their present form, but are the result of a (mostly) uncontrolled process. There are mathematical approaches to model the evolution of complex networks. The goal of this project is to survey some of them critically. Possible aspects are the following: • What methods are there to scout networks such as the www, and do they produce a faithful picture? • What are characteristic processes involved in the emergence of complex networks? How can they be modeled? • How and to what extent do (purely) graph-theoretic concepts apply to complex networks?	Dr. Sadia Sharmin
44	Algorithm and Application	1	Topic of suggested by student, which goes with my interest.	Dr. Sadia Sharmin

45	Algorithms for Searching Motifs in DNA	2	Discovering meaningful patterns from DNA sequences are becoming important in the analysis of gene regulation and transcription. The specific sequence in DNA having recurring patterns which are assumed to have biological functions are called motifs. The identification of motif helps in detection of promoter regions in gene regulation, transcription factor binding sites, intron/exon splicing sites and alternate splicing sites etc. which are extremely important to understand the gene functions. This research work will focus on motif search algorithms.	Dr. Md. Abul Kashem Mia
46	Algorithms for the Prediction of Protein Tertiary Structures	2	Proteins are essential biological molecules which play vital roles in nearly all biological processes. It is the tertiary structure of a protein that determines its functions. Therefore the prediction of a protein's tertiary structure based on its primary amino acid sequence has long been the most important and challenging subject in bioinformatics. This research work will focus on the algorithms for the prediction of protein tertiary structures.	Dr. Md. Abul Kashem Mia
47	Greedy best first search for puzzle problems	2	The A* search algorithm finds optimal solutions, but for many problems it does not succeed if there are time and memory constraints. In practice, greedy best-first search (gbfs) is used for solving puzzle problems like sliding tile puzzles. In this study, experiments with basic gbfs and related search techniques (like hierarchical search) will be conducted for various puzzle problems.	Abu Wasif
48	Search landscape visualization techniques	2	Hard combinatorial optimization problems generally have high dimensions. The objective is to study techniques for the visualization of search landscapes which will be helpful for analyzing the behaviour of heuristics and devising better heuristics.	Abu Wasif
49	Relaxation heuristics for AI planning and scheduling problems	2	At present, the most successful AI planning problem solvers use relaxation heuristics. The objective is to conduct experiments to analyze the behaviour of various relaxation and abstraction heuristics applied to planning and scheduling problems.	Abu Wasif

50	Performance Modeling & Analysis of Software-Defined Networks and Network Function Virtualization	2	This is collaborative research work with National Chiao Tung University (NCTU). Software-defined networking (SDN) decouples the control plane from the data plane to enhance programmability and flexibility of network control. In SDN, the control plane is a logically centralized controller, which communicates with the data plane via a control channel. In conventional SDN, a controller classifies the traffic redirected from a switch to determine the path to network function virtualization (NFV) modules. The redirection generates a large volume of control-plane traffic, known as Packet-in to the controller. In this work, we will propose an architecture to reduce traffic flow to the controller and measure performance of the proposed architecture. Knowledge of M/M/1 queueing system is essential for this research as most of the work will be on mathematical modeling of the SDN and NFV system.	Dr. Md. Shohrab Hossain
51	Performance measurement of TCP and UDP in SDN / NFV	2	This is collaborative research work with National Chiao Tung University (NCTU). Software-defined networking (SDN) decouples the control plane from the data plane to enhance flexibility of network control. The controller classifies the traffic redirected from a switch to determine the path to network function virtualization (NFV) modules. It has been assumed that the table miss (in a switch) is much higher for a TCP flow than a UDP flow, thereby reducing the performance of the SDN controller. In this work, we will use experiments to verify that UDP performs poorly in SDN and propose algorithm to improve it. Next, we will perform experiments on TCP flow and measure its performance. Finally, a combined policy can be proposed for TCP and UDP flow in the SDN. Knowledge of M/M/1 queueing system is essential for this research as most of the work will be on mathematical modeling of the SDN and NFV system.	Dr. Md. Shohrab Hossain

52	Data mining on Web Server logs to detect / prevent possible attacks	2	Attacks on web servers can cause huge financial damage to a company / a Government entity. Protection of private data from intruders is an obligation of the custodian of the data. The goal of this research work is to use data mining techniques on web server logs to detect and mitigate / prevent attacks by alerting the admin of possible (real time) attacks and/or blacklisting the source of attacks to mitigate the impact on the web server.	Dr. Md. Shohrab Hossain
53	Smart Sensors for Road Safety Architecture	2	In road accident we loose many innocent people every year. Not only that people become disabled in horrible accident in highways and road. Under this topic we will design an architecture using smart sensing system to enhance road safety in a developing country	Dr. Mahmuda Naznin
54	Security in IOT	2	Internet of Things (IoT) is combinations of heterogeneous smart technologies. In IOT, obtaining security, privacy and trust are very challenging. Traditional security countermeasures cannot be directly applied to IoT. Moreover, the high number of interconnected devices arises scalability. Under this project we will study design secured model for IOT	Dr. Mahmuda Naznin
55	The Study of Sensor Cloud Arcitecture	2	In this project we try to model sensor cloud architecture, integration properties and challenges. We will design a better sensor cloud data flow model.	Dr. Mahmuda Naznin
56	Land Map Digitalization	1		Dr. Md. Monirul Islam
59	Binary patterns for Texture Representation	1		Dr. Md. Monirul Islam
58	Color Binary pattern of image retrieval	1		Dr. Md. Monirul Islam
60	Isolated Character recognition using binary patterns	1		Dr. Md. Monirul Islam
61	Binary pattern for Biometric recognition	1		Dr. Md. Monirul Islam
62	Rain and fog effect removal from images and videos	1		Dr. Md. Monirul Islam
63	Bangla Visiting Card reader	1		Dr. Md. Monirul Islam
64	Image Resolution Enhancement	1		Dr. Md. Monirul Islam
65	Degraded Document Image Binarization	1		Dr. Md. Monirul Islam

| | | | Graph theoretic algorithms have applications in almost all areas of science and technology. We wish to explore the applications of graph theoretic concepts in contemporary research areas like social network analysis, bioinformatics, bigdata analysis, VLSI design, information visualization etc. Various types of algorithms such as exact algorithms, approximation algorithms, online algorithms, distributed algorithms etc. are also studied in this research group. Exact topics will be chosen after discussing with the students based on their capability and interest. All students under the supervisor will form a research group and work in Graph Drawing and Information Visualization Laboratory.
However, students are allowed to choose thesis topics individually or in a group of at most three students. There are scopes for theoretical research as well as practical implementation.

 To know about research area visit

http://teacher.buet.ac.bd/saidurrahman/BGTWEB/chapter10.pdf

https://cse.buet.ac.bd/research/group/gd

To know the previous works done by the students under the supervisor visit

http://dblp.uni-trier.de/pers/hd/r/Rahman_0001:Md=_Saidur

You may also be interested to visit

http://teacher.buet.ac.bd/saidurrahman/
<a href="http://scholar.google.com/citations?user=oeNksGwAAAAJ&hl=en">http://scholar.google.com/citations? | Dr. Md. Saidur Rahman |
| | Graph Theoretic Algorithms with | | | |

69	Adaptive content uploads in Instagram like photo sharing applications	1	Instagram like photo sharing apps upload photos as user takes them. As mobile devices run on budgeted data plan such as on 3G, content uploads may not be synchronous rather adaptive to remaining data budget. In this work, we shall investigate approaches to efficient content upload schemes that minimize overall queuing delay as well as ensure better utilization of data budget. Experience on Android may be handy.	Dr. Md. Yusuf Sarwar Uddin
73	High Performance Garbage Collection for non Java languages	2	The recent advances of different garbage collection algorithms like reference counting and conservative garbage collection are all implemented in a Java virtual machine and with Java benchmarks. But we believe that they are applicable to other languages as well. For example, PHP and Objective-C uses reference counting, and Chakra VM and WebKit uses conservative garbage collection. But all of them suffer from significant performance overhead. This work will focus non Java languages and with detailed analysis will improve their performance. 2/3 students	Dr. Rifat Shahriyar
72	High Performance Parallel and Distributed Programming with X10	2	X10 is a strongly-typed, class-based, object-oriented programming language designed for high performance computing. The sequential core of X10 is very similar to the Java and C++ programming languages X10 comes in two flavors: a) Managed X10, built on a Java backend; and b) Native X10, built on a C++ backend. X10 includes specific features to support parallel and distributed programming. This thesis will focus on different areas of X10 programming language with a point of view both as a programmer and language implementer. 2/3 students	Dr. Rifat Shahriyar
78	System of Linear Equations	1	Studying algorithms based on projections. Conjugate gradient algorithm may be helpful.	Dr. M. Kaykobad
79	Linear Programming Algorithm	1	It is based on simplex algorithm. Bland's anti-cycling rule should be studied, and its complexity should be established or a new algorithm should be proposed.	Dr. M. Kaykobad
80	All pairs shortest path Algorithm	1	Should study whether it is possible to recognize an all pair shortest path matrix given a graph.	Dr. M. Kaykobad

81	Majority Spanning Tree	1	Should study a particular structure in directed graphs and find its applications in solving problems.	Dr. M. Kaykobad
82	Hamiltonicity	1	Should study sufficient conditions for Hamiltonicity and propose one.	Dr. M. Kaykobad
83	Minimum spanning tree algorithms	1	Study the available algorithms and look for their improvement.	Dr. M. Kaykobad
84	Heap Sort Algorithm	1	Study heap sort algorithm and look for improvement.	Dr. M. Kaykobad
85	Optimal partitioning in divide-and-conquer based algorithm	1	Usually two partitioning is common. Look for problems where a different partition number yields better solutions.	Dr. M. Kaykobad
86	Topics in Bioinformatics and Computational Biology	0	Students can work on different topics in this area. Of particular interests are the following topics: 1. Protein Structure Prediction 2. Disease (e.g, Cancer) diagnosis/classifications 3. Phylogenetic Tree reconstruction algorithms Most of these topic would require good programming effort.	Dr. M. Sohel Rahman
87	Topics in Bioinformatics and Computational Biology	5	Students can work on different topics in this area. Of particular interests are the following topics: 1. Protein Structure Prediction 2. Disease (e.g, Cancer) diagnosis/classifications 3. Phylogenetic Tree reconstruction algorithms Most of these topic would require good programming effort.	Dr. M. Sohel Rahman
88	(Big) Data Analytics	5	The main target of this work would be to analyze available data in different domain. Of particular interests are the following Domain: 1. Bioinformatics (Gene Expression data) 2. Climate/Environment 3. Social Media We can work on both big data as well as small size data. We will try to infer relations between data on different aspects. Programming will be required	Dr. M. Sohel Rahman
89	Algorithms on Strings and Sequences	5	We have a number of problems that have applications mostly in Computational Biology and Bioinformatics, Networking etc. The goal is to study and solve these problems efficiently. Good algorthmic knowledge is required. Programming may or may not be required.	Dr. M. Sohel Rahman

90	Evolutionary Algorithm		2	Recently, a growing interest has been seen for solving multiobjective optimization problems with a number of objectives considerably larger than two or three. It is because many real-world applications intrinsically have several objectives and from a practical point of view it is often desirable for most applications to include as many objectives as possible. While formulating an optimization problem, designers and decision-makers usually prefer to put every performance index related to the problem as an objective, thereby totaling a large number of objectives. Common appearance of such problems can be found in design optimization. The aim of this research is to devise algorithms for solving optimization problems involving three or more objectives.	Dr. Md. Monirul Islam
91	Data Mining		2	Big Data concern large-volume, complex, growing data sets with multiple, autonomous sources. With the fast development of networking, data storage, and the data collection capacity, Big Data are now rapidly expanding in all science and engineering domains, including physical, biological and biomedical sciences. The aim of this research is to develop Big Data processing model, from the data mining perspective.	Dr. Md. Monirul Islam
92	Machine Learning		2	With the remarkable progress in computer science and artificial intelligence, machine learning is thriving as the computational process of extracting patterns in data and making predictions based on the experience gained from these patterns. In practical machine learning applications, human instruction is indispensable in constructing model. Active learning queries the user with selective sampling in an interactive way to utilize the precious labeling effort effectively. Classic machine learning can be divided into two types: supervised learning and unsupervised learning. While the former aims at inferring a function from the labeled training data, the latter tries to find hidden structure from the unlabeled data. The aim of this research is to propose a machine learning model that can effectively utilize both labeled and unlabeled data.	Dr. Md. Monirul Islam

93	Architecture RealTime Order management System for Stock Market	2	The main purpose is to determine a low cost architecture for Order Management System for the brokerage houses. This must be a real time system that communicates with the matching engine of Stock Exchange. The main job is to analyze the message of the FIX and ITCH protocol to communicate the matching engine. And the other part is to provide the architecture of the web based user interface that shows real time message and submit trade order in the on line. The team must show the plausible APIs to develop the system. The team will not be involved in developing the system. It is an Applied Research leading towards development.	Dr. Md. Mostofa Akbar
94	Information System Development to Support Post-Disaster Rescue Operation	2	Analysis, design and development of information system for a city to support rescue operation after any kind of disaster.	Dr. Abu Sayed Md. Latiful Hoque
95	Development of Mobile Apps for the Clients for analysis and Order Submission	2	This system will do the following i) portfolio management of the clients of the brokerage house.

ii) Submission of online orders and notification of order execution status

iii) Analysis of the market for the current stock holding position. | Dr. Md. Mostofa Akbar |
| 96 | Reverse Engineering of Koha Open Source Library Management System | 2 | Reverse Engineering of Koha Open Source Library Management System | Dr. Abu Sayed Md. Latiful Hoque |
| 97 | Development of Mobile Apps for Asset Management | 2 | This is a portfolio management Solution for the companies with most of the analysis. The analysis will be based on the trading history of stock exchanges. There is an existing development of this solution. The students will do some more shape ups with mobile apps version. | Dr. Md. Mostofa Akbar |

98	Intelligent traffic signaling	1	Intelligence in traffic signaling is of utmost important to enhance experience on road. The intelligence can be derived from real-time data or from analytical prediction. As the first option demands deployments of cameras and other infrastructure, the second option can be a cost-effective solution. Therefore, in this work, the goal would be to focus on analytical prediction based intelligent traffic signal modeling. The course of work is expected to cover designing a solution and implement that in a discreet event road traffic simulator. Success of such work should exhibit a noteworthy impact in Bangladesh.	Dr. A. B. M. Alim Al Islam
99	Simulation of hybrid transportation systems	1	Simulation of unified transportation system such as road, waterways, etc., exhibits partial impact of a complete transportation system the complete system is generally composed of all the diversified systems including road, rail, waterways, and airways. A simulator comprising all these systems is yet to be developed. Therefore, in this work, the goal would be to attempt for devising a simulator that can compose all the alternative systems.	Dr. A. B. M. Alim Al Islam
100	Multi-objective optimization for 5G networks	1	5G networks are expected to offer high throughput and high mobility, however, at the cost of high energy consumption. Minimizing the energy level can degrade the level of performance expected. Therefore, it is of high importance to retain the two contradictory types of metrics within an acceptable limit. In this work, the goal would be to come up with a solution that can simultaneously improve the contradictory metrics or objectives. The solution needs to be validated by experimentation.	Dr. A. B. M. Alim Al Islam
101	Comparative study of query processing algorithms	1	Analysis and performance study of different query processing algorithms in database	Dr. Abu Sayed Md. Latiful Hoque

102	Emergency response through smart-watches	1	Smart-watches have limited resource and limited energy, however, can be ubiquitously deployed all over the world. Therefore, such devices can be utilized in aiding in emergency response such as generating signals while being under violence or generating signals for facilitating rescue missions. However, the limited resource and limited energy are two challenges in road to achieving so. This work should focus on designing solutions for emergency response using smart watches. The work is expected to attempt for devising hardware prototype based on the solution.	Dr. A. B. M. Alim Al Islam
103	Ubiquitous energy harvesting	1	We have different forms of energy all around. Example covers light, sound, EM waves, etc. On the other hand, we are facing lack of energy everyday while driving different types of devices covering from small embedded ones to large electrical devises. Now, the question is how far we can harvest the energies available all around to feed energies to our desired devices. In this work, it is expected to play with real hardware in road to answering this question.	Dr. A. B. M. Alim Al Islam
104	Simulating future wars	1	Early-age war planning was done on papers, whereas, the contemporary war planning is being done through simulation. In this work, a cutting-edge war simulator is needed to be mastered to be able to simulate future wars. Besides, a suggestion providing module is expected to be developed that can help in determining best future maneuvers to lead in road to winning a war.	Dr. A. B. M. Alim Al Islam

105	BUSINESS INTELLIGENCE AND ANALYTICS, FROM BIG DATA TO BIG IMPACT		Business intelligence and analytics (BI&A) has emerged as an important area of study for both practitioners and researchers, reflecting the magnitude and impact of data-related problems to be solved in contemporary business organizations. This introduction to the MIS Quarterly Special Issue on Business Intelligence Research first provides a framework that identifies the evolution, applications, and emerging research areas of BI&A. BI&A 1.0, BI&A 2.0, and BI&A 3.0 are defined and described in terms of their key characteristics and capabilities. Current research in BI&A is analyzed and challenges and opportunities associated with BI&A research and education are identified. We also report a bibliometric study of critical BI&A publications, researchers, and research topics based on more than a decade of related academic and industry publications. Finally, the six articles that comprise this special issue are introduced and characterized in terms of the proposed BI&A research 2 framework.	Dr. S. M. Farhad
106	Positional and Participation Dynamicity of Longitudinal Social Networks		This study proposes a set of measures for longitudinal social networks. A longitudinal social network evolves over time through the creation and/or deletion of links among a set of actors (e.g. individuals or organisations). There are methods (e.g. multi-agent simulation model) in the present literature to study the dynamics of longitudinal social networks. These methods have mainly been utilised to explore evolutionary changes of longitudinal social networks from one state to another and to explain the underlying mechanisms for these changes. However, they cannot quantify different aspects of a longitudinal social network. For example, these methods are unable to quantify the level of dynamicity shown by an actor in a longitudinal social network and its contribution to the overall dynamicity shown by that 2 longitudinal social network.	Dr. S. M. Farhad

107	Dynamic Resource Provisioning for Video Transcoding in IaaS Cloud		2	High-definition video applications are often challenging for mobile devices due to their limited processing capability and bandwidth-constrained network connection. Video transcoding has become an inevitable technology for on demanding video streaming service which needs to be done on the go in real-time for mobile devices. Since video transcoding involves extensive computation, performing transcoding using cloud resource is more cost friendly and time effective. It is challenging to use the cloud resources for video transcoding that minimizes the operating cost. In this paper, we propose a dynamic resource provisioning algorithm for allocating virtual machine to scale video transcoding services on a given IaaS cloud.	Dr. S. M. Farhad