Future Career Plan for the CSE Students

Groundwork and Preparation

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Upon receiving a degree in Computer Science & Engineering, there are many career opportunities to take. Different careers need different skills. Students need to learn and grow their expertise in different topics to become successful in their careers. A few of these career opportunities have been described below:

Software Engineering

If you decide to pursue a career in software engineering, you will be dealing with more of the computer science segment of the Computer Science & Engineering major rather than the Electrical Engineering segment. It is the most exciting and demanding career for the CSE graduates. In this career, you have to be very passionate about software development and planning. In this career, it is essential for you to know one or more high-level programming languages. Some major skillsets of a Software Engineer include but not limited to:

* Designing, coding and debugging applications in various software languages, especially in C. It is taught at very first semester at the university level. Those who possess good knowledge in C are likely to be good in other programming languages as well.
* Good knowledge and understanding of Object-Oriented Design and Analysis (OOD and OOA). One should have good grasp of Object-Oriented Programming languages like C++ and Java.

  Good expertise and understanding of Data Structures and Algorithms.
* Good knowledge of Software Engineering, Modeling and Simulation.
* Knowledge of Software Testing and Quality Assurance (QA).

A student, who wants to see him/herself in the top most software company, should solve competitive programming problems (like ACM) alongside of with possessing above mentioned qualities from the very beginning. Students should try to do the university projects properly (should have the novelty in the project).

Scope of Work (SoW): A good software engineer can seize the day all around the world. There are lots of opportunities for good programmers to work in USA or Europe at different well reputed companies like Google, Microsoft, Yahoo, LinkedIn etc. In our country, according to BASIS survey, there are over 800 registered software and ITES (IT Enabled Service) companies in Bangladesh. There are another few hundreds of unregistered small and home-based software and IT ventures doing business for both local and international markets.

Network Engineering

Network Engineers are responsible for installing, maintaining and supporting computer communication networks within organizations (Hospital, Government buildings, Schools, etc.). Their goal is to ensure the smooth operation of communication networks in order to provide maximum performance availability for their users (staff, clients, etc.). Network Engineers can work as a part of an IT (Information Technology) support team.

Typical work activities of a Network Engineer depend on the size and type of the employing organization. However, the basic responsibilities remain unchanged. These include:

* Installing, supporting and maintaining new server hardware and software infrastructure.
* Managing email, anti-spam, and virus protection.
* Setting up user accounts, permissions and passwords.
* Monitoring network usage.
* Ensuring the most cost-effective and efficient use of servers.
* Suggesting and providing IT solutions to business and management problems.

CSE graduates can opt career in Network Engineering, especially who are less passionate about computer programming. Some skillsets that students should learn at the university level:

* Very broad knowledge in the field of Data Communication. This includes extensive knowledge in TCP/IP model, transmission media, bandwidth utilization, switching, wired and wireless LANs, virtual LANs, ATM, logical addressing, routing, internet protocols, TCP, UDP, congestion control, Domain Name System, WWW, FTP, SNMP, SMTP and knowledge of computer security and cryptography.
* Expertise in open source operating system (LINUX, Fedora, Ubuntu etc.).
* Try to achieve parallel degrees and knowledge like Cisco Certification Program (CCNA, CCNP etc.), Red Hat Certification Program (RHCE, RHCA etc.) which qualify a graduate to enter into job market.
* Hand-on work experience with networking tools with as well as simulation tools (NS, NS-2, NS-3, Cisco Packet Tracer).

Scope of Work : They can work in multinational organizations, for government and in private banks, Internet Service Providers (ISPs), local organizations, training centres etc. These days, every organizations starting from local to multinational, public or private-owned require IT teams as IT is touching all aspects of our lives. IT teams work under IT departments which require CSE graduates from reputed universities.

Database Engineering

There are basically two type jobs in database engineering: 1. Database Administrator and 2. Database Developer/ Analyst. A database administrator is the person who is responsible for keeping a database up to date and running. Their responsibilities include: writing and applying scripts to update the database, keeping the database running 24/7, and backing up the database.

A database analyst is a person who looks at a database from a higher level. That person would look at the database design and recommend additions for new projects and design the tables and relationships to meet needs. Then the administrator would make the changes in the database. One of the primary ▸

roles of a DBA is to provide the support needed by an application developer so that the application developer can accomplish the task of building and maintaining information systems.

Skill sets required for CSE graduates for becoming a database administrator:

* Very good knowledge in the field of database management system. Every university offers one or more courses at undergraduate level for DBMS.
* Very good knowledge in installing DBMS softwares/upgrades, database/users/accounts creation/deletion and maintenance, disk space allocation and management, database backup/restore/migrate, database optimization and tuning, database security etc.
* Good knowledge in database constraints, SQL, indexing, file structure, Database curser, trigger, stored procedures etc.

Skill sets required for database analyst/developer:

* Expertise in the Database Management System (DBMS) knowledge. Every university offers a detail DBMS course. This includes database constraints, in depth SQL including dynamic SQL, indexing, file structure, database curser, trigger, stored procedures etc.
* Good knowledge in database administration.
* Good programming knowledge is required. Programmers should have good grasp on programming knowledge.

Scope of Work : All multinational companies, banks, Telecommunication companies recruit database administrator/ developer.

Web Development

Generally speaking, Web Development is nothing but working on the technical aspects of a website. A Web Designer is the person in charge of the visual design and layout of the website, and the Web Developer takes that design and vision from a static design to a fully working website that is online and available to the world.

To become a Web Developer, one needs to master the following qualities:

* Good programming knowledge is a must. Specially one should have good object oriented programming knowledge.
* Good Database Management System (DBMS) knowledge. Every university offers detail DBMS course. This includes database constraints, in depth SQL, indexing, file structure, Database curser, trigger, stored procedures etc.
* Good knowledge in HTML, CSS, Javascripts, PHP, ASP.NET, frameworks. Though these topics are not directly taught in university but there are many sources where students can learn by themselves.

Scope of Work: Most of the software companies have teams who work with web development tools. In Bangladesh, most of the software companies work with web-based technologies.

Software Testing

Software Testing is a process of rating properties of a computer system/program to decide whether it meets the specified requirements and produces the desired results. In process, you identify bugs in software product/project. Software Testing is indispensable to provide a quality product without any bug or issue.

Currently, there are 5 major mobile platforms, each with its own core language(s) and development environment:

Mobile Platform	Core Language	Dev. Environment	Mobile Devices
Android	Java	Eclipse	Multiple Vendors
iOS (Apple)	Objective-C	Xcode	Apple Devices Only
RIM (Blackberry)	Java	Eclipse	Blackberry Only
Symbian	C++	Multiple choices	Multiple Vendors
Windows Mobile	C#	Visual Studio 2010	Multiple Vendors

Some main skill sets of a Software Engineer include but not limited to:

* Very good knowledge on Software Engineering. There is detailed course of Software Engineering at the university level.
* Good knowledge on computer architecture and system.
* Good knowledge in all undergraduate level CSE courses. Because one needs to have a good overall knowledge about CSE courses to become a good QA.

Scope of Work: It is a necessity that a software company should have Quality Assurance teams parallel with development teams. They work with the products developed by the developed teams.

Mobile Application Development

The latest mobile devices and applications are changing the way we communicate, do business, and access news and entertainment. Businesses, consumers and programmers have embraced this innovative medium, making mobile application developer one of the most demanding and fastest growing IT career paths. Mobile Application Developers find it reasonably fun and satisfying as they enjoy the visual aspect of building something, and they feel like they are actually developing some professional skills as well.

To become a Mobile Application Developer, one needs to master the following qualities:

* Grow expertise in the programming languages particularly in C, C++, C# and Java which are core courses at undergraduate level.
* Good knowledge in on Web Design and Development using HTML, CSS and JavaScript which students require to develop university projects.
* In parallel students need to achieve knowledge in User-Interface (UI) & User-Experience (UX) Design Training alongside their university studies.

Scope of Work: Mobile Application Development is an emerging field. New companies are coming into market and opportunities are increasing day by day in both home and abroad.

Cloud Engineering

This is closely related to DevOps job. Cloud Services (like Amazon Web Services) have their own data enters at different countries in the world. From those they cell platform as a service upon which developers deploy their applications. The main advantage is scalability and high availability. Start-up companies often start with cloud services to have a quick look if they can sustain with their business strategy. Currently AWS is leading the world in offering cloud platform.

To become a "Cloud Engineer" one needs to master following qualities:

* Good knowledge on linux OS, specially on process, how is a linux box being watched etc.
* Good knowledge on networking.
* Good knowledge on how system works - like how a database works as software, which ports are used, what the configuration file means, where log goes etc.
* For advanced level - knowledge on cloud services, how they scale, how they create cluster and how to monitory them.

Scope of Work: Many software companies seek cloud engineers in DevOps role. Start-up companies values high for a cloud engineer.

System Administration

This job is a combination of Network Engineering and Database Engineering. He/she looks the overall system of the organization. Students should gain knowledge mentioned in above.

Game Development : Basically this is a subset of software development. But it focuses only on the game related development.

To become a Game developer, one needs to master the following qualities:

* Students must have extreme passionate about game and as well as all the qualities mentioned above to become software engineer.

Scope of Work: There are lots of opportunities in gaming industries especially outside.

SEO Specialization

Search engine optimization (SEO) is the process of affecting the visibility of a website or a web page in a web search engine's unpaid results—often referred to as "natural", "organic", or "earned" results. In general, the earlier (or higher ranked on the search results page), and more frequently a site appears in the search results list, the more visitors it will receive from the search engine's users, and these visitors can be converted into customers. SEO may target different kinds of search, including image search, local search, video search, academic search, news search and industry-specific vertical search engines.

To become a SEO specialist, one needs to master the following qualities:

* Should have overall good knowledge in undergraduate courses.
* Students should have dedication, reliability, honesty and willingness to work as a team.

Business Analysis

A business analyst is someone who analyzes an organization or business domain (real or hypothetical) and documents its business or processes or systems, assessing the business model or its integration with technology.

* Students who have a plan to become a business analyst should have business knowledge parallel to technical knowledge. Students should have a plan to study MBA and short courses on business for higher studies.

Scope of Work: All multinational companies, banks, Telecommunication companies recruit database administrator/ developer.

Government Sector/Jobs:

Graphics Designing

Graphic designers create visual concepts, by hand or using computer software, to communicate ideas that inspire, inform, or captivate consumers. They develop the overall layout and production design for advertisements, brochures, magazines, and corporate reports.

* Students have to be creative in this field. Students who want to develop career in graphic design should have significant knowledge in image editing and animation.
* Working knowledge in Adobe Creative Suite, JavaScript, jQuery, HTML5.

Scope of Work: Lots of opportunities in Cartoon and Movie industries, Game companies, Software interface design, Web design, and User Interface (UI) design etc. in both home and abroad.

Outsourcing and Freelancing and Entrepreneurship

Student who wants outsource his/her skills to outside world should have good communication skill and sound technical knowledge, especially programming. Even students can give their own companies (Entrepreneurship). They can work solely (freelancing). Bangladesh government is providing lots of benefits to establish a proper ICT environment in Bangladesh. Students can know about the facilities that government is providing and make most effective use of this opportunity. For example, the government of Bangladesh signed a financing agreement with the World Bank for the Leveraging ICT for Growth, Employment and Governance Project (LICT project). The project is aimed to train the students in different technologies. The project aims to create an estimated 30,000 direct jobs in the IT and ITES sectors, which has the potential to create up to 120,000 indirect jobs, and expects to increase the IT and ITES industry revenue by over $200 million by January 2018. Among the direct jobs 9,000 will be for women.

Career Counselling

Every university should have a central counselling team to help and guide the students. All renown universities of the world have career counselling teams. But in our country we are lacking of this concept. Very few universities of Bangladesh have career counselling teams. We need career counsellors who will guide, motivate and lead the students to find the best career path. University teachers have to give dedicate time and effort for career counselling. Teachers know best about students' potential. If students are more inclined to R&D teachers can guide them about planning of future and higher studies. If they are fit for job market and industry teacher may help them to find the proper job.

Industry Collaboration

So many discussions have already been discussed regarding this issue in so many times and in so many places. Every university has some industry collaborations but it has to be increased and effective. Students can visit industries by which they learn about working environment and technology. Industry people can come to university premises and can provide guidelines to the students.

Collaboration of different Association

Universities can associate with different organizations who provides job specific skills to the students. Different associations provide training on networking, database, testing, security etc. Association can arrange trainings, workshop and seminar on a regular basis by which the students can find guidelines for their future career life.

Contest

Students have to be motivated and encouraged to participate on Programming (for example NCPC, ACM-ICPC) and other contests (for example hackathon). By participating these contests, students can gain in-depth knowledge and skills. Then they can achieve the capabilities of deciding future career by themselves.

Successful Alumni and Community discussion

A person who has already reached to top position in the organization knows best how he/she achieved and reached the goal. Such person can provide best guideline to the students. Universities should invite such successful people. A healthy discussion or seminar with the students may take place. Students will be motivated and gain knowledge about successful career paths.

Internship

Internship is generally provided to final year students or the students who have just completed the graduation. Internship provides guidelines and students can gain real life knowledge in the intern period. This knowledge will give them a foundation for their future career path ◘