Career Exploration Report

Computer Programmer & Game Designer/Developer

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ABSTRACT

The purpose of this career exploration report was to explore two specific careers that was of interest as well as possible internships relating to those careers. The two careers chosen were computer programming and game designing/developing. The report contains essential questions asked while researching, two reports containing research on both careers, four companies of interest that may be contacted for an internship, a rationale for what was concluded in the form of a reflection, and a logbook detailing the changes made to the report. The information that has been gathered in this report came from the Bureau of Labor Statistics, ONET, Indeed, Road Trip Nation, Learn How To Become, the New England Institute of Technology, and GameDesigining. After researching, it is concluded that a career as a game developer will be the primary focus with a career as a computer programmer as backup. In high school, contact with computer programming companies will be made in order to line up an internship. In college, a degree in computer science will be pursued.

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CAREER EXPLORATION REPORT

OVERVIEW

The purpose of this document is to report the research process of Bryan Nguyen during his career exploration in Technical Reading and Writing at the Dayton Regional STEM School during the 2020-21 school year. The following sections document essential questions used to begin the career exploration process, potential career(s) and rationale(s) for choosing those career(s), an overview of the research process used during Bryan Nguyen's career exploration, resources found and used during the process, a resolution, and a reflection of the process as well as a daily logbook of all tasks completed.

The following Driving Question was used to guide this career exploration process: How can I locate a potential internship site, college, potential career by conducting extensive independent research?

ESSENTIAL QUESTIONS

Throughout the career exploration research process, the following questions were asked:

- WHAT IS THE MEDIAN SALARY OF THIS FIELD?
- WHAT DO PEOPLE WITHIN THIS FIELD DO DAILY?
- WHAT SKILLS ARE NECESSARY IN ORDER TO SUCCEED WITHIN THIS FIELD?
- HOW IS THIS FIELD PROJECTED TO GROW IN THE FUTURE?
- WHAT IS THE MINIMUM DEGREE NEEDED IN ORDER TO GET A JOB WITHIN THIS FIELD?
- WHAT CLASSES ARE RECOMMENDED TO TAKE DURING COLLEGE THAT WILL HELP IN THIS FIELD?

POTENTIAL CAREERS & RATIONALES

This section provides a comprehensive list of potential future careers as well as rationale for choosing those careers.

COMPUTER PROGRAMMING

Computer programmers are people who speak in the language of computers. They write instructions, in the form of code, for computers that will then execute the

instructions as it is given to them. Computer programmers will spend most of their time on a computer either writing and compiling code, testing a program to make sure that it works, or debugging the program for any problems found during testing. Aside from working on the computer, computer programmers will have to collaborate with other employees in order to find new ways to improve an already existing software. Computer programmers will also have to communicate with their clients in order to create programs that will fit the client's need.

According to the *Bureau of Labor Statistic*, the average income of a computer programmer in 2019 was $86,550 per year or about $41.61 per hour. As stated by the Bureau of Labor Statistic, "the lower 10% of computer programmer had an average salary of $50,150 per year (about $24.11 per hour) while the upper 10% of computer programmer had an average salary of $140,250 (about $67.43 per hour)" (BLS). Charts from the Bureau of Labor Statistic show that the average salary of a computer programmer is approximately $79,080 a year. the Bureau of Labor Statistic also states that the job outlook for computer programmer is projected to decline by approximately 9% from 2019 to 2029. Currently, in Ohio, there are about 5,630 computer programmer that are currently being employed. This leads to an employment rate of 1.03 employment per every 1000 jobs.

According to *Learn How To Become*, the most common degree choice for most college students aspiring to become computer programmers is a bachelor's degree in computer science. Students that choose this path will learn the fundamentals of programming and discrete math. Students will also learn how to create algorithms that is able to perform a variety of task such as sorting and organizing data and finding optimal solution to problems. The writers at Learn How To Become state that, in discrete math, students will learn how to "use math and algorithms to solve various problems and create math proofs" (Learn How To Become). Most colleges will require the students to participate in many projects that will use what the students learned in class in order to show the students understanding of a concept.

Computer programmers will need a variety of skills and knowledge in order to complete a variety of tasks. As stated by *Road Trip Nation*, computer programmers are responsible for creating different types of software for both their company and everyday users. Computer programmers are also tasked with testing these programs to make sure that they work and updating the program overtime as technology grows. Aside from creating, testing, and updating software, computer programmers are tasked with creating instructions on how to use a software and the details of what the software does. In order to successfully complete the task given to them, *ONET* states that the ability to understand information and to use that information to come up with a solution is recommended. Active listening and critical

thinking skills will also be necessary in order to succeed as a computer programmer. Knowledge on computers and engineering principles, as well as a good understanding in math, will also help in the success of a computer programmer.

The career of a computer programmer, while projected to decline in the US within the next 10 years, is a career with an abundance of jobs. Computer programmers are necessary for the foreseeable future as much of the task that we do day to day rely on technology which in turn relies on the people creating them. Many companies today use technology in order to do what they need to do, and many companies tend to hire computer programmers in order to create software for the company to use. Computer programmers will also be a career that will be relevant as technology starts to evolve and change over time.

POSSIBLE INTERNSHIPS FOR COMPUTER PROGRAMMING

When looking for an internship for programmer, places centered around computer software and places that use mainstream programming languages would be the most ideal. Since programmers will spend long periods of time around computers and since most of their work is done electronically, environments that deal with the hardware of the computer, fixing/troubleshooting problems for a computer may also be beneficial to anyone looking for a career as a computer programmer. Two potential internship locations as well as contact information can be found below.

Reynolds and Reynolds

Contact: Thomas Schwartz

Email: thomas_schwartz@reyrey.com

Phone: (937)485-8109 - Office

(937)269-9569 – Mobile

Location: One Reynolds Way Dayton, Ohio 45430

Centauri

Email: recruiting@centauricorp.com

Phone: (937)702-9346

Location: 4027 Colonel Glenn Highway, Suite 301 Beavercreek, OH 45431

GAME DESIGN/DEVELOPING

Game Designers/Developers, as the name suggests, are people who create ideas for video games; as well as the people who take those ideas and bring them into reality for both entertainment and recreational purposes. More specifically, game designers/developers are the people who come up with ideas for game from the game's mechanic to the game's story and artwork as well as the people behind all the updates to a game after it has been released. Game Designers will work with groups of people that may increase in size depending on the size of the game that they are currently working on. In the group, there will be different people with different specialties. There will be those that specialize in programming, those that specialize in art, those that specialize in audio creation, and more.

According to Ryan Stolz from *NEIT*, the New England Institute of Technology, the average salary of a beginning game designer is about $60,131, which increases based on the amount of work experience. A game designer that has been in the field for a while can make upwards of $81,474. Other factors that may affect the salary of a game designer includes the employer, location, and the title that the game designer holds. The game design job market is being projected to grow by 9.3% from 2016 to 2026 with about 287,200 game designers currently employed. (NIET) In Ohio, there are about 7,900 employed game designers; in California, there are about 47,930 employed game designers; in states that are known for technology, such as Washington and Texas, the amount of game designer employed ranges from 10,000 to 20,000.

As stated in another blog by Ryan Stolz, depending on what part of a game a person may want to work, the degree and the courses that they take may differ. If a person would like to be an artist, animator, or work on the creative side of a game, then that person would want a bachelor's degree in game design. However, if a person would want to specialize in the more technical aspect of a game such as programming; then that person would want a degree in game development. If the college that the person goes to does not provide a game development degree than a computer science degree would also suffice. In the Game design course, a student will learn about 3D modeling and animation, game engines, and game statistic. In the game development course, students will learn the skills needed in order to create a game such as "advanced algorithm and API, design patterns, virtual reality development, 2D and 3D game console programming," (NEIT) and more. According to Game Designing, game developers that are looking to practice their skills in game

developing should use unity and if they are looking to learn a new programming language then it is recommended that they learn C# or Java.

According to *ONET*, critical thinking skills and active listening are recommended skills to have as a game designer. The ability to think of new ideas as well as being able to focus on the small details will also be helpful for game designers. This is backed up by Ryan Stolz. Ryan states that games designers should be innovative and creative, as well as having strong problem-solving skills, the ability to collaborate and communication skills and "above all else, a strong passion for gaming." (Ryan Stolz). Ryan Stolz also states that game developer should have good programming skills and should be an expert in at least one coding language alongside have a lot of patience and being able to focus on the smaller details.

During the 10th grade, the opportunity to experience the process of game design and development had arose in the form of a class. Within this class, students were able to go through all the stages of game development and were able to experience the struggle that came with game development. Through this class, the interest in game designing started to grow within a lot of the students and most students within the course would love to go into a game design career if the opportunity ever arises. Although, the starting salary for a game designer may be on the low side, the projected growth of the industry is promising.

POSSIBLE INTERNSHIPS FOR GAME DESIGN/DEVELOPING

Beneficial internships for game designers/developers are those that use game technology whether it be for create entertainment games or simulations/serious gaming. Since a game designer can have many different roles that each person fills, internships that have to deal with sound creation, graphic design, 3D modeling, programming, and story telling will be the most ideal. Personally, internships that deal with 3D modeling and programming will be looked at for as possible internship locations. Two possible internship sites are listed below.

The Gaming Research Integration for Learning Laboratory

Contact: Winston Bennett

Email: Winston.bennett@us.af.mil

Location: 1706 Woodman Dr, Kettering, OH 45420

Radiance Technologies

Email: careers@radiancetech.com

Phone: (937)425-0747

Location: 3715 Pentagon Boulevard, OH 45431

RESOURCES

This section provides a list of resources found during the career exploration research process.

- Learn How To Become. (n.d.). *How to become a computer programmer*. Retrieved from https://www.learnhowtobecome.org/computer-programmer/
    - Provided possible education path to become a computer programmer
- Bureau of Labor Statistic. (September 1, 2020). *Computer Programmers*. Retrieved from https://www.bls.gov/ooh/computer-and-information-technology/computer-programmers.htm#tab-1
    - Provided salary, job growth, and job outlook information
- Indeed. (n.d.). *Programmer*. Retrieved from https://www.indeed.com/jobs?q=programmer&l=Dayton%2C%20OH&vjk=39a64a9c423c874b
    - Provided job responsibilities and outlook in the Dayton area.
- ONET. (November 17,2020). *Computer Programmer*. Retrieved from https://www.onetonline.org/link/summary/15-1251.00?redir=15-1131.00
    - Provided information on the skills, knowledge, and experience needed in order to become a computer programmer
- RoadTripNation. (n.d.). *Computer Programmers*. Retrieved from https://roadtripnation.com/career/15-1131.00
    - Provided responsibilities of computer programmers as well as possible education paths for computer programmers
- ONET. (November 17,2020). *Video Game Designers*. Retrieved from https://www.onetonline.org/link/summary/15-1255.01?redir=15-1199.11
    - Provided information on the skills, knowledge, and experience needed in order to become a computer programmer
- Bureau of Labor Statistic. (Fall, 2011). *Work for play: Careers in video game development*. Retrieved from https://www.bls.gov/careeroutlook/2011/fall/art01.pdf
    - Provided information on the individual roles within game design as well as skills needed in order to succeed in each role
- Indeed. (n.d.). *Game Developer.* Retrieved from https://www.indeed.com/q-game-developer-l-Dayton,-OH-jobs.html

    - Provided responsibilities of game designers as well as a look into the job outlook for the career
- Stoltz, R. (May 25, 2020). *Video Game Design vs Video Game Development.* Retrieved from https://www.neit.edu/blog/index.php/difference-between-game-designer-and-game-developer/
    - Provided possible education paths and skills needed in order to become a game designer/developer
- GameDesigning (n.d.). *The Video Game Developer Career Profile.* Retrieved from https://www.gamedesigning.org/career/game-developer/
    - Provided information on the responsibilities of a game developer
- Stolz. R. (June 18, 2020). *Job Prospects and Career Outlook for Video Game Designers*. Retrieved from https://www.neit.edu/blog/index.php/video-game-designer-job-outlook/
    - Provided information on the salary, job growth, and job outlook for a game designer

REFLECTION

This section provides the reflection and resolution to Bryan Nguyen's career exploration.

When I was young, I had enjoyed playing games and being on a computer. This enjoyment of computer started to grow as the years went by. Around 6th grade, I had a strong feeling that for my future I would want to have a career pertaining to computer. At first, I had wanted to become an electrical engineer, but then in 8th grade, I started to really enjoy coding as we had to code our own website for our portfolio. I found programming to be something that could understand easily as well as something that I would have fun doing. Currently, I am taking a computer programming class where I am learning Java right now. This is a good step as I am starting to learn new languages other than HTML which was what I had been using for the past 3 years. Through this project, I gained more knowledge on being a computer programmer. Specifically, I had learned a lot on the steps to becoming a computer programmer. With this knowledge, I will be able to better prepare myself for the future if I decide to continue pursuing a career in computer programming. However, I also learned about the drawbacks of pursuing a career in computer programming. Since computer programming jobs are projected to decline by 9% by 2029 as more jobs are shifted overseas, getting a job as a computer programmer by the time I graduate may prove to be more difficult when I will graduate from college. However, with the abundance of computer programming jobs there are and

as technology is growing, I feel like the opportunity to get a job as a computer programmer will arise.

My second career choice came to me in the 10th grade where I had taken an extra after school class called game design. In this class, we learned about the process of creating a game and the struggles that people in the industry must overcome. In this class, we took similar steps to those of a game designer/developer. We had created a pitch for a game, created concept art for a game, created 3D models for a game, and even created our own mini game. I had enjoyed every project that we had done in the class and I felt like the career really felt like a career that I could get into. Currently, I am taking the game design class as an elective and we are currently doing a big project that is going to span 2 years where we will create a game from scratch. Through this project, I learned a lot about the viability of being a game designer. I learned that in Ohio there is a limited amount of colleges that offer a game design course. The average salary of a game designer is also relatively low and in order to get a higher paycheck a person will most likely have to go to a bigger company. Most big game companies tend to be stationed in areas where the cost of living is also higher. The good new, however, is that the game design job is expected to grow by 9.3% by 2026 which is the year that I will most likely graduate from college (considering a 4-year degree). This means by the time I graduate, there will be more job opportunities available to me.

Through this career exploration report, I was able to deeply think and make good educated decisions on what path I want to take moving forward after high school. Although nothing is set in stone, this career exploration report has set a good framework for my future. This career exploration report has also helped me develop good research skills for any endeavors that I may do in the future. In conclusion, I have decided that first I will pursue a degree in computer science. Since I can both be a computer programmer and a game designer with a computer science degree, pursuing a computer science degree will be the best choice for me in college. Another reason as to why I decided to pursue a degree in computer science rather than a game design degree is that computer science degree is more readily available to me. There are a couple colleges around Dayton as well as in Dayton that offer good computer science courses. Past college, I will look towards being a game designer as that is a career that I am most interested in. However, I will most likely only take this path if an opportunity arises. Since the need for computer programmer is still present even with the shift of jobs to overseas, the career of being a computer programmer will always be a good backup.

LOGBOOK

The following logbook was kept during Bryan Nguyen's career exploration process. It details the tasks completed during this process including sources consulted, essential questions asked and answered, as well as any other information collected each day.

11/6/20	**Researched more articles for Career 1 and 2. Composed a few essential questions for the report.**
11/16/20	• Created an outline for the report.
11/17/20	• Began drafting the introduction for Career 1.
11/19/20	• Continued drafting for Career 1. • Finished the introduction, paragraph 1 and 2.
11/20/20	• Finished drafting report for Career 1.
12/2/20	• Researched some potential internship sites
12/3/20	• Researched some potential internship sites
12/4/20	• Revised report based on critique
12/7/20	• Drafted Internship 1 and 2
12/8/20	• Drafted/Finished Reflection
12/9/20	• Did final touches to the report • Created citation for sources.