

CSCI to Career Pathway
Career Development Modules

A Primer for Students Interested in Pursuing
First Destination Roles in Technology

CSCI to Career Pathway

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Career pathways are an individually determined journey. This document is intended to delineate several of the traditional career pathways for students majoring in computer science (CSCI) within a liberal arts academic environment as a helpful tool for students to determine and design their first destination strategies and tactics. Contained in this document are:

- Middlebury College's Learning Goals for Computer Science Majors;
- Typical Career Roles and Pathways that may be relevant to CSCI majors/disciplines;
- Three Stages in the Campus to Career Pathway;
- Resources for Students during their career exploration process; and
- CCI Career Exploration Modules.

The following content has been developed from many sources including: the Computer Science department at Middlebury, alumni and parent members of the Middlebury Professional Network (MPN), many technology industry employers, as well as, other industry-related sources.

The Big Picture

The United States is the largest tech market in the world, representing one-third of the total global market. It represents an industry which accounts for the highest number of fastest growing companies. The Internet of Things (IoT) now links millions of devices that were previously unconnected to the web. Technology sector reports indicate that the number of internet-connected devices will hit 50 billion by 2030. Organizations of all types (for profit, non-profit, public sector) will need to deploy AI within their work activities within the next five years to continue to succeed in their respective areas of expertise.

Notwithstanding a robust job market for careers in the technology field, securing an internship or full-time position is a very competitive undertaking which will require commitment on your part: commitment of time in your busy schedule, as well as, quality of effort.

There are many paths to a rewarding career in technology. Some graduates will pursue a career with a large enterprise or a start-up, while others may prefer small community-based employment. Still others will elect to become educators.

A few careers in technology require post-graduate schooling, e.g., a PhD to become a Data Scientist. It's not uncommon for students to work in their prospective field for a couple of years before entering graduate school, testing their interests and learning valuable skills. Language skills can be immensely useful and represent a distinguishing characteristic in your candidacy for internship and first destination career roles.

The best ways to affirm your career interests are to speak with others who have experience with the career roles you are exploring (family members, friends, alumni) and by doing internships involving the knowledge and skill sets generally required in those career roles. Generally, internship and job seekers prove most successful when they are able to relate their academic achievements, extracurricular accomplishments, work experiences, personal motivations, and relevant technical and soft skills to the career roles sought. See some interesting ways Middlebury alumni have applied their CSCI majors to engage the world with the [CSCI Major Guide](#).

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Learning Goals for the Computer Science Major

Source: Middlebury CSCI department page

- I. A student graduating from Middlebury College with a Computer Science major will:
 1. Have critical thinking skills to solve problems by developing and implementing algorithms.
 2. Be able to analyze the inherent complexity of computational problems as well as the complexities of their solutions.
 3. Be able to design, implement and test computer programs that solve substantial computational problems.
 4. Be able to communicate clearly in written and oral form.
 5. Be able to work effectively on a team.
 6. Be able to recognize, identify, and make informed judgements about societal and ethical issues that arise from the uses and development of computing technology.

- II. A student graduating from Middlebury College with a Computer Science major will also have a solid knowledge and understanding of the following concepts:
 1. Abstraction to manage complexity.
 2. Algorithmic problem-solving: an ability to design, code, analyze, and prove the correctness of algorithms using recursive divide-and-conquer, dynamic programming, and greedy approaches.
 3. The conceptual organization of computers—including both computer architecture (the hardware level) and operating system issues.
 4. Data storage on a computer—including the digitization of analog information.
 5. Computer programming—including working knowledge of at least two programming languages in different paradigms.
 6. Models of computation—including NP-completeness and computability and the practical significance of both.
 7. Recursion and induction.
 8. Data structures: an ability to use and implement fundamental abstract data types including queues, stacks, balanced search trees, hash tables, and graphs.
 9. Applications of computing: an understanding of how computers, algorithms, programs, and/or data structures are used in several application areas.
 10. Responsible computing: an understanding of the societal context of computing, including bias within models and algorithms, the impact of a lack of diversity within datasets and development teams, and the overall role of algorithms in shaping daily life.

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For students entering Middlebury in Fall 2020 or later, requirements are as follows:

Required for the Major in Computer Science (11 courses):

1. CSCI 145 – Introduction to Computing or 150 – Computing for the Sciences
2. CSCI 0200 – Math Foundations of Computing,
3. CSCI 0201 – Data Structures,
4. CSCI 0202 – Computer Architecture,
5. CSCI 0301 – Theory of Computing,
6. CSCI 0302 – Algorithms and Complexity,
7. four CSCI electives numbered 303 or higher, e.g.,
 - a. CSCI 0311 - Artificial Intelligence
 - b. CSCI 0312 - Software Development
 - c. CSCI 0313 - Programming Languages
 - d. CSCI 0315 - Systems Programming
 - e. CSCI 0318 - OOP & GUI Application Dev
 - f. CSCI 0321 - Bioinformatics Algorithms
 - g. CSCI 0333 - Quantum Computing
 - h. CSCI 0390 - Spatial Agent-Based Modeling
 - i. CSCI 0401 - Computational Complexity
 - j. CSCI 0414 - Advanced Operating Systems
 - k. CSCI 0416 - Parallel Computing
 - l. CSCI 0422 - Geometric Modeling
 - m. CSCI 0431 - Computer Networks
 - n. CSCI 0433 - Compiler Design
 - o. CSCI 0435 - Embedded Systems
 - p. CSCI 0450 - Fourier Signal Processing
 - q. CSCI 0451 - Machine Learning
 - r. CSCI 0452 - Image Processing
 - s. CSCI 0453 - Computer Vision
 - t. CSCI 0454 – Biometrics
 - u. CSCI 0455 - Drone Robotics
 - v. CSCI 0461 - Computer Graphics
 - w. CSCI 0465 - Information Visualization
 - x. CSCI 0466 - Usable Mobile Interfaces
 - y. CSCI 0467 - Generative Art
 - z. CSCI 0500 - Advanced Study
 - aa. CSCI 0701 - Senior Seminar
 - bb. CSCI 0702 - Senior Thesis
 - cc. CSCI 1005 - Crash Course/Systems Security
 - dd. CSCI 1007 - Human Genome Analysis
 - ee. CSCI 1012 - Bias, Belonging, Power in Tech
 - ff. CSCI 1015 - Intro to Rocket Propulsion

One elective can be substituted with MATH 216, MATH 218, or MATH 228.

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Career Roles and Pathways

There are several career pathways in the tech industry for students majoring in computer science. Broadly speaking, one can divide the computer science career role universe into two pathways, one which is technically focused and the other which is more focused on customers/users of products and services. In both cases, a strong foundational preparation in data structures, algorithms, programming languages, and math coursework will prove most beneficial. A few of the classic entry level roles in the broad-based tech industry are described below, many of which are also involved in AI, machine learning, and AR/VR applications (note: specific role titles may vary and over time new entry-level roles will undoubtedly emerge as technology continues to evolve):

Technically focused roles:

Front-end Developer: A software engineer who specializes in the development of the user interface (UI) is called a front-end engineer. The user interfaces include visual elements like layouts and aesthetics. Front-end engineers deal with [cross browser compatibility](#) and fixing bugs to ensure an excellent visual presentation of the UI. Thus, they work with the code that runs on different user devices, browsers, and operating systems. Developing a responsive application also comes under this. A few of the common qualifications include:

- Experience with data structures or algorithms gathered from inside or outside of school or work.
- Experience programming in three or more of C, C++, C#, Java, JavaScript, Go, Python or similar.
- Experience with web application development, UX, Unix/Linux environments, mobile application development, distributed and parallel systems, machine learning, information retrieval, natural language processing, networking, developing large software systems, or security software development.
- Suggested coursework:

Back-end Developer: A software engineer who specializes in the underlying logic and performance of the application is called a back-end engineer. They often design and implement the core logic, keeping in mind scalability for server-side development. They do this by integrating with data systems, caches, email systems using Application Programming Interfaces (APIs). Typically backend engineers also have expertise in building aps, distributed systems, queues, parallel processing algorithms, etc. A few common qualifications include:

- Experience programming with one or more: Java, C, C++, Ruby, Perl, Python, Scala, Go
- Familiarity with frameworks: Spring, Micronaut, Django, Flask
- Basic understanding of data structures and algorithms, e.g., linear and binary search, hashcode, data sorting, stacks, queue, and lists.
- Familiarity with database management systems, e.g., PostgreSQL, Oracle, SQLServer, AWS
- Understanding the basics of the Linux operating system
- Suggested coursework:

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Full-stack Engineer: A software engineer who is fluent in front-end and back-end skills and responsibilities is referred to as a full-stack engineer. These individuals possess all the skills necessary to create a fully functional web app, from the front-facing user experience to the complex systems behind it. A few common qualifications include:

- Familiarity with UX and UI frameworks
- Experience programming with CSS, JavaScript, HTML, Java, C, C++, Ruby, Perl, Python, Scala, Go
- Knowledge of HTTP and REST protocols
- Experience with one or more: Kubernetes, Docker, Apache Mesos, Jenkins, HashiCorp stack (Terraform, Vault, Consul, Nomad)
- Suggested coursework:

DevOps Engineer: Software engineers who are familiar with the technologies required for the development of systems to build, deploy, integrate and administer back-end software and distributed systems are called DevOps engineers. DevOps (development and operations) engineers apply processes and methodologies to streamline product development, improvement and maintenance as well as facilitate communication between development and operations teams. Their work requires familiarity with the processes used by back-end developers to build, deploy and integrate across technologies, like cloud computing services. They mostly manage the application infrastructure, i.e., the database systems, servers, etc. A few common qualifications include:

- Experience programming with JavaScript, Java, C, C++, Ruby, Python
- Experience with one or more: Kubernetes, Docker, Apache Mesos, Jenkins, HashiCorp stack (Terraform, Vault, Consul, Nomad)
- Familiarity with cloud storage applications such as OneDrive, GitHub and Amazon Web Services (AWS)
- Suggested coursework:

Security Engineer: A software engineer who specializes in creating systems, methods, and procedures to test the security of a software system and exploit and fix security flaws is called a security engineer. This type of developer often works as a “white-hat” ethical hacker and attempts to penetrate systems to discover vulnerabilities. A few common qualifications include:

- Knowledge of IT Security concepts and fundamentals
- Excellent written and oral communication skills
- Knowledge and/or experience with IT system administration or network administration and troubleshooting
- Experience with Operating Systems – Linux/ macOS/ Unix / Windows
- Knowledge and understanding of TCP/IP Network Fundamentals
- Knowledge and understanding of basic routing protocol fundamentals
- Knowledge of Firewall Fundamentals and/or experience with Firewall administration and management
- Experience programming with Python, Ruby, C, C++, Java
- Suggested coursework:

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Hardware Engineer: Computer hardware engineers research, design, develop, and test computer systems and components such as processors, circuit boards, memory devices, networks, and routers. They ensure that computer hardware components work together with the latest software.

- Bachelor's degree in Electrical Engineering, Computer Engineering, Computer Science, or a related technical field.
- Experience in one or more of the following areas: Hardware System Integration, Signal and Power Integrity, RF System Validation, Bluetooth, Wireless Communications, Product Design, Test, Computer Architecture, Microarchitecture, Digital Design Verification, Digital Circuits, ASIC Physical Design, Electronic Design Automation, FPGAs, Embedded Systems, Compilers, Hardware/Software Co-design, Emulation, Memory Systems, Design methodology.
- Experience working on consumer hardware projects.
- Experience with wireless communication interfaces and sensors
- Experience with board layout (e.g. working with CAD/PCB design), Systems Integration, RF, Hardware Test, or Antenna
- Suggested coursework:

Quality Assurance Engineer: A QA engineer, also referred to as a "software engineer," tests, reviews, assesses and writes software to validate the quality of an application. These individuals create automated tests, tools and methods to make sure systems are running as expected, catching errors and working to account for their solutions. A few common qualifications include:

- Understanding of QA methodologies
- Experience writing automated tests (Cypress, Selenium, Ruby, Javascript)
- Analytical, organizational, and time-management skills with high attention to detail
- Strong interpersonal and communication skills to collaborate with development teams and product managers
- Suggested coursework:

Embedded Systems Developer: software integration engineers use coding languages to program hardware like consumer devices, home security alert systems, electronics, interfaces, real-time systems and serial data transmissions. A few common qualifications include:

- Coursework in software development, embedded systems, product development, system software, engineering services, and programming.
- C, C++, Assembly, Java, proprietary technologies/frameworks/toolkits
- Suggested coursework:

UX Engineer: A user experience (UX) engineer builds and designs digital products like websites and apps while using UX principles. UX engineers generally deal with the front end of these products—the user-facing parts that people interact with, like the buttons, layouts, and flow of the interfaces. A few common qualifications include:

- Experience in JavaScript and frontend frameworks (Angular2+, Vue, React)
- Experience in development or prototyping.
- Experience coding in Go, Python, C++, Java, Kotlin, Objective C, Swift or similar
- Familiarity with design tools and with all the things in frontend engineering - with some aspects of Product Development like defining requirements
- Suggested coursework:

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Game Developer: a game developer, has specialized knowledge in designing and implementing gaming systems that are both engaging and interactive. They use creative skills like storytelling and world-building to program complete environments in which a game can take place. From setting to props to characters, game developers code all the factors that create the gameplay experience for a user. A few of the common qualifications include:

- Familiarity with DirectX, OpenGL, Unity 3D, WebGL, C, C++, Java, Swift, JavaScript, HTML5
- multimedia frameworks, 3d model frameworks
- Proficient with programming languages, including C++, Java, and C
- Experience building libraries and APIs
- Knowledge of the latest gaming trends
- Strong artistic and technical skills
- Design and creativity
- Suggested coursework:

Customer/User Focused Roles:

UX Designer: A UX designer makes products and technology usable, enjoyable, and accessible for humans. UX designers tend to work as part of a wider product team, and will often find themselves bridging the gap between the user, the development team, and key business stakeholders. As a UX designer, it's your job first and foremost to advocate for the end user or customer. Whether you're designing a brand new product, coming up with a new feature, or making changes to an existing product or service—the UX designer must consider what's best for the user and the overall user experience. A few common qualifications include:

- Currently pursuing a degree in Design (e.g., Interaction, Graphic, Visual Communications, Product, Industrial, etc.), Human-Computer Interaction (HCI), Computer Science (CS) or a related field.
- Experience with industry standard design tools (e.g., Photoshop, Illustrator, Sketch, InVisio, Principle, etc.).
- Experience in designing usable interfaces.
- Experience working with web or mobile based technologies such as HTML, CSS, JavaScript, Android Studio, XCode, etc.
- A design portfolio demonstrating design principles for web and/or mobile platforms.
- Suggested coursework:

Data Engineer/Data Analyst: a data engineer develops software programs that analyze information. This often puts them in charge of statistical analysis, machine learning, data visualization and predictive modeling, providing an organization with metrics that can help determine how a product will grow to fit the needs of the business. A few common qualifications include:

- Some Engineering experience and or project course work using large data systems on SQL, Hadoop, etc.
- Proficiency using one or more programming or scripting language to work with data such as: Python, Perl, or C#.
- Some experience and or project course work performing data analysis and applying statistics working with tools such as: Excel, R, MATLAB, AMPL, or SAS.
- Proficiency with data visualization/reporting.

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- Coursework in machine learning encouraged
- Strong interpersonal and communications skills.
- Suggested coursework:

Project Manager: Project managers are responsible for planning, organizing, allocating resources for, budgeting, and successfully executing organizations' specific IT goals. Such projects might include: Software and app development; projects around business analytics and data management. A few common qualifications include:

- software development lifecycle, scheduling, forecasting, communicating
- Organization skills, time management skills
- Some experience with project management concepts and tools
- Excellent written and oral communication skills
- Excellent interpersonal skills
- Suggested coursework:

Technical Writer: Technical writers often create diagrams to show users how a product works. Technical writers, also called technical communicators, prepare instruction manuals, how-to guides, journal articles, and other supporting documents to communicate complex and technical information more easily. A few common qualifications include:

- Facility with technology
- Ability to write clearly
- Talent in showing ideas graphically
- Patience in problem-solving/troubleshooting
- Ability to interact with SMEs (Subject Matter Experts)
- Suggested coursework:

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Three Stages in the Campus to Career Process

With appropriate academic exposure and an understanding of the various types of roles and associated qualifications, candidates are in a position to best position themselves to secure their desired internship and first destination roles. There are three stages in the campus to career process: ***Researching and Preparing; Applying and the Selection Process; and Performing the Job/Internship***. This primer will focus on the first two stages to help students gain entry to their first destination in their career journey.

Researching and Preparing

Before students start applying to the vast amount of opportunities in the technology field, they should first “do their homework”. This means understanding what the various types of entry-level roles there are (the previous section can be a starting point for this research). The basic idea is to understand what the role does, the qualifications for the role, and destinations that this first entry role can lead to from a medium and longer term perspective.

In addition to looking for this information in various job descriptions available in many job boards, students should also talk with other individuals who are familiar with these roles. Great places to find these individuals are within your own personal networks (family and friends), as well as, the Middlebury Professional Network – many sources of career intel and advice can be found on Midd2Midd within the MiddConnect feature. More information on the whys and wherefores for talking with individuals within your available networks is discussed below.

Next, with this research information, students should then map their own experiences (academic, extracurricular, work, and life) to the requirements of various roles; this mapping can help in two ways: 1) help you prioritize roles that may be a good fit for you and 2) help you to tune up your resume and cover letter content to more accurately reflect your qualifications for a given role to which you may be applying. Students should meet with one of CCI’s PCAs (Peer Career Advisor) to “tune up” their resumes for the next stage in the process.

Applying and the Selection Process

The hiring process for most employers is about selecting the “right person” for the position to be filled. As you undertake the phases in this stage, keep in mind that recruiters and hiring managers are evaluating candidates on three elements: competencies (can you do the job?), motivation (why do you want to do this job and with our firm?), and fit (do you have the personal qualities and a mental mindset that are consistent with the mission, values, culture of the employer). So knowing that these are the elements on which you will be evaluated, make sure that your application materials and your interview responses address these elements. The more you can answer the questions above for each element, the lower the hiring risk for the employer, and the higher the probability of success for you in being hired.

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Applying for Career Opportunities:

A few thoughts on the application process. First, your mentality should be *quality over quantity*. It's not about the volume of applications you have submitted but rather choosing your targets (job role and organization) wisely and connecting the dots (your fit with the role and organization being sought) for anyone reviewing your application materials. The work that you did in researching and preparing your resume and cover letter (and any other application materials) so that they align clearly with the qualification sought by the employer/role to which you are applying will raise your profile with the recruiter/hiring manager; the easier it is for them to see that you are perfect for the role, the better.

Secondly, generally, you should only apply to those opportunities for which you have had some communication (in person, virtually, or email) with someone within that target organization. There are three main strategic reasons for making the effort to communicate with someone within the target organization:

1. You will be able to gain important intel about the role and the organization that can help you determine if it is a good fit for you, and that intel can help you better tailor your application material with insightful content;
2. The individual with whom you communicate may be able to have an influence on whether your application is seen by the recruiting and/or hiring managers and advocate for you; and
3. Your profile within the recruiting and/or hiring manager's mind will be raised relative to the other many candidates who have not demonstrated this initiative and motivation to speak with people employed in the organization.

This is where your efforts in the *Research and Preparation* stage to speak with people in your networks pays off.

Everything up to this point has been about getting an interview; next comes getting to an offer! The really good news is that much of the work you did to this point will be valuable to you in the selection process as well.

The Selection Process:

Typically there is a multi-phase interview process for most software engineering roles in the industry. The specific types and focus for the interview phases is described below; the actual number of each type of interview may vary from organization to organization. One other "habit" of the industry to take note of is that unlike other industries, e.g., finance and management consulting, many tech industry employers take their time getting from the initial screening of applications to an offer, in some cases many weeks. The fundamental mindset is that they would rather take their time making a good hire decision rather than make quick bad hire decisions.

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Preparing for Your Interview:

- **Do Your Research** - Don't stop at understanding the position you're interviewing for. Learn about the employer and how the position contributes to helping the employer to achieve its mission. You should understand what's happening in the tech industry and what the employer is doing well, and how they may differentiate themselves from their competition. Learn about the team with whom you will be interviewing: understand what they do, and reflect on how and why you want to be a part of it. This is also a chance for you to make sure that the opportunity is what you are looking for. Make sure to prepare questions to ask during your interview.
- **Know Your Core Competencies** - The interviews will include competency-based questions, as well as questions about your resume. Keep the core competencies in mind. Think of examples you can share or incorporate into your conversation. For example:
 - Collaboration. Communicating effectively within the team and across teams.
 - Drive for results. Working tenaciously to deliver on commitments, constantly seeking bigger challenges, holding yourself and others accountable.
 - Customer focus. Our mission at Microsoft is to empower every person and every organization to achieve more.
 - Influencing for impact. Successfully persuading and influencing others with effective communication.
 - Judgment. Effectively scoping complex problems and making knowledge-based decisions.
 - Adaptability. Ability to deal with ambiguous and uncertain situations or problems with agility.
- **Understand your Fit**
- **Articulate your Motivations**

The interview phases generally consist of some form of **Screening Interview** to kick off the selection process, one or more **Technical Interviews** to assess your job role competencies, and several **Behavioral Interviews** to assess your motivations and fit with the role and organization.

Screening Interview. The screen can consist of two types. One type focuses on validating your application content, e.g., "walk me through your resume" and is typically conducted by a recruiter or is an online set of prompts. The second type is a more technical screen which is increasingly being conducted as an online problem set. Some employers may ask the candidate to complete a "take-home" assessment to understand a candidate's decisions and self-direction while programming against a problem given a specific set of constraints. The problem sets here are generally closely related to the role for which the candidate is applying.

A candidate must pass an interview screen to get a chance to speak with the hiring manager and others involved in the selection process. The screen exists merely to ensure that the company and the candidate are working within the same ballpark compensation, role expectations, and general technical skillsets.

Technical interviews are problem-solving focused and cover technical excellence and core competencies. You'll be assessed on your knowledge of technical principles and methods, as well as on how you approach problem-solving, your technical agility, and your ability to think strategically to solve complex problems. Generally, the technical interview process will evaluate you on all the following:

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- Problem Solving - Interviewers want to see how you break down information and navigate through problems. They also want to learn more about how you think, how you put yourself in the customer's shoes, and how you make choices. Ask clarifying questions for any ambiguities and come up with a plan before you implement a solution. Managing your time is important, given the short 45-minute interview round.
- Design – This assessment is also looking for engineers who can work not only with an existing platform, but who also understand what it takes to build or design a new system or platform from scratch.
- Coding - Demonstrate best practices and ensure your code is clean, concise, and bug free. You'll be asked to code only in the language you're strong in. You'll be using a third-party coding tool where you can run and compile your code. ***Practice, practice, practice.*** This can't be overstated. **This is a critical part of the interview.**
- Algorithms - Interviewers want to see what types of algorithms you use to implement your solutions. Recursion can be a common pattern for some types of questions. You should know the details of at least one $n \cdot \log(n)$ sorting algorithm, preferably two (for example, quicksort and merge sort). You'll need to explain the complexity of your algorithm.
- Data Structures - These are some common data structures that tend to come up often in questions: arrays and strings, queues and lists, linked lists, trees/tries, hash maps/hash sets, graphs. You should be familiar with when to use each one and describe their pros and cons.
- Testing – It is possible that your interviewers will expect you to do some testing or show you understand how to test your solutions. When you finish your solution, don't forget to test it before you say "done!" Remember, your basic responsibility is to make sure the feature you've coded works. Then, consider all the factors that could cause problems. What are the security implications of the feature? How can you stress this code? What are the boundaries and error conditions?

Depending upon the role you are seeking, interviews may touch upon the content below:

- *System Design* - Knowledge of distributed systems, SOA, and n-tiered software architecture is very important in answering system design questions. Resiliency, high availability, auto-scaling, replication, CAP theory, partitioning, all may be included. If you don't work with these concepts regularly, make sure to review them before your interview.
- *AI/Machine Learning* - Experience with machine learning models and training pipelines to perform model evaluation, profiling, and optimization; AND Ability to apply, implement, and/or develop AI/ML algorithms and principles to solve complex problems.
- *Data Science* matters, including:
 - Data Manipulation/Fluency/Data Insights and Exploration. Can you deal with data at various dataset levels, and how do you reason with the data as scale of data increases, run time, and so on.
 - Probabilistic Thinking/Mathematics. There may be specific math or statistics questions and open-ended questions. We're looking for how you process problems; how you analyze, clarify things, and draw solutions; and also how investigative you are about the data or results you have.

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- Statistics. Linear regression, time-series complexity, hypothesis testing/probability (t tests/p-values, and so on).
- *Computer Networking* - Show your understanding of the layered model, application-specific protocols like HTTP, security-related protocols like TLS, network-level protocols like TCP and IP, and routing protocols like BGP and ISIS.

Behavioral Interviews

“Tell me about a time when . . . ” or “Describe how you . . . ” are how most behavioral interview questions begin. This provides you with an opportunity to tell a relevant “story” that highlights your skills or how you have demonstrated competency in an area of importance to the position you want. We strongly recommend you use the STAR framework (page 9) to clearly and concisely communicate concrete examples from your past experiences. Think through examples of situations where you have demonstrated certain behaviors or qualities for which the organization is searching (e.g., teamwork, analysis, creativity, etc.) and practice telling your story. For more general interview prep guidance, check out the [Interview Preparation Guide](#) among the many resources available on the CCI website.

In a software engineering context, this set of interviews is typically to assess the candidate’s motivations and to assess the candidate’s future potential with the employer. This interview is where the candidate will be asked questions related to the core values of the organization. Many engineers make it through the technical assessments, but cannot speak to what it means to be a collaborative and supportive teammate on an engineering team. This element is where Middlebury students may have an advantage with more of a liberal arts background. Good energy, the ability to tie your personal motivations to the employer's mission and values and being prepared with really thoughtful questions about the engineering experience will go a long way here in standing out compared to other candidates.

This set of interview is usually conducted by a Product Manager or some sort of UX / UI Designer. This interview assesses the candidate's ability to work effectively with non-technical stakeholders. Specifically they need to demonstrate efficacy in communicating complex technical tradeoffs to the non-technical people that need to make decisions around those tradeoffs (sequencing, roadmaps, etc.). Generally the interviewer is looking for ways that the engineer ties their work back to the business and the business' overall goals. Engineers who incorporate this thought into their work over time are more likely to be promoted into managerial roles.

And that's the interview process! Make sure that you send follow-up thank you messages to each and every person with whom you interviewed throughout the selection process. Also, be sure to keep the network individuals who have helped you to this point informed as to the status of your search.

It is reasonable to follow-up with the recruiting manager/coordinator (likely the first person who contacted you to begin the interview process) regarding the status of your candidacy one to two weeks following your final interview; hopefully, they will have already informed you as to what to expect regarding their selection decision at the conclusion of your last contact in the process.

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Resources for Students

The CCI technology advisor offers various resources and assistance to help students pursue career roles of their choice in the technology field whether in a tech company or any other industry, e.g., data analytics, software engineering, and non-technical roles. Several links for resources to help you navigate to your career role of interest and to pursue internship and first destination opportunities are provided in the content below. Explore your interests through your own research, meeting with a career advisor, and speaking with alumni who have experience in the industry and the roles of interest to you. Below are a few of these resources.

CCI Resources

In addition to the resource access you have through Handshake, check out a number of events, programs, and resources to help you navigate along your career exploration and development path through the [CCI Webpage](#) where you will find:

- [Events and Programs](#) to explore career fields and employers of interest;
- ["I want to"](#) find resources to support career exploration, find internships/jobs, resume building and interview prep;
- [Links to Handshake](#) which includes helpful resources, upcoming employer/career field events and job and internship postings;
- [Midd2Midd](#), Middlebury's online alumni community volunteers to help you get career field/role intel, as well as, an insider's perspective on the employers with which they have or currently work. You can also register for the MiddMentors program if you would like to develop a mentoring relationship with an alumni volunteer.

You should also consider subscribing to the weekly CCI [Technology Newsletter](#) which contains technology-related news items, upcoming events and opportunities of note, Top Resources for students interested in pursuing career opportunities in technology, and Stories from the Field where alumni in various career roles in a broad selection of employers provide their insights and advice through recorded interviews.

Resources for Those Interested in Technical Roles

- [Top Technical Career Roles](#)
- [Best Job Boards for Software Engineers](#)
- [Leetcode – a source for practicing technical interviews](#) which uses real sample questions from tech companies. This interview phase has taken a lot of heat from some folks in the industry as of late, but many of my sources say that candidates that have excelled in this area have been more effective on the job.
- Hacker news <https://news.ycombinator.com> is awesome for technical (and non-technical) things that engineers find interesting.
- <https://betterprogramming.pub/> just software / code related stuff. Pretty good content for beginners
- If you want to write the “front-end” of web software, this is an awesome resource: <https://egghead.io/>

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- [CareerFoundry info on UX/UI, Data Analytics, Web Development Roles](#) contains some great beginners info about these roles, videos, and articles

Resources for Those Interested in non-Technical Roles

e.g., product manager, program manager, technical writer, data analyst

The 10 Most Important Product Manager Interview Questions

The types of questions you can expect to be asked in a Product Management interview are pretty vast and varied. But in general, you'll probably be asked some of the following:

1. **What do you see as a Product Manager's main role within product development?**
2. **How do you stay user-focused?**
3. **What main changes would you make to [our product]?**
4. **How do you see your career developing in the next 5 years?**
5. **Tell us about a time you used data to influence an important stakeholder.**
6. **Tell us about a time you faced failure and how you bounced back.**
7. **How would you improve your favorite product?**
8. **What's your approach to prioritizing tasks?**
9. **Why do you want to work at [our company]?**
10. **Why do you want to be/what do you love about being a Product Manager?**

Questions will vary depending on the role, the company, and the industry, and the types of questions you'll be asked will change as you move through the interview process.

Check out the [The Ultimate List of Product Manager Interview Questions](#) article from Product School to help you better prepare for the interview.

- [A Few Non-technical Career Roles](#)
- [More Non-technical Career Roles](#)

For students thinking about graduate school

[Guide to Computer Science Degree Programs](#)

Technology Industry Trade Association

The Computing Technology Industry Association is an American non-profit trade association, issuing professional certifications for the information technology industry. It is considered one of the IT industry's top trade associations. <https://www.comptia.org/home>

Student Organizations

(You can find a complete listing of all of the student organizations through [this link](#))

[Middle Endian](#) is Middlebury's student led Computer Science club. It aims to cultivate community among Computer Science students and faculty, as well as complement the academic Computer Science curriculum on campus. Check out their website and events.

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[Underrepresented Students in STEM \(UR-STEM\)'s](#) mission is to normalize the participation in STEM classes and careers, bridge the academic gap in students from different backgrounds, and improve retention of underrepresented students in the STEM fields by providing support systems and essential resources for success.

[Women in Computer Science++](#) – The purpose of wiCs++ is to create a culture and space that welcomes historically underrepresented groups in the field of computer science.

[Middlebury Consulting Group](#) (MCG) is a non-profit student organization dedicated to providing consulting services to local businesses and nonprofits. MCG brings together students with distinct skill

Some general tips/suggestions:

- The most popular programming languages for web software startups right now are Node.js (JavaScript/Typescript), Python, Go, and Java. Stick to those if you are looking for the largest surface area of companies to apply to. Larger companies are open about what technologies they use. Read up on the ones you are interested in
- Most cloud-based software runs on unix-based servers or containers (even .NET runs on linux now)
- If you want to be involved in roles in AI, learn Python
- If you want to be involved in roles in VR/AR learn C++ or C# (Unity).
- Create a Github account and publish some projects as code examples for recruiters

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Career Exploration Modules

CCI has many programming formats which can support the creation of Career Development Modules within the CSCI to Career Pathway, including:

[Field Guides](#) Co-sponsored by departments, these Field Guides bring alumni back to campus virtually to share knowledge and experience related to their post-Middlebury careers and professional lives. (20 Field Guides to date)

[UpNext](#) Each UpNext event brings alumni in a specific industry to campus to give students an insider's understanding of that industry, available career paths, and info about roles and skills necessary to enter future jobs and internships. Last program on March 6, 2020, UpNext: Careers in Data Analytics. (over 200 students in attendance for day-long program)

[MiddVantage](#) The program is designed as a series of "episodes" both recorded and live that delivers a robust set of content, providing knowledge about a specific career field as well as skill development relevant to that career path. The series targets all class years. (7 series to date, over 3000 student views)

[Future Forward](#) *Futureforward* features several alumni and parents who are leaders in a variety of career fields, discussing their industry's current environment, their perspective on the future outlook for that career field, and action steps students can take now to position themselves for entry into those career fields. (over 1988 views and nearly 70,000 LinkedIn, Twitter, and Facebook Impressions)

[Student Treks](#) Hosted over breaks, these CCI-led trips are cohort experiences that provide students with an opportunity to explore a particular field of interest. CCI works with members of the [Middlebury Professional Networks](#) (MPNs) to plan meaningful experiences. Activities include but are not limited to the following:

- Job Shadowing opportunities with industry-specific alumni in various job functions and roles
- Reflection dinners
- Opportunities to engage with alumni and Middlebury parents
- Career Networking Reception for alumni and students

[Midd Gigs](#) CCI created and launched the Midd Gigs program in June, 2020, as a forum for Midd alums and parents to share short-term project opportunities with students to help students gain relevant experiences, build professional skills, and grow their career networks. Through the 2020/21 year, 107 alumni, representing 100 different organizations have offered over 150 gigs to our students.

Career Conversations are in person or virtual sessions conducted with professionals within the career field and students. Typically, these programs are structured involving one professional who focuses on a specific topic of interest (employer, career role, industry trends, or relevant technical skills) in a presentation format, allowing Q&A from a student audience.

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Based on these formats and information provided earlier in this document, CCI has developed the following outline of programming ideas to support students' career exploration activities. The specific format and timing of the programs will be determined each year based on various circumstances, e.g., college calendar, CSCI faculty interest, and availability of professionals to deliver content within the individual programs.

Overview of First Destination Roles

An alumnus/na professional within the industry provides students with an overview of the typical first destination roles for CSCI majors within the tech industry, as well as, the typical career path progression from that entry-level role. Discussion should include what differentiates the roles, what types of individuals are best suited for those roles, and the qualifications (academic and extracurricular) expected for these roles. Suggested timing is early spring semester to best prepare students for their internship and full-time recruiting seasons during the following fall semester.

Technical Interview Program

The Center for Careers & Internships (CCI) organizes practice technical interviews during the summer months for rising senior and junior students interested in software development and/or engineering roles (internship or full-time entry points for next year). The alumni technical interview coach:

- a. conducts a minimum of three practice technical interviews with their assigned student over the course of the summer;
- b. provides performance feedback to the student after each practice interview and additional preparation suggestions for the student to undertake before each session; and
- c. shares their perspectives on the software developer/engineer career space and important things the student can/should do to position themselves to successfully secure positions in the future.

This program is open to CSCI students applying for admission to the program. Each selected student will be paired with one alumni volunteer. Given the importance of candidate performance on technical interviews within the selection process, it is highly recommended that all CSCI students interested in pursuing software development/engineering roles apply for admission to the program.

The Selection Process

A professional familiar with the selection process within this career field will discuss the several stages within the process from application to hire, including the types of interviews, what recruiters/hiring managers are looking for in candidates, and how best to go about this process successfully. Suggested timing is early fall semester to best prepare students for their internship and full-time application development/submission during the following fall recruiting seasons.

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Directions in Computer Science Applied Areas

An alumnus/na professional within the industry provides students with an overview of a specific applied area within the industry. Discussion should include the scope of the functional area, what types of individuals are best suited for those roles, and the qualifications (academic and extracurricular) expected for these roles. Suggested timing are both the fall and spring semesters subject to interest and availability of professionals to deliver the content. There are many functional areas that could be covered in an hour-long program (in person or virtual) which discuss the dimensions and dynamics trends for that area. Separate programs could be delivered for any number of example areas of discussion including:

- AI
- Machine Learning
- AR/VR
- Data Science
- Research
- Quantum Computing
- Cyber Security

Software Engineering in Various Industries:

Alumni professionals with software development/engineering career experiences discuss the state of the career role within a given industry, providing students with an understanding of the roles within that industry, the key issues/problems addressed in that industry, and future career growth prospects. This content could be delivered as individual session by industry or in one set of sessions across multiple industries. Suggested timing are both the fall and spring semesters subject to interest and availability of professionals to deliver the content. There are several industries/applications that could be covered in an hour-long program or a full-day UpNext program (in person or virtual) which discuss the dimensions and dynamics trends for that area. Example areas of discussion include:

- eCommerce
- The IoT
- Green Economy
- Social Media
- Media & Entertainment
- Finance
- Government & Policy
- Education

Other programming ideas are welcome. Contact CCI if there is interest in exploring program ideas.