

Learn Tips

How to Start Learning
Computer Programming

Computer programming

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Are Functions Core Concepts in Computer Programming?

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Computer programming is a phrase that is bandied about quite heavily, but only few people actually understand its implications. The process of computer programming itself is difficult to understand for people who are not in the computer science field. Computer programming makes use of a code or a language: this language can be placed into several lines of code that can be translated to mean different things once they are processed as a program. For instance, the software that you use to calculate your taxes, or the software that you employ to make your simple web page are all products of skilful computer programming. Behind these software programs are scripts and codes, and these scripts and codes can mean different things.

For many different programming languages, a function can be important and can therefore be a key concept to learn when someone is interested in software and computer programming. A function can also be termed as a subroutine, procedure, or sub-query. How is a function important? For instance, if a company or institution has a library of many different programs, these programs can therefore consist of millions upon millions of lines of a source code. In the interests of time and space, you would like to keep from duplicating a certain source code in many different places.

Why is duplication so undesirable? If a source code is duplicated in many different places, it is being needlessly copied, and it can spell Hell for the programmer and troubleshooter when things go wrong down the line. If the source code is actually erroneous, the programmer or troubleshooter will have to correct the code in all the different places that it appears. If the source code has to be updated or improved in order to make the program either run faster or perform more operations, then the source code has to be modified, improved, and updated in all the places that it appears. And if the source code has to be removed and replaced with a new source code, then it has to be erased and replaced with the new code in every single place that it appears.

This is indeed time-consuming, and it can lead to more errors because of all the human intervention that has to be done. On the other hand, if there are functions that are built to handle all the different programs, then only one or a few changes need to be made should there be errors, or should the source code have to be updated, modified, improved, or changed. You can think of the function as an umbrella: it covers all of many different programs beneath it, so that you do not have to cover each program individually. Having a single source code serving as the function is also advantageous when you have to introduce a new program that still makes use of that same source code. Because the source code is already available as an overall function or sub-program, you do not need to add the source code to the new program. You only need to find a way for the new program to interact with the source code itself.

These are only a few facts that you need to know about functions in computer

programming. For more information, read up on the latest computer programs, how different programs can interact with each other using some umbrella or overall scripts, and how different programs can be improved when using functions.

BASIC: A Computer Programming Language

Computer programming has its own language, and that's just the beginning of the software adventure. There are many different languages in computer programming, and all of them have their own purposes. In order to understand the importance of computer programming languages, knowing them, and tweaking them, one has to understand the importance of computer programming. Computer programming produces software packages, among other things, to meet our needs. We may need software for accounting, making photos bigger or smaller, or editing our home videos. Behind all these software packages are the computer programmers who use their individual languages in order to create the software.

One such computer programming language is the Beginner's All-Purpose Symbolic Instruction Code, or BASIC. BASIC is actually composed of many different kinds of programming languages that are actually higher level than most other languages. This BASIC family of computer programming languages was first designed in the 1960's, and was originally made for non-science people to gain better access to computers. During that time, using a computer required that a person write customized software, a task that only mathematicians and scientists were equipped to do. The BASIC language was therefore a bridge for people of other professions to take advantage of the power of computers.

When the 1970's came, the BASIC language, whether in its original form or a variant of it, spread onto microcomputers; and by the 1980's, even home computers could be run in BASIC. Today, BASIC remains popular, as it serves as the basis for many of the more modern programming languages that have been developed in the wake of advanced operating systems and the Internet.

When it was originally conceived, BASIC was meant for beginners: it was a language that people could use easily, whether or not they were educated in mathematics and the sciences. The language also had to be a general purpose one, in that it had to serve many different needs, and not only those that mathematicians and scientists required. The root language of BASIC also had to allow for advanced features to be plugged on as experts grew more and more adept in it, and as the language found further use in many other fields. BASIC was also meant to be interactive, and was designed to show error messages that were clear and friendly; that is, these error messages had to completely explain what the problem was, which would hopefully allow the user to fix it faster and easier.

When it was first released, moreover, BASIC was free of charge, which allowed the language to spread much faster. Once the language spread much faster, it was also easy to modify it and correct errors. BASIC was also distributed to a few high schools in order to promote it faster. Thanks to this widespread use of the language, BASIC was soon implemented on several microcomputers, and by several software manufacturers.

Despite its success, BASIC has had its dissenters. For instance, some programmers find that its scripts do not show proper programming practices, and the language itself is too slow, or sometimes even too simple. Despite all these, however, BASIC has continued to thrive, succeed, and evolve, and has thus become a good tool to introduce beginner programmers to the concept of coding and computer programming.

These are only a few facts about the BASIC language. For more information on BASIC,

read and do your own research through several key pages online, or using computer programming books.

Training in Macromedia

The Macromedia family of software might be something that is taken for granted by people who have used the different kinds of software in it a lot. By popping the Macromedia disk into the CD-ROM drive, everyone, from a toddler to a computer programmer, can do a lot of things with his or her computer. However, for those who are interested in working with such software, computer programming and training in Macromedia is needed.

There are many kinds of software in the Macromedia family. For instance, if you are interested in developing computer software, and if you are looking for a way to make a dynamic website, then you may need Adobe ColdFusion, which works like the ASP package of Microsoft, or the programming language PHP. If you are hoping to cut down on website design, development, and editing time, then you may also be interested in Adobe Contribute, which allows different members of an organization to contribute to the changes made in a website, therefore saving time and money in hiring a single person or a team to make the changes in the site.

If you want to do website design but want to see your results immediately instead of plodding through oceans and oceans of script, then you may be interested in Adobe Dreamweaver. This popular member of the Macromedia family may not require programming skills, but it can help software programmers understand what certain scripts do and how these scripts behave online.

For those interested in online learning solutions, there is Macromedia Authorware, which is a programming language that is based on flowcharts. Authorware is used for making programs that are interactive, and that can be integrated into various types of multimedia content. Also in demand is Adobe Director, which was originally created for making animation. Today, Adobe Director is used as a scripting language for creating a standalone kiosk, or CD-ROMS. It is also being used for developing online three-dimensional games.

The Macromedia family also has its own graphics editor in the person of Adobe Fireworks. The Fireworks program is the graphics editor that is designed to integrate with other Macromedia products. Another graphics program is the FreeHand package, which creates vector graphics in two-dimensions, and is designed for the use of desktop publishers.

What is undoubtedly the most popular package in the Macromedia family is the Flash and Shockwave group. Macromedia Shockwave players are multimedia players that were originally designed as independent packages, and that were made to play Flash programs. Today, however, the two are integrated heavily with each other; Flash itself is a highly powerful tool for website designers who want to create more dynamic and attractive websites that thrive heavily on animation. Despite the “eye candy” feel of Flash, however, most website designers stay away from it and do their own scripting, since Flash animation cannot be picked up by search engines, and can thus limit the amount of readable content that can help a website be more popular.

If you are interested in training in Macromedia, you also have to be aware that most of the packages presented are already under the Adobe umbrella. Moreover, you may need to

hone your computer programming skills well enough to be able to run Macromedia applications and use them for your work. Not only is Macromedia all about popping something into your CD-ROM drive, it is about computer programming used well, in order to serve a wider variety of purposes.

The Different Sides of Computer Game Programming

Many people will play computer games without any knowledge of how much work went into the game. True, a lot of thought and creativity had to be employed in order to make the game work, but the game also required a good deal of computer programming and knowledge of different computer programming languages in order to make the game not only feel real, but look attractive as well. There are many sides of computer game programming, so if you are interested in computer game programming and may want to take up courses in the future, take a look at this list.

The game physics programmer is someone who directs how a game uses physics in order to look correct and feel correct. In most cases, a computer game will not completely simulate the physics of a real world, but some important aspects of physics may have to come into play for some games. For instance, wind resistance might be important to dogfights, while the fluid but retarded movements of some characters in water might be needed for a role-playing game.

The artificial intelligence programmer is the one in charge of developing the logical sequence of the game itself. For instance, when a game involves finding a path, employing strategies, or giving rise to enemy tactics, an artificial intelligence programmer may be called in to make a game smart – in other words, to make the game think on its own. In general, the computer language used for artificial intelligence programming is simpler than other languages, and it can be shared with the game's players.

The graphics programmer uses a series of codes and algorithms in order to provide graphics in the world of the game. In the modern age, a graphics programmer has to work in a three-dimensional environment, and should therefore have knowledge of calculus, vector math, and other algebra concepts that may be needed for specializing in rendering such images. There are only very few graphics programmers, and they may usually demand high wages for their work.

A sound programmer will provide sounds in terms of characters' dialogues, music, and even sounds that can make the game seem more real, such as the sound of crunching leaves or grass as characters walk on them. The gameplay programmer will add to the experience of the game, and will do so by focusing on the game's feel and strategy.

Computer game programming will also require a team of scripters, who are also usually the designers of the game. These scripters write the code of the game itself, usually with a basic computer language. Also needed are user interface programmers, or the UI: the UI programmers will create a library of different aspects that can be used across a wide variety of worlds within the game, or a wide variety of games within a manufacturer. The UI programming language involves a good deal of math, with the aim of producing special effects.

Also important is an input programmer, who writes codes for how different kinds of hardware, such as the keyboard, joystick, or mouse, will affect the game. The network programmer will find ways for the game to work on a network, where people can play against each other. A porting programmer ensures that the game can work on different platforms and operating systems.

Overseeing all these tasks is the lead game programmer. These are only a few aspects of computer game programming. As the field widens, more and more programmers of different kinds will have to be called in and identified as important.

What You Should Know About a Computer Programming Career

Computer programming is one of the most important and exciting careers today. It is also a field that offers plenty of job opportunities for graduates. It's one of the best fields of endeavor for people who love technology and are willing to try out new things. If you're considering pursuing a computer programming career, here are some things that you should know:

What is computer programming?

Computer programming is basically the process of writing codes to create a computer program. A programming language is used to write this code, also known as the source code. Computer programming is actually an umbrella term that encompasses all types of programming involving the use of computers. The design and method utilized to write a source code will depend on the type of computer language used for the job. Some of the most common computer languages include BASIC, COBOL, FORTRAN, C++, Java, Visual Basic, Python and PHP.

The job of computer programming also includes testing the source code, debugging it to check for flaws and weaknesses and maintaining it to ensure optimum performance.

Creating the code

The soul of computer programming is the creation of the source code, which can either be brand new or something created to modify or improve upon an already existing code. The object of the source code is to build a program that will perform a particular series of tasks based on a specific set of commands. This is called customization.

The end result of writing the source code is a computer program. In software engineering, computer programming is an important initial phase.

What does a computer programmer do?

The main job of a computer programmer is to write the codes that serve as the foundation of software programs. He is also tasked to test, troubleshoot, debug and maintain the program to ensure its quality and reliability.

Generally, the tasks that a computer programmer must perform are assigned by another person, usually the system analyst. The computer programmer's job is then to write the program, test it, modify it if necessary and ensure that it passes compatibility and quality standards. If errors are found, it is the computer programmer's job to ensure that they are corrected.

The job of a computer programmer usually requires hours upon hours spent in front of a computer to design and write a computer program. Depending on the type of program being written, its purpose and the complexity of the commands required in order for a computer to execute the series of steps involved, writing a program can take several months to several years to complete.

The length of time it often takes for a program to be completed often necessitates having a single program broken down into a smaller series of steps. These steps will then be assigned as tasks to a group of programmers who will work on them independently. The

final step is to put the end results and produce one coherent and useful computer program.

Computer programming is a very dynamic field and involves plenty of imagination and discipline. Although there are set standards for the tasks involved, the profession itself does not require certification tests from government agencies. There are also no state and federal licenses to obtain.

How much does a computer programming job pay?

That will depend on the experience and level of expertise of the programmer. Most entry level programmers earn a minimum of about \$33,000 a year while mid-level programmers earn approximately \$50,000 a year. For senior level programmers and those who have several years of experience behind them, their typical take-home pay averages at about \$65,000 a year. Consultants, some managers and those who have advanced well in their computer programming career are often paid more.

What You Need to Know About a Computer Programming Course

Computer programming may seem like a highly complicated discipline but at its roots, every program actually begins as a simple set of instructions. Computer programming is essentially the design of a simple program in order to create a more complicated program. It is currently one of the most sought-after courses and is also a career that presents plenty of opportunities in a very exciting field. If you're curious about what taking a computer programming course will be like, here are some important information you can use.

The course Computer programming is one of the disciplines under computer science. It requires study and practical application of theories and concepts. Simply put, computer programming is the process of writing and creating a group of instructions that a computer can read and execute.

Computer programming is not a single, one-size-fits-all discipline. For one, the task of programming (or coding) involves several computer languages. These languages have different uses and as such, will often require a different set of instructions. JavaScript, for example, may be a computer language but it is not the same as HTML or COBOL or Visual Basic. There are also certain sub-disciplines in computer programming that lead to a specific field of specialization. Students must determine which field of computer programming they want to focus on. If they want to work for companies that create video games, for example, they will have to choose courses that teach graphics and animation, among others.

In the course of study in computer programming, a programmer must be able to learn multiple concepts and theories on top of the technical stuff, such as computer language conventions, elements and important operators used to create a source code that will later produce a computer program.

Computer programming is an essential phase in the development of software and is an integral part of software engineering.

How learning is obtained

There are two major ways computer programming can be learned – through classroom type instruction or online, as part of a distance learning program. Classroom type instruction is still the most common way of attending classes for students but online classes are fast becoming the method of choice.

What to expect from the course

A computer programming course is usually composed of lectures and hands-on assignments. The instructor uses lectures to teach theories and concepts in programming and to provide students with an introduction to the discipline. Generally, students will be listening to lectures while using computers, a way for instructors to allow participants to immediately apply what they have learned.

Other than access to a computer, students may also be required to obtain textbooks to be used as references during coursework. Some lessons, such as those used in online classes, may also be downloaded from a website.

Who should take the course

Computer programming is not for everyone. Just because you love computers and have sufficient curiosity about how they work doesn't always make you the ideal candidate for this course. Computer programming requires a lot of patience, attention to detail, creativity, logic and common sense. It also requires careful study and understanding of certain subjects such as mathematical and engineering concepts.

What to expect upon completion of the course

Once a course has been completed, a computer programmer is ready to be hired for entry-level jobs in companies that design software. If the programmer chooses a higher level of study, he can also increase the chances of being hired for higher pay, particularly if he chooses a field of specialization. A computer programming course can provide a graduate access to different fields as well, including banking, finance, research & development and database administration.

Computer Programming Courses in New York City

Although New York City is more famous for its museums, parks, theaters and businesses, it is also a great location for schools offering computer programming courses. New York has always been pioneering in many ways and it offers plenty of opportunities for highly in-demand courses related to computer science. Here are some resources that can help you look for computer programming courses in New York City:

New York University

NYU is a recognized leader in the field of education and is acknowledged as one of the top universities in the U.S. It is an excellent institution for many fields of study in academia but it also has a solid curriculum offering courses in computer programming.

To find out about the type of courses the school offers, go to their website (www.cs.nyu.edu) and look for their current course list. The link will bring you to their computer science department page. The course list will outline the courses offered for a particular semester so you will have an idea of which course to take.

Computer-Schools

Computer-Schools.us is a website that lists schools anywhere in the United States. The site lets you look for the physical locations of schools or if you prefer, you can search for schools offering online courses. The site lists a good number of computer programming schools you can check out. To look for courses, you can click on the links for more detailed information.

Education-Portal

Education-Portal.com is another website that lists schools in New York offering courses in computer programming. You can click on the link to the schools to find more information about specific subjects and courses you might be interested in. The site also offers information about schools offering computer programming courses that lead to certification, perfect if you want to build a serious career in this field. New York Institute of Technology

The NYIT in Old Westbury offers courses in computer programming. You can check out their site (www.nyit.edu) or send an e-mail to inquire about admissions requirements at admissions@nyit.edu.

FutureKids

FutureKids is an excellent provider of courses in computer programming, especially for younger participants. Some of their offerings include C/C++, HTML, XHTML, Visual Basic and Computer Graphics, among others. If you want children to develop an early interest in a career involving computers, this is a good place to start.

Columbia University

Columbia University's Department of Computer Science is an excellent source for information about computer programming courses. It also offers courses in related fields such as software engineering, networking and web development.

Berkeley College

Berkeley has a New York City campus which offers some excellent courses in computer programming. You can check out their site at www.berkeleycollege.edu or send them an e-

mail at info@berkeleycollege.edu. Other courses include web design, software engineering and networking.

NetCom Information Technology

NetCom Info has a wide range of choices for computer programming courses. It is currently recognized as a top training center in New York. It offers over 250 computer-related courses and about 40 certification programs. The center is a partner to several IT companies and has key relationships with many large corporations. It is also an authorized provider of training by companies such as Microsoft, IBM, Oracle, Linux and Novell, among others.

NetCom is one of the best places to obtain computer programming courses in New York City. If the type and quality of computer programming courses from this center does not attract you, its address will – it's located at the 7th floor of the Empire State Building.

Computer Programming Fundamentals You Should Know

Quick! Can you tell me how to prepare a bowl of cereals with milk? Too simple, right? You can probably give me a series of no-brainer instructions that I can perform in less than a minute. Now try telling a computer to do just that. What began as a simple task has now become complicated. It's not just a matter of dumping a cup of cereals in a bowl and pouring milk in. With computers, it's so much more than that. Sounds exciting? It should be. Because that's what you'll expect once you begin learning computer programming fundamentals.

The basics

Computer programming is a whole new world of possibilities. Believe it or not, programming actually began in the 1200s, when simple machines were designed to execute simple mechanical tasks. It has grown both as an art and as a science since then, providing us with the technologies that have made many aspects of our lives easier and faster.

Once you start learning computer programming, some of the basic stuff you'll encounter include:

- The basic understanding of the discipline

You'll need a good background in the field in order for you to understand how it really works. With a solid foundation built on knowing the basics of computer programming, it will be easier to comprehend its details, including procedures, steps and other instructions.

- Understanding the types of programming

Essentially, there are two basic types of programming, each of which has its own uses and set of advantages and limitations. Procedural programming, while older, is quite useful particularly because it is a much simpler way to tell a computer what to do. It is also the heart and soul of many computer languages. Basically, it's an input-output operation, where a user or programmer inputs a set of instructions and a computer reacts to it by executing those instructions. Learning procedural programming helps new programmers understand elements such as sequence, selection and iteration.

The other type of programming is object-oriented, which is relatively newer. This type of programming treats instructions as a set of objects, something that is more convenient in many of the programs that are in use today. With object-oriented programming, you'll learn an object's properties, event handlers and methods.

You'll learn both types of programming as part of a fundamental or basic course. These will help you understand how to design codes that are easy for a computer to understand and effective enough to execute. Using the cereal and milk analogy, for example, you will be able to write a code that will tell a computer how to pour the right amount of cereal into a bowl and how much milk to use, in that order. And if you're truly good, you can even tell the computer what specific type of cereal and milk to use.

- Understanding the nature of the code

Another important basic knowledge you must learn in programming is understanding codes. While their functions are generally the same – that is, to power a computer program – codes differ in design and use depending on the language. Codes are at the heart of a

computer program and will be one of the basics you will learn in programming.

- Learning problem-solving

Much of your time as a first-time computer programmer will be spent poring over problems – how to create a source code for a desired end result, how to fix a bug, how to solve a glitch, how to put things together or in sequence so they work. You'll learn how to look at a problem, break it down to its solvable components and come up with ways to solve it.

- Thinking logically.

If you're not a fan of mathematics and logic, you'll be dismayed to know that many of the computer programming fundamentals you'll be learning will require you to think in numbers, figures and sequences. However, these basics are easy to learn, provided you have the patience to follow the right steps. Once you've trained your mind to think like this, you're well on your way to a great career as a computer programmer.

On the Way to Learning Computer Programming In Nano

Today's digital technology gives birth to a host of programming languages. And there are several programming languages being used in different applications such as the web, Windows, Apple, and Unix. And right now, computer programming in Nano is one of the newest developments.

It was believed that a Nano mechanical computer could run a million times faster than a microprocessor-based computer. This is because that one out of the million components of a computer is made of mechanical space. Therefore, if a programming language is patterned on the mechanical space a computer has, it will follow that the computer will work faster.

But then again, engineers would have to create an entirely new line of computer systems. Computers that are more energy efficient and consumers lesser space is the ones that would work well with a Nano computer language.

However, the Nano computer language is believed to work well with the present day computers systems as well. The primary use of this programming language is on graphics. With the Nano-X graphics system you could create much fancier graphical programs. To make it work, you have to specifically create the program with the Windows, Unix, or Macintosh interface in mind.

The Nano computer language primarily came from the nano technology. Nano technology refers from the fields of applied science that control matter on its molecular and atomic scale. The technology can be used in materials science, applied physics, and of course, computer programming.

Japan is one of the pioneers of nano technology and nano programming. In fact, they are very active in holding symposiums and conventions on both professional nano technologies and aspiring young scientists. They are constantly looking for new ideas and concepts surrounding the nano technology and the improvements on the nano computer language.

Right now, the interest in learning and improving computer programming in nano is spreading to Asian countries like Vietnam, South Korea, and in Europe, France. The demand for different applications in nano computer programming is increasing, causing increased users and clients base.

The nano program is basically very easy to learn and to apply. Texts can be typed immediately into the interface. It is also quite simple to insert text into the program with the use of some editing configuration. There is also the nano editor software that you can use with the main program base so that saving, cutting, pasting, and searching becomes fairly straightforward.

Currently, there are a lot of instructions software and basic instructional kits for use of those who want to learn computer programming in nano. Since nano is being one of the more popular languages today, this software is being applied in almost all newer applications.

All programming professionals are challenged to learn this new technology. With the basic

knowledge you have for computer languages, learning the nano language won't be much of a trouble. The basic principles of the program resemble the other wellused popular programming languages. The more complex uses and functions of the nano programming language are unique from all others. But that is always a part of learning a whole new programming language.

Learn more about computer programming in nano by searching relevant instructional web sites as well as from different offline sources. The nano programming language is a good language to learn as it is expected to improve over time.

The Need For Computer Programming Language Evolution

The digital world constantly changes. New technologies are introduced and new developments in the industry are being made known to the public. There will always be changes in technology. And technology will constantly improve to help create a better world.

And one of the primary movers of technology and the digital world is a computer programming language. This is the language spoken and understood by the computer. The computer language is machine language. Basically, what the computer can understand and process are just a bunch of one's and zero's. It is really upon the expertise of the programmer to create special software that could be understood by the computer and the human user.

Computer programming software follows a certain language that computers follow. Examples of these languages are the Assembly language, C++, FoxPro, Visual Basic, Visual FoxPro and several others. These types of software can mediate between the computer and the programmer. All the programmer has to do is to input the commands he would like the computer to do. He'll write the commands in the syntax that the computer programming language understands. The commands are then processed and converted into the machine language the computer processor understands. This is how the many applications and programs downloadable from the internet are created.

Different computer programming languages can provide different levels of functionality. Some software can give crisp graphical images. These programming languages are usually used in making games. Games are really what make computers half popular. And this is all because of the computer programming language created for making games that people from all over the world love. Games are complex individual programs that are interlinked together by the main game application.

Aside from computer games, programming languages allows for the development of functional software such as word processing programs, database programs, webbased applications, and several others. The software is made possible with the creation of the programming languages that are most fitting to the design and interface of the program being created. There are many times that a single application can be created multiple language platforms.

But then again, all of these programs won't be possible without the creation of an operating system. The operating system is the software by which a computer system runs. Popular examples of such software are the Windows platform, Linux, Unix, and Mac OS. There are a lot of old operating systems being used before and the most popular of which is DOS. The operating system serves as a good median for the computer and the processor's language. Its main job is to translate every single program created for the operating system and allow the machine to process them accordingly, so that people can run and use the program.

The evolution of computer programming languages is required in this ever-changing world. It is mandatory that they have to keep up with the demands of the current times. Before, computers are used against a black, monochrome background. Right now,

computers uses images, colors, and interactive icons. The contrast is very striking that you can just imagine what would happened if there were no evolution that happened.

The introduction of new computer programming languages should be a welcome addition to the growing group of computer languages. The new features and abilities these can be used widely in different applications are in currently in demand.

Your Guide to Computer Programming Magazines

If you want to be updated with the new gadgets and the new technologies dealing with computer programming, you have to subscribe to respectable industry-related magazines. Thanks to the internet, these magazines are also available for public viewing over the web. This means you really don't worry about missing a subscription or so. In other cases, you don't even have to pay for subscriptions anymore. All you have to do is to log on to your internet and read the new entries or the new issue from the programming magazines off your desktop or laptop computer.

Here are the different computer programming magazines you can check out online:

1. Application Development Trends

This magazine provides all the information you might need about newly released software and all the new trends in information technology. The audience of this magazine is usually the technical management groups of big companies and enterprises.

2. C++ Source

This online programming magazine is going to be indispensable for C++ professionals. It contains information about the C++ language, its philosophy, and the direction it is taking in this changing world. Aside from that, it also offers feature articles to its readers. There are also related topics about computer programming and C++ tutorials that are perfect for the beginners. It also has a news section that gives updates about C++.

3. Developer Network Journal

If you are a .NET, ASP, COM, and ADO technology aficionado, this is the magazine for you. Every issue is right with articles that software developers are going to find useful. This is the primary magazine of the Windows and Microsoft-based platforms.

4. Developer

Developer is an independent magazine that is primarily created to carry information about different topics of interest a computer programmer needs to know. It contains features about software development, programming, architecture, database creation, and other things.

5. Doctor Dobb's Journal

Doctor Dobb's Journal or DDJ is the foremost programming online magazines that features relevant software tips, tricks, and tools for both aspiring and professional programmers. It is also rich in source code, articles, book reviews, product resources, and a whole lot more.

6. Java World

Java World is your optimum source of all Java-related programming resources. Both professional and amateur Java developer can use it. It always has fresh news, API's, tutorials, tools, feature articles, and interviews with the experts that all deals with the Java technology.

7. SYS-CON Media

SYS-CON media currently is the leader in information technology media in the world. They specialize in AJAX development, as well as .NET and JAVA. But they are also the

authority when it comes to XML, Coldfusion, WebLogic, and Flex.

8. MSDN Magazine

If you want to get ahead with the newest technologies that affect the Microsoft networking systems, then the MSDN magazine is what you need. Their issues are always rich with source codes and helpful articles. They also have an archive of back issues, should you be interested in them too.

9. Leading Edge Java

This magazine could qualify as the practical Java handbooks for Java developers. It contains tutorials, news, tools, and current uses of the Java technology.

10. Luminary

Luminary is a free newsletter published monthly. It contains features on software management, consulting, and development.

These are the 10 most useful programming magazines you can check out over the internet. If you want to take a glimpse of how what's new and hot in the programming world, just check out these magazines and know yourself.

Learning Computer Programming Terminology

Computer programmers are professionals who are in demand these days. This is because of the fact that everything is on the stage of being converted into digital. Not too soon, there won't be analog systems anymore. All systems would be created according to the digital generation.

Right now, there are different schools and institutions providing training for computer programming. You can enroll to either offline or online schools, depending upon your time availability. For those who recently get off from high school and would like to pursue a career in computer programming, they can inquire from the different schools, colleges, and universities around them. These institutions are surely offering programming courses.

However, for those who are currently holding down a job and would just like to learn computer programming as a hobby, they can enroll in an online school that follows a distance education setup. They are free to catch up on their lessons during their free time, whenever they are, provided they have a laptop with an internet access.

Here are the different schools where you can take training courses on computer programming:

1. Collins College

Collins College is located in Arizona. It is previously known as the Al Collins Graphic Design School. Right now, the school follows emphasized programs for visual communications through graphic design, computer animation, and digital video. They also offer e-commerce programming.

2. Brown College

Brow College's main institution is in Minnesota. However, they are accepting enrollees from various locations. They are implementing quality programs in computer programming. The school employs competent faculty members that implement them.

3. International Academy of Design and Technology

This career-oriented institution is dedicated in providing academic excellence to their students. Computer programming is not a very easy course. But this school is one of the few that tries to find a way to make the learning process more fun and rewarding.

4. American Inter Continental University

The school offers different degrees related to business, industrial, and government career paths. And all of their graduates have adequate computer programming units to back them up. There are also Master's Degree and Associate's Degree programs being offered, on top of the school's Bachelor's Degrees.

5. ITT Technical Inst

If you want true-blue computer programming training, you have to go to the authority. The ITT Tech Inst is a special educational institution that focuses on information technology courses. The schools offers both Bachelor's and Associate's degree.

6. Tech Skills

If you want hands-on computer programming and information technology courses, you should go to Tech Skills. They are offering different programs related to computers and

technology. Their programs include training and certification for Oracle, Microsoft, A+, Cisco, and a whole lot more.

7. Unitek

Unitek is the premier provider of certificate courses for both CISCO and Microsoft. They are also offering training courses for these two. They can provide assessment testing for anybody situated across the country. They have prepared a skills test online for aspiring students who would want to join their boot camp.

8. Kaplan University

Kaplan University is an online school that offers classes around the clock. This is one of the best schools offering programming courses for both teens and adults. Their curriculum is focused on the individualized career path of their students.

These are the eight different computer programming training centers you can check out. Look for the school that is equipped to improve your skills and abilities the most. This way, you can make your future look a lot brighter.

How To Implement Credit Card Computer Programming

There are different types and applications of computer programming. Computer programming is very essential anywhere there's a computer or a digital device. Programs are the primary requirement before a system or device could run. And in this digital age, they are required by almost all applications, including web-based ones.

Credit card computer programming is one of the most vital forms of programming these days. This is precisely what makes online banking and e-commerce possible. With these sets of programs, people can freely buy things over the internet. And merchants can also get their earning easily from the issuing banks of the credit cards used to pay them.

The main requirement of credit card computer programming is security. These programs should be created with multiple layers of security so as to protect the interests of both the online seller and the buyer. Credit card programming requires a series of intricate commands and test runs just to avoid the loopholes in the programming.

Adequate security is also necessary so that identity theft and other illegal acts are not committed over the internet. The main reason why identity theft is rampant over the internet is because there are not sufficient security measures that both online sellers and buyers follows. It is really the task of credit card computer programmers to make indestructible security programs for their clients.

Identity theft is the act of stealing one's sensitive financial information such as credit card number, social security number, name, address, and age. All of these are required before an online transaction could push through. But because of the improving abilities of hackers and fraudulent individuals, they somehow manage to find ways on how squeeze out the information from unsuspecting victims. They don't run out of creative ways of enticing people to freely give out the information they need.

A website that uses a faulty credit card computer programming protocol is exposed to the risks associated with refunds, fines, and even legal costs. But more than that, the website's customers will be very irritated with their experience arising from the transaction with the website. Worse, they could even suspect that the website is part of a big scam operating in the underworld of the internet. This is where things could get nasty with legal fees arising from suits filed by the affected consumers.

Therefore, it is very important for small and medium-scale internet business owners to avail of credit card computer programming services only from reputable sources. For all they know, the program that they are using are created with a backdoor that only the programmers know about. If you can request for a customized programming complete with documentation and a legal contract, it is highly recommended that they avail of that.

But if that seems a little too expensive, they can definitely try one of the many third party payment processors in operation today. This is a good alternative to buying or creating a special software for your e-commerce website. Examples of a third party payment processor are PayPal, Google Checkout, FirePay, and others. These companies are offering the processing of payments in cash, checks, and credit cards. However, these companies charge a certain amount or a percentage of the payment received.

This deal should be just fine, because they normally assume all responsibility when it comes to the proper handling or credit card charge requests. And for them to do it right, they ensure their clients that they have a very complex credit card computer programming system in place.

Looking Adeptly at Programming Function Examples

Before looking at the different examples of programming functions, it is best to understand the purpose and definition of function. A function is the means by which someone who uses a program can execute a code block which has two purposes: to finish a certain task and to return values. Although functions are expected to return a certain value, it is not always that values are returned.

A function is also considered as a procedure in some programming languages. On the other hand, functions are commonly known as any term that is being used in referring to names of code blocks. Take note that it is the C programming language which solely uses the keyword function. Functions accept restrictions, they also return values, and they are maintained on a separate location from the code of primary program. The C language uses main function as the point of entry to certain programs.

Functions can show up in a single or two locations. This is dependent on whether the function is single line or multi-line. Having a single line function means a value is returned after the performances of work (in a single line) while the multi-line function is broadened over different lines.

Perhaps, the most common example of a programming function is a mathematical function. Log and tan are examples of mathematical functions. The other two known functions are string functions and the date functions.

Simply defined, a programming function allows you to assign certain values where results can be calculated in a matter of seconds while saving yourself from the task of doing the computations manually.

On the declaration or calling of a function which has two or more parameters, the use of comma is needed to separate the different parameters. One function declaration could resemble this:

```
function print_two_strings($var1, $var2) {  
echo $var1;  
echo "\n";  
echo $var2;  
return NULL;  
}
```

For these functions to be called, a value must be assigned to the parameters, hence:

Function call:

Print two strings ("hi", "guys");

The output should appear as:

hi

guys

One other good way to have active parameters is the use of PHP's integral functions such as func get args, func get arg, and func num args functions. These functions are able to calculate arithmetic means of any values that are placed onto them and an output is derived. An example:

```
mean(35, 43, 3);
```

The output is then:

Mean: 27

A programming function is usually best when it returns some value or information. Functions do calculations, indeed, but it is also useful in indicating any errors that are encountered any function. To return an information from functions, you can use return () statement on the specified function.

An example of script for PHP is the following:

```
<?php
function add_numbers($var1 = 0, $var2 = 0, $var3 = 0) {
$var4 = $var1 + $var2 + $var3; return $var4;
}
$sum = add_numbers(2,4,6)
echo "The result of 2+4+6 is {$sum} ?>
```

The result is:

The result of 2+4+6 is 12.

Take note that {} statement ended the course of the function. If multiple variables are to be returned, a group of variables should be returned, not a single variable: An example:

```
function maths ($input1, $input2) {
$total = ($input1 + $input2);
$difference = ($input1 - $input2);
$ret = array("tot"=>$total, "diff"=>$difference);
return $ret;
}
```

There are also ways of accessing functions without having to type a function name or {} syntax. This can be done in two ways: the call_user_func or the call_user_func_array. One complex example is the following:

```
$one = "One";
$two = "Two";
$three = "Three";
$callback_func = "my_function";
$result = call_user_func_array($callback_func,array($one,$two,$three)); echo $result;
```

These equations may show as a bunch of gibberish letters and numbers but these symbols actually account to make a certain task easier. And that, for us, is the most important thing.

Computer Programming Functions: Get to Know What They Are

When it comes to computer programming vocabulary, there are so many terminologies that people who do not have enough know-how tend to become lost and confused. One term could be translated into so many different names in different languages. For example, the following words are quite similar: Functions, Programs, Subroutines, Procedures, Subprograms, or Subqueries. The only question now is which of these terms could stand on their own.

Theoretically speaking, computer programming avoids the duplication of any code in multiple spaces. For example, one institution utilizing the programs could have some libraries of different thousands or even more programs with billions of basic code lines. With such intricate case, duplication could still be avoided. Let us say that an error message occurs because the collection now needs to have an additional 'member'.

A good example is the addition of another global currency called the Euro. If each and every program will be told to update itself because of this new addition, it could be complex. But with sub-programs or functions specifically designed to handle diverse situations, then the only function that would take care of the change would be the one assigned to handle such a scenario.

In the same way that we write new programs, many of the components that it will need are already in existence (e.g. accessing a certain file to dig up a certain data, computing inventories on hand). In cases such as this, a good alternative to writing different source code lines to work on the new function (and eventually replication of the code onto numerous other programs), the sub-program is accessed to work on the specified function.

In a handful of programming languages, there are certain parameters that are being passed from a specific program name to the program that is being called to do a task. A secondary program usually makes the values altered and then the control is brought back to the main program. These actions could be levels deeper. The various programs that are being used to call each other are written in so many varying languages. The reasons behind this are: to have a reasonable controllable function pieces and having various languages means being better able to suit different function types.

To further define the uses of programming functions, a function may appear in two different locations or even a single location. This depends on whether it is multi-line or single-line function. A function that is single line is one that gives back a value after performing tasks (all of this in a single line). The multi-line function, however, is stretched on many different lines.

A single line function could show in a code block all because it only responds when called by a certain name. The multi-line function does otherwise. If it is a multi-line function that is being defined in a block of code, then the statements that follow the definition are done in a non-sequential manner.

In its simplicity, functions are code blocks that can be reusable. These code blocks often return single values (sometimes they don't). Common examples of these code blocks are

Mathematical functions (e.g. tan or log), date functions (figures between two dates), or string functions (looking for incidents of 1 string located within another string). Functions are also kept separately from the primary program code. A lot of programming language has specific functions which are delegated as entry points to a certain program.

Knowing what functions are in computer programming could take sometime to noncomputer savvy individuals. But the basics are all here. Looking at the many complex things that functions do, you get to appreciate the things that the computer does for you each day, don't you?

The Future of Computer Programming

Computer programming is also known as software program or sometimes it is simply called 'program'. Whatever name it's called, its purpose is to provide instructions to a computer machine. If there is one thing that a computer needs to be able to function (aside from electricity, of course!), it would be computer programs. The executor of the instructions is the central processor.

Computer programming is categorized into two functional lines which are the application and system software. And when it comes to working on these matters, the experts are the so-called computer programmers or software developers. But where there is software, there should also exist the hardware. Generally speaking, hardware devices are any physical things that are being used in computer manipulation. Examples are circuit boards, keyboards and processors. The development of hardware plays a major role on the advancement of computer programming.

This is because most computer programs are embedded in hardware. This means that some programs that are stored in the computer can be accessed by an initial program that is stored in its ROM for booting. The process of booting is to be able to recognize and also initialize all system features.

After the initialization process, the primary program of the computer would load the operating system which would set the program counters to initiate usual operations. Totally self-sufficient, a hardware device could have some embedded firmware in controlling its operation.

Nowadays, there are a number of hardware development tools in the market. Along with some software development kits are the hardware development tools that are designed to allow users to have control on design flow processes. There are many different types to choose from. There are development boards for hardware that are used in assisting designers for systems and software to validate designs. For example, there are tools that are used in SoC prototypes, or there are tools that combine several device features such as Flash programmer or Memory emulator.

Going back to the basics, there are numerous computer programs that would run concurrently on just one computer. This process is called multitasking. And multitasking can run on either software or hardware systems.

Operating systems that are modern are able to run several programs through the so-called process scheduling—this is software system that switches the central processing unit amongst processes. By doing this, users are able to interact with every single program while it is being run. As to hardware, modern multiprocessors or computers that are equipped with multicore processor might run several programs.

'Heard of the term open source hardware? There is currently no real definition of this term but this is generally understood as open source software usage alongside hardware. Also, this is the free discharge of information on the hardware (release on schematics, size, design and other information). This is the latest in open source hardware information and logic design sharing is a known open source hardware form.

Designers of open hardware often meet to discuss design problems and their corresponding solutions; they also assist each other in looking for parts; they also meet to converse about recent developments in their works.

Since it is believed that the development of software is quite limited (and might even have reached its peak), the focus on progression is now on hardware development. With the many hardware development tools in the market nowadays, the world could look forward to more innovations in the not-so-distant future...or maybe even tomorrow.

Computer Programming and Its Rich History

If it's the history of programming that has to be retold, then it is safe to begin an account with the difference engine of Charles Babbage way back in 1822. Even from the time when computers were so simple, they still needed to have instructions so that they will be able to perform tasks that are inputted to them. This set of instructions is what is known today as computer programming.

During the difference engine's era, the gears needed to be changed manually which would then result into the calculations being made. All of that was changed when signals of electricity replaced physical motion with the US Government's 1942 machine named ENIAC. The concept of accepting programming was also followed by this machine.

To make programming faster, two vital concepts which directly influenced programming languages were developed in 1945 by John Von Neumann, who was then with the Institute for Advanced Study. The first concept was known as the shared-program method. This concept dictated that the hardware had to be noncomplex and need not be hand-wired for every program. Intricate instructions were used to control this type of hardware which made reprogramming quicker.

The second concept called the 'conditional control transfer' gave birth to code blocks which can be used even in different orders or the so-called subroutines. The next part of the concept was logical branching. With this, the concept of having code blocks that can be used and reused was born.

By 1949, the Short Code language came out. It became the mother of electronic device computer language. With this language, the programmer was required to use 0's and 1's instead of the usual statements. 1951 marked the appearance of compiler named A-0 by Grace Hopper. This program translated all the 0's and 1's for the computer. This gave way to much quicker programming.

FORTRAN (FORMula TRANslating System) was introduced in 1957 which was also the first key language. It was designed for IBM for scientific computation. This language included the GOTO, DO and IF statements. FORTRAN's forte was not business computing, though. It was a good program for number handling but not for business computations.

COBOL was then developed in 1959. It was designed as a businessman's language. The COBOL's program was comparable to an essay where there are 4-5 sections comprising a major whole. This made it easier to study.

The LISP language (developed for artificial intelligence study) also known as the Cambridge Polish was developed in 1958 by John McCarthy. This programming language is highly abstract and specific that is why it is still being used today. The LISP can store lists and modify them on its own.

In that same year, the Algol language was produced. This became the mother of the Pascal language, C and C++, and also Java. Algol also had the first proper grammar called the Backus-Naar form or BNF. Algol 68, which was the next version, was a harder version to use. Due to this difficulty, Pascal came into existence.

Niklaus Wirth introduced the Pascal language in 1968. It was a necessary means of teaching then. It was a combination of the following languages: ALGOL, FORTRAN and COBOL. It was also Pascal that improved the pointer data form. Its downfall was caused by its lack of variable groups. Modula-2 then appeared but C was already popular among many users.

C by Dennis Ritchie (1972, used by Unix) was comparable to Pascal but its precursors were the B and BCPL. It is also being used in Windows, Linux and MacOS. OOP (Object Oriented Programming) was developed in 1970's until the 80's. This developed into the C++ language in 1983. This language can manipulate many tasks all at the same time. This is also the chosen language courses in AP Computer Science. In 1987, Perl (Practical Extraction and Reporting Language) was developed.

Java soon followed in 1994. It has yet many goals to reach especially with its slowrunning programs. But there are high hopes that a lot is in store in the future for this language. Microsoft has also developed VB or Visual Basic which uses widgets and these are now widely used.

The future holds many more developments for computer programming. It may have started on a crude method but looking at the languages in use today, there were so many developments that we can only wonder what 'impossibilities' could be made possible very soon.

Information on Computer Programming

Many of today's companies, businesses, and organizations depend largely on computers and computer software. Nearly all our business and organizational processes, from accounting to auditing, editing to writing, and communications to schedule organizing, all work best with the help of computers. There are many different programs that are associated with all these processes, and they deal with helping computer users make spreadsheets, tally earnings, check for grammatical or spelling errors in a document, and organize a person's schedule. These computer programs are made by, and are constantly updated by computer programmers.

The process of computer programming is by no means easy. It starts with developing a program: here, computer programmers will often work with marketers or even sociologists or social psychologists. Together, this team, along with many other members, will determine what computer programs a market might need in order to function better, whether in the workplace or at home. The program's features are developed, with the psychologists or market experts making suggestions, and computer programmers looking at the feasibility of these suggestions.

Once the program's features have been determined, it's time for the computer programmers to go to work. They will then start writing the program. This is done through the process of coding, wherein the programmer types in his or her special language, with the aim of giving rise to a program that will function in the way that it is desired. There are many different computer programming languages that are available: all of them have their own special features, and it is not unlikely for programmers to be adept in only one or two languages. This can make their work easier, because a computer programming language needs to be learned in enough depth to write it out and identify errors later.

Once the program has been written out, it has to be tested. This can be done, at the first level, by the computer programmer: the programmer will test the program on different operating systems, with different microprocessor speeds, and then, eventually, with beta users. In the past, software companies did not immediately release their software unless it was completely free from errors. Today, however, many errors might not be pinpointed early on, so beta versions are released, often with the request that users report any bugs so that they can be immediately fixed.

Once testing has revealed different kinds of program errors, the programmer can then debug the program or troubleshoot these errors. The errors will often arise from coding errors, and the computer programmer will often go back to the code and make the necessary corrections. If there are no coding errors and the program is still not functioning properly, then the programmer may have to modify the code or rewrite the program altogether.

A computer programmer is also in charge of updating a program and making sure that it fits a growing market's needs. In this case, the computer programmer may have to check back with the marketing team and the social psychologist in order to find out if there are new things that the market might be interested in. Better yet, the computer programmer can ask for suggestions from the market itself in order for the program to function better.

For more information on computer programming, talk to a computer science expert, or read on computer programs and the process of coding.

The Benefits of Computer Programming

Many of the technologies we enjoy today are the result of computer programming. Technologies that allow us to utilize and enjoy the Internet, desktop and laptop computers, mobile phones, video games, even those that run automated processes in homes, offices, banks and airports are available thanks to the genius of computer programming. However, the uses of computer programming are not limited to these alone. It actually has numerous benefits, such as:

It allows the programmer to have a better understanding of computers. Computers are run by programs. Without programs, computers are nothing but steel, plastic and alloy, essentially useless. With a background knowledge in programming, it makes it easier to understand how computers work, which helps users view the equipment as more than a tool.

A better understanding of computers also allows users to determine the hows and whys of the system, which helps them become more effective in using the equipment. Knowing how programs work makes it easy to understand their limitations, such as what they can and cannot do. This helps users maintain realistic expectations about computers and learn how to maximize their equipment.

Programmers are able to create newer, more useful programs.

Computer programming is responsible for creating very valuable programs. Operating systems, for example, the heart and soul of every computer, are made up of thousands, even millions of smaller programs. If you have the right skills in computer programming, it will be easy to literally build a program from scratch and create a very useful tool that may be utilized in many different fields or industries.

Programmers are able to correct bugs in a program.

A background in computer programming will allow you to look at a problematic program and do more than just sit helpless. If there is a glitch or bug in the program, it will be easy for a trained individual to look at the system, detect and locate the problem and make the necessary corrections. Testing the program will then be easier once you understand what the defective issue was.

It allows programmers to improve an existing program.

Modifying a program is the realm of programmers who deal with specialist applications. Computer programmers, especially those who have the training and experience, can take a look at an existing program and determine whether or not it has the necessary components to become a highly optimized program. If it is not, they can modify the program and improve it, creating a newer, better version. This is usually done if the program is problematic or if there are bugs in the system.

It provides programmers more creative ways to entertain.

There is a huge market for games and other forms of entertainment that computer programming can support. New video games, mobile games, animations, graphics and file types are the results of programming.

Computer programming is an exciting career.

For individuals looking for a great future in information technology, computer

programming is an excellent career path to follow. According to the figures estimated by the Bureau of Labor Statistics, the field of computer science will continue to grow. The need for programmers, for example, is predicted to increase by more than 70% by 2010, which is more than a 50% increase in the number currently required.

Computer programming and the future

One of the most exciting benefits of computer programming is that it offers us a glimpse of the future. The possibilities being offered today, such as CGIs, voiceautomated technology, artificial intelligence, more sophisticated programs and the like are just a few of the things we can expect. With computer programming, many aspects of our lives have gotten easier, quicker, safer and much more interesting.

Computer Programming: Working In a Team

Computer programming requires some very intricate work. This is the type of work that thrives on details and people who work in this field understand that the absence of even the minute elements can spell a huge difference in the overall result. If a programmer fails to correct this problem, it can lead to errors down the line. As a result, bugs will appear in the system and errors will emerge later on. Programming is also taxing work, requiring hours upon hours of writing, testing and debugging. This is why computer programming thrives on team work. Without team work, a single computer program can take decades to complete.

Although one programmer has the necessary skills and knowledge to work competently on a problem or even create a program, he or she can only do so much. Creating the source code for an operating system, for example, will require thousands of manhours from a single programmer and most probably, he or she will only be halfway through. There just isn't enough time for one or even two programmers to work effectively to produce a usable program.

Team profile

So what constitutes a team in computer programming? A team is usually headed by the team leader, such as a systems analyst or senior programmer. The senior programmer is usually a person who has had years of training and experience behind him. His task is to supervise the team, lead in brainstorming and problem solving sessions, delegate assignments, check the correctness of the coding, dispense advice and recommendations and lead in debugging and software maintenance.

The team leader is the one who holds the team together and ensures there is a well coordinated effort that will lead to the desired results. All team members report to him and depending on the size of the project, the team leader may have an assistant or another leader to work with.

The team is usually composed of junior or entry level programmers, particularly those who may have the qualifications but not the number of years' worth of experience yet. Depending on what the team leader wants, a junior programmer may be tasked to work on his own on much simpler assignments or he may be assigned as part of a group. This group may consist of other entry level programmers or more experienced professionals.

The members of a team are chosen based on their expertise. At the beginning of a project, the team leader, along with other more senior programmers, will try to break down the problem into components, which will consist of tasks. Tasks can vary according to complexity and function and will be assigned to a team who has the skills to complete them.

The number of programmers in a team can be as small as 3 or it can number in the dozens or even hundreds. Again, it all depends on the size of the project and the availability of resources.

Team work is a necessary component of computer programming. It helps pool a group's resources and form a coordinated effort in order to produce a particular program or software. In some cases, such as in exceptionally huge projects, some teams may work

alternately or in shifts, which makes it necessary that a team is capable of sustaining coordination among them.

Team work drives computer programming. A vast majority of the computer programs and software we enjoy today – from the operating systems to the video games to the technology that run our phones – were produced not by a single programmer but by a team. Whatever it is that has made using computers and other forms of technology that much easier and more convenient is something we owe to a team of well-trained and highly skilled computer programmers.