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<div align="center">Software Engineering</div>

      Software engineering is a branch of computer science field which involves the development, deployment, and maintenance of software applications for businesses and individual users. There exist many types of software applications, and, therefore, software engineering in itself has specializations such as game development, software integration, mobile development, and web development among many. With a growing demand for the automation of mundane tasks and the creation of applications for users to better interact with the services offered by businesses, software engineering has become a rewarding career. According to the United States Bureau of Labor Statistics (2023), 150,000 positions are projected to open each year for software engineers and quality assurance (QA) analysts, with the median salary being $124,200 annually across the United States, which is 268% higher than the median nationwide salary of $46,310. Software engineering is not an easy career to attain, since it often requires an academic degree, as well as related work experience to get a job as an entry-level developer. Certain strategies that may lead to a successful landing of a position in software engineering will be discussed, given that a candidate will be attending an online computer science degree at the California State University, Monterey Bay (CSUMB).

      While software engineering is a branch of its own, it still is an umbrella term that encompasses other sub-branches that were mentioned prior. Because of such diversity in specialization, there are many companies that are hiring for various positions, which generates the demand. Some of the most desirable tech companies to work for are Meta, Amazon, Apple, Netflix, and Google, known by their acronym MAANG (former FAANG). One of the main

reasons these companies are desirable targets for new and seasoned developers is the possibility for them to grow in their field being given stellar opportunities and high compensation. But the search is not limited to MAANG. One company that has recently been standing out due to its advancements in Artificial Intelligence and high-performance computing is NVIDIA.

The company was established by three electrical engineers - Jensen Huang, Chris Malachowsky, and Curtis Priem in April of 1993. Huang and Malachowsky are still at the company as Chief Executive Officer and Senior Vice President for Engineering and Operations respectively. Jensen Huang has worked for a chip manufacturer prior to venturing into his own company and he holds both a bachelor's degree from Oregon State University and a master's degree in electrical engineering from Stanford University (NVIDIA Corporation, n.d.). His early life, however, was not an easy one. Huang is an immigrant from Taiwan and, in when he was nine, he was sent to a school for difficult children in Tacoma, WA, where his job was cleaning bathrooms (The Immigrant Learning Center, 2022). But, as Huang claimed himself, the hardships in his youth helped him establish a strong work ethic. Chris Malachowsky has been an executive at NVIDIA and oversaw operations of different departments. According to the Executive Bios page on NVIDIA Newsroom website (n.d.), Malachowsky created 40 patented technologies in integrated-circuit design. Malachowsky holds a bachelor's in electrical engineering and master's in computer dcience degrees. Though no longer with NVIDIA, Curtis Priem has been a significant figure in innovation. According to the Rensselaer Magazine archive, Priem was known prior to NVIDIA for authoring 88 patents in graphics, as well as developing the first graphics processor while working for IBM (RensselaerMag, 2000).

NVIDIA started out as a Graphics Processing Unit (GPU) company with the goal of creating computer chips that would bring 3D graphics to gaming (NVIDIA, n.d. -a). In 1999, six

years after establishing the company, NVIDIA introduced the world's first GPU for personal computers. The company has come a long way since then, and now employs over 26,000 people across its multiple locations in North America (and one location in Brazil), with its headquarters located in Santa Clara, California (NVIDIA, n.d. -b). NVIDIA is mostly known for their NVIDIA RTX line of GPUs, which allowed for real-time ray tracing. Ray tracing is the technology that makes the light reflect realistically off surfaces in graphics, creating a more immersive experience in gaming and computer-generated imaging (CGI). AI technologies like leading neural networks for image detection (AlexNet) and large language models (ChatGPT) were all made possible because of NVIDIA's GPUs (Goldman, 2023). This is thanks to the parallel processing capabilities of the graphics cards, which allowed for deep learning algorithms and generative AI models to run efficiently. Parallel processing, also called parallel computing, is a process of running many subtasks simultaneously. This demonstrates how influential NVIDIA has become, with its hardware as well as its software making new technological endeavors possible.

Aside from the tech industry, healthcare also benefits from NVIDIA's innovations. What is called the Clara ecosystem by NVIDIA, is the suite of AI software that is used for research and analytics in biotechnology industry (NVIDIA Corporation, 2023). One of the software applications in the bundle is called BioNeMo. BioNeMo is a cloud powered AI library which allows for more efficient optimization and discovery of new drugs (Bonemann, 2023). It allows for designing new molecules and testing how a drug may affect humans all in the ecosystem itself, without the need for direct experimentation. NVIDIA Clara bundle is thus a major player since it could take decades to develop and approve new biopharmaceutical products without it, and, as a result, this kind of research may bring down its cost due to increased efficiency and,

theoretically, fewer ethical issues, since a lot of the experimentations will be done in the cloud. It is thrilling to witness what NVIDIA will bring about within the next decade and how its technologies will change the way people work around the globe.

Aside from its vigorous advancements in various technologies, NVIDIA is known to be one of highly desirable places to work. According to *NVIDIA* by Great Place to Work (n.d.), more than 97% of employees say that NVIDIA is a good company to work for, with 98% saying that they feel proud to work for them, 97% saying that the facilities facilitate their work dynamics, and at least 97% approving of the management. This is a promising statistic for a talented engineer who is in search for a job, since the national average satisfaction rate is barely 60% average, according to the same source.

Developing software applications for the purpose of facilitating the way humans operate is a rewarding endeavor. There is, however, a set of skills and milestones that a person must possess in order to land a job in the field of information technology. One meaningful requirement that is seen in many job listings is a bachelor's degree. A proof of higher education is first and foremost the proof that a person possesses discipline to perform to a set standard. To get the diploma, one must be able to prioritize tasks in terms of time commitment and difficulty. A bachelor's degree shows that a candidate can sacrifice their time, make compromises, practice discipline, and go out of their way to tackle difficulties along the way. Many technology-related jobs in the market list bachelor's degree in computer science or electrical engineering as a requirement for an entry-level position. Moreover, some jobs may seek a grade-point average (GPA) above 3.0 on a 4.0 scale. Thus, it may not be sufficient to just perform good enough to pass, but it is critical to perform to the best of one's ability and show excellence. Regarding the curriculum, CSUMB Computer Science Program offers superb preparatory classes for their

software engineering cohorts. According to the official CSUMB website (2023), its online computer science program prepares students for careers in software engineering, mobile app development, and project management. Some of the classes that directly train the technical skills needed for a software engineer are CST 338, CST 370, CST 438, and CST 499.

CST 338 is an intermediate software development course that covers software development life cycle (SDLC) among other topics. SDLC is a requirement for many software development positions and is describing the process of planning, analyzing, designing, deploying, and maintaining a software project while staying resourceful in terms of time and funds. CST 370 is a class that teaches design and analysis of algorithms. Mastering algorithms is critical in the hiring process since employers often assign algorithmic problems to candidates to test their problem-solving skills. In addition to that class, people use Leetcode, a website with logical programmatic problems, to get ready for the interviews. CST 438 is an advanced software development course, which, in addition to CST 338, teaches project management, implementation of the best practices in software development, and testing. Writing tests such as end-to-end, unit, and functional tests is important in the industry to avoid large scale bugs appearing after deployment.

Another skill is needed for a software engineer is an ability to work in a team, and the computer science degree at California State University Monterey Bay requires its software engineering cohorts to learn to work in teams since day one. This includes respecting each other's differences in personality, work style, and schedules. On the first week of instruction, the cohort was broken down into ten teams ranging from three to five people. Students were to connect, and present their first group project – technical team resume. Such practices are paramount, since in the tech industry, people rarely work on their own, and engineers work in

large or small teams to deliver the best version of the product for their customers. It takes many people to create a better product, as it is difficult for one person to catch all the mistakes in production. In addition, if companies were to have one engineer working per project, it would take a substantial amount of time to complete, which is not suitable for the industry with fast-growing technological innovations.

One of the best ways to gain the attention of employers is to have job experience in the industry. Many companies offer internship opportunities for students who are working on their baccalaureate or master's degrees. This way, students are able to experience what the workplace in tech will be like, and how rigorous the workload could become. This is one of the ways the employers can discover potential talent for full-time job offers.

If unable to find an internship, CSUMB offers the opportunity for students to work as teacher assistants for the classes they previously took. One class that can help with experience in the industry that was not already mentioned is a two-part capstone project class - CST 489 and 499. This class allows students to arrange in large groups and create a project that could potentially be deployed for usage by people. In many cases, employers look for applicants that have a developed GitHub portfolio with both solo and group projects. This capstone gives students the opportunity to develop meaningful software and to showcase their skills in collaboration, software development, creativity, and project management. This will demonstrate that the student is also capable to adapt to different workflows.

While job hunting, there will be the need to showcase that a newly graduated candidate is used to going above and beyond to learn industry skills. A great way to do that is through online certificates. There are many affordable online resources that teach pupils specialty skills like Robotics, Machine Learning, Full-Stack Web Development, Cloud Engineering, and more.

These programs go in-depth into the concepts of interest, and at the end of the program, award students a certificate of completion. Programs like that, however, may lack structure. For a more structured approach, but much less affordable, some students may choose to enroll into a coding bootcamp with a specialization of their interest. Therefore, if students are not able to land a job in the field they would like after graduating, there are opportunities online to further their education in a more specialty direction.

There are many opportunities to succeed in landing a job in software engineering. However, some preparatory measures work best, and those effective practices were discussed in this paper, such as attaining a higher degree, getting job experience in the field as an intern, and furthering education through webinars and certificate programs. A specific company that has a significant influence in the tech industry was also discussed. For the purposes of this paper, the preparatory education for a student was California State University Monterey Bay's online computer science program, and the company of choice was NVIDIA. Since NVIDIA specializes in hardware and software, a person with a BS in computer science from CSUMB may consider taking additional courses in electrical engineering or pursue a master's degree with a specialty in circuits and embedded systems to become a more competitive candidate for a position at NVIDIA as a well-rounded engineer.

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