I.

Career: Computer Programmer

Description: The role of a computer programmer entails many responsibilities and tasks, the general task at hand is writing code to create software programs, however there is also a planning aspect behind these software solutions, such as creating models & flowcharts of the software execution, and actually designing & debugging the code.

Essential Skills (Computer Programmer OSP, n.d.):

- Reading: ability to interpret labels of software and hardware, emails, license agreements, client communications, proposals, programmer interface, design specifications, and software manuals.
- Writing: ability to write letters & emails, application install instructions, license agreements, help files, training manuals, proposals, project documentation, and a variety of reports for clients.
- Document Use: ability to scan lists & schedules, use tracking forms, manipulate flowcharts, analyze technical reports, and synthesize information from documentation for software development.
- Digital Technology: ability to use communication software (email), troubleshoot code online, create spreadsheets, use graphics, word processing & presentation software, systems and software design in multiple programming languages.
- Oral Communication: ability to speak with clients, superiors or users directly, attend meetings, give presentations and proposals.
- Money Math: ability to create invoices, calculate totals & taxes.

- Scheduling or Budgeting and Accounting: ability to monitor costs, maintain a budget for projects, schedule a timeline for projects in a timely manner according to contracts.
- Measurement and Calculation: ability to measure free disk space, time needed for program execution, use formulae for webpage dimensions.
- Data Analysis: ability to gather user data, integrate mathematical functions to calculate metrics, analyze the number and size of data packets to correct glitches and improve network performance.
- Numerical Estimation: ability to estimate repair time for glitches or updates, and time to develop new software applications.
- Job Task Planning and Organization: ability to plan personal schedule to meet deadlines, coordinate schedule to work ideally with projects and co-workers,
- Decision Making: ability to decide names for applications & components, decide file transfer protocols, workload distribution, prioritize important tasks, choose methods and programming languages.
- Problem Solving: ability to work through messy programming, arrange to meet clients expectations to the fullest, work through any bugs or glitches.
- Finding Information: ability to research online and follow code exemplars or feedback to circumvent any issues experienced such as bugs.
- Critical Thinking: ability to manipulate features from other application and manipulate them into current projects, evaluate the feasibility of a proposal and the clients requirements. Take into account factors like time and budget.

Outlook: The job outlook for a computer programmer in the near future is very high in Ontario, and moderately high in British Columbia. (Computer Programmer Occupation, n.d.).

Salary: The salary range for a computer programmer in Ontario is between $39,998 - $104,000 and in British Columbia is between $41,600 - $101,005 (Computer Programmer Occupation, n.d.).

II.

There are many opportunities to learn more about the computer science field and determine if it is a viable prospective career, opportunities such as co-op programs are amazing to provide work experience to a field, however co-op opportunities are very limited in the computer science field and thus not everyone gets an outlook on the field. However, a more popular opportunity is attending a hackathon. A hackathon is an event where people of all ages, high school, university get together at a venue and are presented with a problem set, further tasked to find an innovative solution to solve the problem. Most hackathons provide coding workshops amongst others and often require no prior coding experience. They are a great opportunity, and oftentime there are sponsors from major corporations who are engineers and developers to help around and provide an outlook to their personal experience.

III.

University Route (Computer Science, 2019):

Degree: Bachelor's Degree in Computer Science

University: University of Waterloo

Program: Computer Science

High School Requirements:

- Advanced Function
- Calculus & Vectors
- English 12
- Any other 4U course
- Computer Science 11 Recommended
- Admission average: Low 90s

First Year Course:

- Algebra: covers basic algebraic systems, integers, rational numbers, complex numbers, and polynomials.
- Calculus 1: covers absolute values, inequalities, sequences & series, function limits, derivatives, linear approximation, and a multitude of theorems.
- Designing Functional Programs: Introduction to computer science fundamentals, programming syntax and semantics, and data structures.
- Algorithm Design & Data Abstraction: Builds upon the knowledge from 'Designing Functional Programs' , design and analysis of algorithms, information management, and sorting algorithms.
- Linear Algebra 1: Covers system of equations, matrix algebra, elementary matrices, a multitude of other matrix and vector operators/functions such as Gauss Jordan elimination.

- Calculus 2: Builds upon Calculus 1, introduces integration, applications of integration, and builds upon series knowledge.

The above list of course are the essential core courses needed for the program, the course in parts, seem to resonate with the high school course curriculum, covering derivatives, introduction to computer science, and basic functions. The part 2 of the courses introduce the newer topics, like integration, and matrices.

Duration: 4 Years Undergraduate Degree

Cost (Budget Calculator, n.d.):

- First Year: $33,971
- Four Years: $33,971 * 4 = $135,884
- Cost Calculated through UW Cost Calculator for CS with CO-OP, include all books, residential and personal expenses.

College Route (Computer Programmer, n.d.):

Degree: Ontario College Diploma

College: Seneca College

Program: Computer Programmer

High School Requirements:

- Grade 12 or Grade 11 Math
- Grade 12 English

First Year Course:

- Computer Principles for Programmers: covers the principle behind computer software functionality as well as hardware functionality.
- Communicating Across Contexts: covers the core concepts of communication and the application in texts and concepts. Build upon reading and writing skills.
- Introduction to Programming Using C: covers the introduction to C, the barebone language upon which object oriented languages like C#, C++ are built upon.
- Introduction to UNIX/Linux and the Internet: covers the use and fundamentals behind a linux operating system, using command line, and the intersection of OS with internet. Includes writing basic shell scripts.

Duration: 2 Years

Cost:

- Tuition: $3858, Books and Supplies: $375
- 2 Years: ($3858+$375)*2 = $8466

IV.

The two options for postsecondary education are college or university. In my personal perspective I feel I would be a better fit in a University environment, the reasons behind this choice is because I feel I would like the University content better than the college, as it is more diverse and builds upon a lot of the previous high school knowledge, whereas the college courses are an individual skill like learning C, and Linux. But in University I am able to build upon high school math, and learn matrices, integration and much more. In addition the co-op opportunities available to computer science students in a university are higher than the prospects available in a

college environment. The final factor in my choice being the type of job role I am able to gain with a university education, as I aim to be very skillful in a niche area of computer science, I want the greatest magnitude of math proficiency to excel in that area, which I can learn best in a university environment as some courses offered in university are not also offered in college programs.

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