Sample Template: **Version 1.0.1**

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# New Chapter

[Ada Lovelace](https://en.wikipedia.org/wiki/Ada_Lovelace) is considered by many to be the first computer programmer.[[1]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-1)

British [countess](https://en.wikipedia.org/wiki/Count) and mathematician [Ada Lovelace](https://en.wikipedia.org/wiki/Ada_Lovelace) is often considered to be the first computer programmer, as she was the first to publish part of a program (specifically an [algorithm](https://en.wikipedia.org/wiki/Algorithm)) intended for implementation on [Charles Babbage](https://en.wikipedia.org/wiki/Charles_Babbage)'s [analytical engine](https://en.wikipedia.org/wiki/Analytical_engine), in October 1842. The algorithm was used to calculate [Bernoulli numbers](https://en.wikipedia.org/wiki/Bernoulli_number).[[2]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-2)[Because Babbage's machine was never completed as a functio](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-2)

# New Chapter

# Programmer

From Wikipedia, the free encyclopedia

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| <https://en.wikipedia.org/wiki/File:Text_document_with_red_question_mark.svg> | This article **possibly contains inappropriate or misinterpreted [citations](https://en.wikipedia.org/wiki/Wikipedia:CITE) that do not [verify](https://en.wikipedia.org/wiki/Wikipedia:V) the text**. Please help [improve this article](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit) by checking for citation inaccuracies. *(September 2020)* *([Learn how and when to remove this template message](https://en.wikipedia.org/wiki/Help:Maintenance_template_removal))* |

*This article is about people who write computer software. For other uses, see [Programmer (disambiguation)](https://en.wikipedia.org/wiki/Programmer_(disambiguation)).*

*For someone who performs coding in the social sciences, see [Coding (social sciences)](https://en.wikipedia.org/wiki/Coding_(social_sciences)).*

*For someone who performs medical coding, see [Medical coding](https://en.wikipedia.org/wiki/Medical_coding).*

*For the unincorporated community in Pennsylvania, see [Coder, Pennsylvania](https://en.wikipedia.org/wiki/Coder,_Pennsylvania).*

<https://en.wikipedia.org/wiki/File:IBM_Electronic_Data_Processing_Machine_(9467782802).jpg>

Two programmers working on an [IBM 704](https://en.wikipedia.org/wiki/IBM_704) at [NACA](https://en.wikipedia.org/wiki/National_Advisory_Committee_for_Aeronautics), 1954

A **computer programmer**, sometimes called a **software developer**, a **programmer** or more recently a **coder** (especially in more informal contexts), is a person who creates [computer software](https://en.wikipedia.org/wiki/Computer_software). The term *computer programmer* can refer to a specialist in one area of [computers](https://en.wikipedia.org/wiki/Computers), or to a generalist who writes code for many kinds of software.

A programmer's most oft-used [computer language](https://en.wikipedia.org/wiki/Computer_language) (e.g., [Assembly](https://en.wikipedia.org/wiki/Assembly_language), [COBOL](https://en.wikipedia.org/wiki/COBOL), [C](https://en.wikipedia.org/wiki/C_(programming_language)), [C++](https://en.wikipedia.org/wiki/C%2B%2B), [C#](https://en.wikipedia.org/wiki/C_Sharp_(programming_language)), [JavaScript](https://en.wikipedia.org/wiki/JavaScript_(programming_language)), [Lisp](https://en.wikipedia.org/wiki/Lisp_(programming_language)), [Python](https://en.wikipedia.org/wiki/Python_programming_language)) may be prefixed to the term *programmer*. Some who work with [web](https://en.wikipedia.org/wiki/World_Wide_Web) programming languages also prefix their titles with *web*.

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## History[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=1)]

*See also: [Computer program § History](https://en.wikipedia.org/wiki/Computer_program" \l "History), [Computer programming § History](https://en.wikipedia.org/wiki/Computer_programming" \l "History), and [Programming language § History](https://en.wikipedia.org/wiki/Programming_language" \l "History)*

<https://en.wikipedia.org/wiki/File:Ada_Lovelace_portrait.jpg>

[Ada Lovelace](https://en.wikipedia.org/wiki/Ada_Lovelace) is considered by many to be the first computer programmer.[[1]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-1)

British [countess](https://en.wikipedia.org/wiki/Count) and mathematician [Ada Lovelace](https://en.wikipedia.org/wiki/Ada_Lovelace) is often considered to be the first computer programmer, as she was the first to publish part of a program (specifically an [algorithm](https://en.wikipedia.org/wiki/Algorithm)) intended for implementation on [Charles Babbage](https://en.wikipedia.org/wiki/Charles_Babbage)'s [analytical engine](https://en.wikipedia.org/wiki/Analytical_engine), in October 1842. The algorithm was used to calculate [Bernoulli numbers](https://en.wikipedia.org/wiki/Bernoulli_number).[[2]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-2) Because Babbage's machine was never completed as a functioning standard in Lovelace's time, she unfortunately never had the opportunity to see the algorithm in action.

The first person to execute a program on a functioning, modern, electronic computer was the renowned [computer scientist](https://en.wikipedia.org/wiki/Computer_scientist) [Konrad Zuse](https://en.wikipedia.org/wiki/Konrad_Zuse), in 1941.

<https://en.wikipedia.org/wiki/File:Two_women_operating_ENIAC_(full_resolution).jpg>

[Betty Jennings](https://en.wikipedia.org/wiki/Jean_Bartik) and [Fran Bilas](https://en.wikipedia.org/wiki/Frances_Spence), part of the first [ENIAC](https://en.wikipedia.org/wiki/ENIAC) programming team

The [ENIAC](https://en.wikipedia.org/wiki/ENIAC) programming team, consisting of [Kay McNulty](https://en.wikipedia.org/wiki/Kathleen_Antonelli), [Betty Jennings](https://en.wikipedia.org/wiki/Jean_Bartik), [Betty Snyder](https://en.wikipedia.org/wiki/Betty_Holberton), [Marlyn Wescoff](https://en.wikipedia.org/wiki/Marlyn_Meltzer), [Fran Bilas](https://en.wikipedia.org/wiki/Frances_Spence) and [Ruth Lichterman](https://en.wikipedia.org/wiki/Ruth_Teitelbaum) were the first regularly working programmers.[[3]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-3)[[4]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-4) International Programmers' Day is celebrated annually on 7 January.[[5]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-5) In 2009, the [government of Russia](https://en.wikipedia.org/wiki/Government_of_Russia) decreed a professional annual holiday known as [Programmers' Day](https://en.wikipedia.org/wiki/Programmers'_Day) to be celebrated on 13 September (12 September in leap years). It had already been an *unofficial* holiday before that in many countries.

### **Software**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=2)]

The word *software* was used as early as 1953, but did not regularly appear in print until the 1960s.[[6]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-6) Before this time, computers were programmed either by customers or the few commercial computer manufacturers of the time, such as [UNIVAC](https://en.wikipedia.org/wiki/UNIVAC) and [IBM](https://en.wikipedia.org/wiki/IBM). The first company founded to specifically provide software products and services was the [Computer Usage Company](https://en.wikipedia.org/wiki/Computer_Usage_Company), in 1955.[[7]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-7)

The software industry expanded in the early 1960s, almost immediately after computers were first sold in mass-produced quantities. Universities, governments, and businesses created a demand for software. Many of these programs were written in-house by full-time staff programmers; some were distributed freely between users of a particular machine for no charge. And others were developed on a commercial basis. Other firms, such as [Computer Sciences Corporation](https://en.wikipedia.org/wiki/Computer_Sciences_Corporation) (founded in 1959) also started to grow. The computer/[hardware](https://en.wikipedia.org/wiki/Computer_hardware) manufacturers soon started bundling [operating systems](https://en.wikipedia.org/wiki/Operating_systems), [system software](https://en.wikipedia.org/wiki/System_software) and programming environments with their machines.[*[citation needed](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)*]

The industry expanded greatly with the rise of the [personal computer](https://en.wikipedia.org/wiki/Personal_computer) ("PC") in the mid-1970s, which brought computing to the average office worker. In the following years the PC also helped create a constantly-growing market for games, applications and utilities software.[[8]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-8)

In the early years of the 21st century, another successful [business model](https://en.wikipedia.org/wiki/Business_model) has arisen for hosted software, called [software-as-a-service](https://en.wikipedia.org/wiki/Software-as-a-service), or SaaS. From the point of view of producers of some [proprietary software](https://en.wikipedia.org/wiki/Proprietary_software), SaaS reduces the concerns about [unauthorized copying](https://en.wikipedia.org/wiki/Software_copyright), since it can only be accessed through the Web, and by definition, no [client software](https://en.wikipedia.org/wiki/Client_software) is loaded onto the end user's PC. SaaS is typically run out of the [cloud](https://en.wikipedia.org/wiki/Cloud_computing).[[9]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-hardiman2014-9)

## Nature of the work[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=3)]

*Some of this section is from the [Occupational Outlook Handbook](http://www.bls.gov/oco/ocos110.htm), 2006–07 Edition, which is in the [public domain](https://en.wikipedia.org/wiki/Public_domain) as a [work of the United States Government](https://en.wikipedia.org/wiki/Work_of_the_United_States_Government).*

Computer programmers write, test, [debug](https://en.wikipedia.org/wiki/Debug), and maintain the detailed instructions, called [computer programs](https://en.wikipedia.org/wiki/Computer_programs), that computers must follow to perform their functions. Programmers also conceive, design, and test logical structures for solving problems by computer. Many technical innovations in programming — advanced computing technologies and sophisticated new languages and programming tools — have redefined the role of a programmer and elevated much of the programming work done today. Job titles and descriptions may vary, depending on the organization.

Programmers work in many settings, including corporate [information technology](https://en.wikipedia.org/wiki/Information_technology) ("IT") departments, big [software companies](https://en.wikipedia.org/wiki/Software_companies), small service firms and government entities of all sizes. Many professional programmers also work for consulting companies at client sites as [contractors](https://en.wikipedia.org/wiki/Independent_contractor). [Licensing](https://en.wikipedia.org/wiki/License) is not typically required to work as a programmer, although [professional certifications](https://en.wikipedia.org/wiki/Professional_certification) are commonly held by programmers. Programming is widely considered a [profession](https://en.wikipedia.org/wiki/Profession) (although some[*[who?](https://en.wikipedia.org/wiki/Wikipedia:Manual_of_Style/Words_to_watch" \l "Unsupported_attributions)*] authorities disagree on the grounds that only careers with legal licensing requirements count as a profession).

Programmers' work varies widely depending on the type of business for which they are writing programs. For example, the instructions involved in updating financial records are very different from those required to duplicate conditions on an aircraft for pilots training in a flight simulator. Simple programs can be written in a few hours, more complex ones may require more than a year of work, while others are never considered 'complete' but rather are continuously improved as long as they stay in use. In most cases, several programmers work together as a team under a senior programmer's supervision.

<https://en.wikipedia.org/wiki/File:Coding_Shots_Annual_Plan_high_res-5.jpg>

A software engineer writing [JavaScript](https://en.wikipedia.org/wiki/JavaScript)

Programmers write programs according to the specifications determined primarily by more senior programmers and by [systems analysts](https://en.wikipedia.org/wiki/Systems_analyst). After the design process is complete, it is the job of the programmer to convert that design into a logical series of instructions that the computer can follow. The programmer codes these instructions in one of many programming languages. Different programming languages are used depending on the purpose of the program. [COBOL](https://en.wikipedia.org/wiki/COBOL), for example, is commonly used for business applications that typically run on [mainframe](https://en.wikipedia.org/wiki/Mainframe_computer) and [midrange](https://en.wikipedia.org/wiki/Minicomputer) computers, whereas [Fortran](https://en.wikipedia.org/wiki/Fortran) is used in science and engineering. [C++](https://en.wikipedia.org/wiki/C%2B%2B) and [Python](https://en.wikipedia.org/wiki/Python_(Programming_Language)) are widely used for both scientific and business applications. [Java](https://en.wikipedia.org/wiki/Java_(programming_language)), [C#](https://en.wikipedia.org/wiki/C_Sharp_(programming_language)), [JS](https://en.wikipedia.org/wiki/JavaScript) and [PHP](https://en.wikipedia.org/wiki/PHP) are popular programming languages for Web and business applications. Programmers generally know more than one programming language and, because many languages are similar, they often can learn new languages relatively easily. In practice, programmers often are referred to by the language they know, e.g. as *Java programmers*, or by the type of function they perform or the environment in which they work: for example, *[database](https://en.wikipedia.org/wiki/Database) programmers*, *mainframe programmers*, or [Web developers](https://en.wikipedia.org/wiki/Web_developer).

When making changes to the [source code](https://en.wikipedia.org/wiki/Source_code) that programs are made up of, programmers need to make other programmers aware of the task that the routine is to perform. They do this by inserting comments in the [source code](https://en.wikipedia.org/wiki/Source_code) so that others can understand the program more easily and by [documenting their code](https://en.wikipedia.org/wiki/Software_documentation). To save work, programmers often use [libraries](https://en.wikipedia.org/wiki/Library_(computing)) of basic code that can be modified or customized for a specific application. This approach yields more reliable and consistent programs and increases programmers' productivity by eliminating some routine steps.

### **Testing and debugging**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=4)]

Programmers test a program by running it and looking for [bugs](https://en.wikipedia.org/wiki/Software_bug) (errors). As they are identified, the programmer usually makes the appropriate corrections, then rechecks the program until an acceptably low level and severity of bugs remain. This process is called [testing](https://en.wikipedia.org/wiki/Software_testing) and [debugging](https://en.wikipedia.org/wiki/Debugging). These are important parts of every programmer's job. Programmers may continue to fix these problems throughout the life of a program. Updating, repairing, modifying, and expanding existing programs is sometimes called *maintenance programming*. Programmers may contribute to [user guides](https://en.wikipedia.org/wiki/User_guide) and [online help](https://en.wikipedia.org/wiki/Online_help), or they may work with [technical writers](https://en.wikipedia.org/wiki/Technical_writer) to do such work.

### **Application versus system programming**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=5)]

Computer programmers often are grouped into two broad types: application programmers and systems programmers. Application programmers write programs to handle a specific job, such as a program to track inventory within an organization. They also may revise existing packaged software or customize generic applications which are frequently purchased from [independent software vendors](https://en.wikipedia.org/wiki/Independent_software_vendor). Systems programmers, in contrast, write programs to maintain and control computer systems software, such as [operating systems](https://en.wikipedia.org/wiki/Operating_system) and [database management systems](https://en.wikipedia.org/wiki/Database_management_system). These workers make changes in the instructions that determine how the network, workstations, and [CPU](https://en.wikipedia.org/wiki/Central_processing_unit) of the system handle the various jobs they have been given and how they communicate with peripheral equipment such as [printers](https://en.wikipedia.org/wiki/Computer_printer) and [disk drives](https://en.wikipedia.org/wiki/Data_storage_device).

### **Qualifications and skills**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=6)]

A software developer needs to have deep technical expertise with certain aspects of computing. Some positions will require a degree in a relevant field such as computer science, information technology, engineering, programming, or any other IT related post-graduate studies.[[10]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-10) An ideal software developer is a self-motivated professional carrying a dynamic hands-on experience on key languages of programming such as [C++](https://en.wikipedia.org/wiki/C%2B%2B), [C#](https://en.wikipedia.org/wiki/C_Sharp_(programming_language)), [PHP](https://en.wikipedia.org/wiki/PHP), [Java](https://en.wikipedia.org/wiki/Java_(programming_language)), [C](https://en.wikipedia.org/wiki/C_(programming_language)), [JavaScript](https://en.wikipedia.org/wiki/JavaScript), [Visual Basic](https://en.wikipedia.org/wiki/Visual_Basic), [Python](https://en.wikipedia.org/wiki/Python_(programming_language)), and [Smalltalk](https://en.wikipedia.org/wiki/Smalltalk).

According to developer Eric Sink, the differences between system design, [software development](https://en.wikipedia.org/wiki/Software_development), and programming are more apparent. Already in the current market place, there can be found a segregation between programmers and developers, in that one who implements is not the same as the one who designs the [class](https://en.wikipedia.org/wiki/Class_(computer_science)) structure or hierarchy. Even more, so that developers become [software architects](https://en.wikipedia.org/wiki/Software_architect) or [systems architects](https://en.wikipedia.org/wiki/Systems_architect), those who design the multi-leveled architecture or component interactions of a large software system.[[11]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-Sourcegear_2005-11)

### **Types of software**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=7)]

Programmers in software development companies may work directly with experts from various fields to create software – either programs designed for specific clients or packaged software for general use – ranging from [video games](https://en.wikipedia.org/wiki/Video_game) to educational software to programs for [desktop publishing](https://en.wikipedia.org/wiki/Desktop_publishing) and financial planning. Programming of packaged software constitutes one of the most rapidly growing segments of the computer services industry. Some companies or organizations – even small ones – have set up their own IT team to ensure the design and development of in-house software to answer to very specific needs from their internal end-users, especially when existing software are not suitable or too expensive. This is, for example, the case in [research laboratories](https://en.wikipedia.org/wiki/Research_laboratories).[*[citation needed](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)*]

In some organizations, particularly small ones, people commonly known as *programmer analysts* are responsible for both the systems analysis and the actual programming work. The transition from a mainframe environment to one that is based primarily on [personal computers](https://en.wikipedia.org/wiki/Personal_computers) (PCs) has blurred the once rigid distinction between the programmer and the user. Increasingly, adept end-users are taking over many of the tasks previously performed by programmers. For example, the growing use of packaged software, such as spreadsheet and database management software packages, allows users to write simple programs to access data and perform calculations.[*[citation needed](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)*]

In addition, the rise of the Internet has made [web development](https://en.wikipedia.org/wiki/Web_development) a huge part of the programming field. Currently, more software applications are [web applications](https://en.wikipedia.org/wiki/Web_application) that can be used by anyone with a [web browser](https://en.wikipedia.org/wiki/Web_browser).[*[citation needed](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)*] Examples of such applications include the [Google](https://en.wikipedia.org/wiki/Google) search service, the [Outlook.com](https://en.wikipedia.org/wiki/Outlook.com) e-mail service, and the [Flickr](https://en.wikipedia.org/wiki/Flickr) photo-sharing service.

Programming editors, also known as [source code editors](https://en.wikipedia.org/wiki/Source_code_editor), are text editors that are specifically designed for programmers or developers for writing the source code of an application or a program. Most of these editors include features useful for programmers, which may include color [syntax highlighting](https://en.wikipedia.org/wiki/Syntax_highlighting), auto indentation, [auto-complete](https://en.wikipedia.org/wiki/Auto-complete), bracket matching, [syntax check](https://en.wikipedia.org/wiki/Syntax_checker), and allows [plug-ins](https://en.wikipedia.org/wiki/Plug-in_(computing)). These features aid the users during coding, [debugging](https://en.wikipedia.org/wiki/Debugging) and testing.[[12]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-12)

## Globalization[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=8)]

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| --- | --- |
|  | The examples and perspective in this article **deal primarily with the United States and do not represent a [worldwide view](https://en.wikipedia.org/wiki/Wikipedia:WikiProject_Countering_systemic_bias) of the subject**. You may [improve this article](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit), discuss the issue on the [talk page](https://en.wikipedia.org/wiki/Talk:Programmer), or [create a new article](https://en.wikipedia.org/wiki/Wikipedia:Article_wizard), as appropriate. *(December 2010)* *([Learn how and when to remove this template message](https://en.wikipedia.org/wiki/Help:Maintenance_template_removal))* |

### **Market changes in the UK**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=9)]

According to BBC News, 17% of computer science students could not find work in their field 6 months after graduation in 2009 which was the highest rate of the university subjects surveyed while 0% of medical students were unemployed in the same survey.[[13]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-13) The UK category system does, however, class such degrees as [information technology](https://en.wikipedia.org/wiki/Information_technology) and [game design](https://en.wikipedia.org/wiki/Game_design) as 'computer science', industries in which jobs can be extremely difficult to find, somewhat inflating the actual figure.[[14]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-14)

### **Market changes in the US**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=10)]

Computer programming, [offshore outsourcing](https://en.wikipedia.org/wiki/Offshore_outsourcing), and [Foreign Worker Visas](https://en.wikipedia.org/wiki/Foreign_Worker_Visa) became a controversial topic after the crash of the [dot-com bubble](https://en.wikipedia.org/wiki/Dot-com_bubble) left many programmers without work or with lower wages. Programming was even mentioned in the 2004 US Presidential debate on the topic of [offshore outsourcing](https://en.wikipedia.org/wiki/Offshore_outsourcing).[[15]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-15)

Large companies claim there is a [skills shortage](https://en.wikipedia.org/wiki/Skills_shortage) with regard to programming talent. However, US programmers and unions counter that large companies are exaggerating their case in order to obtain cheaper programmers from developing countries and avoid previously employer-paid training using industry-specific technologies not covered in most accredited degree programs.[[16]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-16)[[17]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-17) Other reasons for employers claiming skill shortages is the result of their own cost-saving combining of several disparate skill sets previously held by several specialized programmers into fewer generalized [multifaceted](https://en.wikipedia.org/wiki/Mechatronics) positions that are unlikely to have enough [" qualified" candidates](https://en.wikipedia.org/wiki/Purple_squirrel) with the desired experience.[[18]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-18)

Enrollment in computer-related degrees in the US has dropped for years, especially for women[[19]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-19), due to lack of general interests in science and mathematics and also out of an apparent fear that programming will be subject to the same pressures as manufacturing and agriculture careers.[[20]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-20) This situation has resulted in confusion about whether the US economy is entering a "post-[information](https://en.wikipedia.org/wiki/Quaternary_sector_of_the_economy) age" and the nature of US [comparative advantages](https://en.wikipedia.org/wiki/Comparative_advantage). Most academic institutions have an [Institutional research](https://en.wikipedia.org/wiki/Institutional_research) office that keeps past statistics of degrees conferred which shows several dips and rises in Computer Science degrees over the past 30 years. The overall trend shows a slightly overall decline in growth (especially when compared to other STEM degree growth) since certain peaks of [1986](https://en.wikipedia.org/wiki/Early_1980s_recession_in_the_United_States), [1992](https://en.wikipedia.org/wiki/Early_1990s_recession_in_the_United_States), [2002](https://en.wikipedia.org/wiki/Dot-com_bubble), and [2008](https://en.wikipedia.org/wiki/Great_Recession) showing periods of flat growth or even declines.[[21]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-21), In addition, the U.S. Bureau of Labor Statistics Occupational Outlook 2016-26 a decline of 7 percent and a decline of 9 percent from 2019 to 2029 [[22]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-22) is expected for Computer Programmers because [Computer programming](https://en.wikipedia.org/wiki/Computer_programming) can be done from anywhere in the world, so companies sometimes hire programmers in countries where wages are lower.[[23]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-23)

### **Country comparison**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=11)]

[Russia](https://en.wikipedia.org/wiki/Russia) and [China](https://en.wikipedia.org/wiki/China) are the countries that are ranked very high when it comes to talent in computer programming.[[24]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-24)[[25]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-25)

## See also[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=12)]

* ***[Computer programming portal](https://en.wikipedia.org/wiki/Portal:Computer_programming)***



* [Game programmer](https://en.wikipedia.org/wiki/Game_programmer)
* [List of programmers](https://en.wikipedia.org/wiki/List_of_programmers)
* [Real Programmer syndrome](https://en.wikipedia.org/wiki/Real_Programmer_syndrome)
* [Software development process](https://en.wikipedia.org/wiki/Software_development_process)
* [Software engineering](https://en.wikipedia.org/wiki/Software_engineering)
* [System administrator](https://en.wikipedia.org/wiki/System_administrator)

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11. **[^](https://en.wikipedia.org/wiki/Programmer" \l "cite_ref-Sourcegear_2005_11-0)** [Eric Sink](https://en.wikipedia.org/wiki/Eric_Sink). ["Small ISVs: You need Developers, not Programmers"](http://software.ericsink.com/No_Programmers.html). Sourcegear. Retrieved 6 June 2008. A programmer is someone who does nothing but code new features and (if you're lucky) fix bugs. They don't write specs. They don't write automated test cases. They don't help keep the automated build system up to date. They don't help customers work out tough problems. They don't help write documentation. They don't help with testing. They don't even read code. All they do is write new code.
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## External links[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=15)]

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* [Software developer](http://www.bls.gov/ooh/computer-and-information-technology/software-developers.htm)

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# Programmer

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*This article is about people who write computer software. For other uses, see [Programmer (disambiguation)](https://en.wikipedia.org/wiki/Programmer_(disambiguation)).*

*For someone who performs coding in the social sciences, see [Coding (social sciences)](https://en.wikipedia.org/wiki/Coding_(social_sciences)).*

*For someone who performs medical coding, see [Medical coding](https://en.wikipedia.org/wiki/Medical_coding).*

*For the unincorporated community in Pennsylvania, see [Coder, Pennsylvania](https://en.wikipedia.org/wiki/Coder,_Pennsylvania).*

<https://en.wikipedia.org/wiki/File:IBM_Electronic_Data_Processing_Machine_(9467782802).jpg>

Two programmers working on an [IBM 704](https://en.wikipedia.org/wiki/IBM_704) at [NACA](https://en.wikipedia.org/wiki/National_Advisory_Committee_for_Aeronautics), 1954

A **computer programmer**, sometimes called a **software developer**, a **programmer** or more recently a **coder** (especially in more informal contexts), is a person who creates [computer software](https://en.wikipedia.org/wiki/Computer_software). The term *computer programmer* can refer to a specialist in one area of [computers](https://en.wikipedia.org/wiki/Computers), or to a generalist who writes code for many kinds of software.

A programmer's most oft-used [computer language](https://en.wikipedia.org/wiki/Computer_language) (e.g., [Assembly](https://en.wikipedia.org/wiki/Assembly_language), [COBOL](https://en.wikipedia.org/wiki/COBOL), [C](https://en.wikipedia.org/wiki/C_(programming_language)), [C++](https://en.wikipedia.org/wiki/C%2B%2B), [C#](https://en.wikipedia.org/wiki/C_Sharp_(programming_language)), [JavaScript](https://en.wikipedia.org/wiki/JavaScript_(programming_language)), [Lisp](https://en.wikipedia.org/wiki/Lisp_(programming_language)), [Python](https://en.wikipedia.org/wiki/Python_programming_language)) may be prefixed to the term *programmer*. Some who work with [web](https://en.wikipedia.org/wiki/World_Wide_Web) programming languages also prefix their titles with *web*.

## **Contents**

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*See also: [Computer program § History](https://en.wikipedia.org/wiki/Computer_program" \l "History), [Computer programming § History](https://en.wikipedia.org/wiki/Computer_programming" \l "History), and [Programming language § History](https://en.wikipedia.org/wiki/Programming_language" \l "History)*

<https://en.wikipedia.org/wiki/File:Ada_Lovelace_portrait.jpg>

[Ada Lovelace](https://en.wikipedia.org/wiki/Ada_Lovelace) is considered by many to be the first computer programmer.[[1]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-1)

British [countess](https://en.wikipedia.org/wiki/Count) and mathematician [Ada Lovelace](https://en.wikipedia.org/wiki/Ada_Lovelace) is often considered to be the first computer programmer, as she was the first to publish part of a program (specifically an [algorithm](https://en.wikipedia.org/wiki/Algorithm)) intended for implementation on [Charles Babbage](https://en.wikipedia.org/wiki/Charles_Babbage)'s [analytical engine](https://en.wikipedia.org/wiki/Analytical_engine), in October 1842. The algorithm was used to calculate [Bernoulli numbers](https://en.wikipedia.org/wiki/Bernoulli_number).[[2]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-2) Because Babbage's machine was never completed as a functioning standard in Lovelace's time, she unfortunately never had the opportunity to see the algorithm in action.

The first person to execute a program on a functioning, modern, electronic computer was the renowned [computer scientist](https://en.wikipedia.org/wiki/Computer_scientist) [Konrad Zuse](https://en.wikipedia.org/wiki/Konrad_Zuse), in 1941.

<https://en.wikipedia.org/wiki/File:Two_women_operating_ENIAC_(full_resolution).jpg>

[Betty Jennings](https://en.wikipedia.org/wiki/Jean_Bartik) and [Fran Bilas](https://en.wikipedia.org/wiki/Frances_Spence), part of the first [ENIAC](https://en.wikipedia.org/wiki/ENIAC) programming team

The [ENIAC](https://en.wikipedia.org/wiki/ENIAC) programming team, consisting of [Kay McNulty](https://en.wikipedia.org/wiki/Kathleen_Antonelli), [Betty Jennings](https://en.wikipedia.org/wiki/Jean_Bartik), [Betty Snyder](https://en.wikipedia.org/wiki/Betty_Holberton), [Marlyn Wescoff](https://en.wikipedia.org/wiki/Marlyn_Meltzer), [Fran Bilas](https://en.wikipedia.org/wiki/Frances_Spence) and [Ruth Lichterman](https://en.wikipedia.org/wiki/Ruth_Teitelbaum) were the first regularly working programmers.[[3]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-3)[[4]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-4) International Programmers' Day is celebrated annually on 7 January.[[5]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-5) In 2009, the [government of Russia](https://en.wikipedia.org/wiki/Government_of_Russia) decreed a professional annual holiday known as [Programmers' Day](https://en.wikipedia.org/wiki/Programmers'_Day) to be celebrated on 13 September (12 September in leap years). It had already been an *unofficial* holiday before that in many countries.

### **Software**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=2)]

The word *software* was used as early as 1953, but did not regularly appear in print until the 1960s.[[6]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-6) Before this time, computers were programmed either by customers or the few commercial computer manufacturers of the time, such as [UNIVAC](https://en.wikipedia.org/wiki/UNIVAC) and [IBM](https://en.wikipedia.org/wiki/IBM). The first company founded to specifically provide software products and services was the [Computer Usage Company](https://en.wikipedia.org/wiki/Computer_Usage_Company), in 1955.[[7]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-7)

The software industry expanded in the early 1960s, almost immediately after computers were first sold in mass-produced quantities. Universities, governments, and businesses created a demand for software. Many of these programs were written in-house by full-time staff programmers; some were distributed freely between users of a particular machine for no charge. And others were developed on a commercial basis. Other firms, such as [Computer Sciences Corporation](https://en.wikipedia.org/wiki/Computer_Sciences_Corporation) (founded in 1959) also started to grow. The computer/[hardware](https://en.wikipedia.org/wiki/Computer_hardware) manufacturers soon started bundling [operating systems](https://en.wikipedia.org/wiki/Operating_systems), [system software](https://en.wikipedia.org/wiki/System_software) and programming environments with their machines.[*[citation needed](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)*]

The industry expanded greatly with the rise of the [personal computer](https://en.wikipedia.org/wiki/Personal_computer) ("PC") in the mid-1970s, which brought computing to the average office worker. In the following years the PC also helped create a constantly-growing market for games, applications and utilities software.[[8]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-8)

In the early years of the 21st century, another successful [business model](https://en.wikipedia.org/wiki/Business_model) has arisen for hosted software, called [software-as-a-service](https://en.wikipedia.org/wiki/Software-as-a-service), or SaaS. From the point of view of producers of some [proprietary software](https://en.wikipedia.org/wiki/Proprietary_software), SaaS reduces the concerns about [unauthorized copying](https://en.wikipedia.org/wiki/Software_copyright), since it can only be accessed through the Web, and by definition, no [client software](https://en.wikipedia.org/wiki/Client_software) is loaded onto the end user's PC. SaaS is typically run out of the [cloud](https://en.wikipedia.org/wiki/Cloud_computing).[[9]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-hardiman2014-9)

## Nature of the work[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=3)]

*Some of this section is from the [Occupational Outlook Handbook](http://www.bls.gov/oco/ocos110.htm), 2006–07 Edition, which is in the [public domain](https://en.wikipedia.org/wiki/Public_domain) as a [work of the United States Government](https://en.wikipedia.org/wiki/Work_of_the_United_States_Government).*

Computer programmers write, test, [debug](https://en.wikipedia.org/wiki/Debug), and maintain the detailed instructions, called [computer programs](https://en.wikipedia.org/wiki/Computer_programs), that computers must follow to perform their functions. Programmers also conceive, design, and test logical structures for solving problems by computer. Many technical innovations in programming — advanced computing technologies and sophisticated new languages and programming tools — have redefined the role of a programmer and elevated much of the programming work done today. Job titles and descriptions may vary, depending on the organization.

Programmers work in many settings, including corporate [information technology](https://en.wikipedia.org/wiki/Information_technology) ("IT") departments, big [software companies](https://en.wikipedia.org/wiki/Software_companies), small service firms and government entities of all sizes. Many professional programmers also work for consulting companies at client sites as [contractors](https://en.wikipedia.org/wiki/Independent_contractor). [Licensing](https://en.wikipedia.org/wiki/License) is not typically required to work as a programmer, although [professional certifications](https://en.wikipedia.org/wiki/Professional_certification) are commonly held by programmers. Programming is widely considered a [profession](https://en.wikipedia.org/wiki/Profession) (although some[*[who?](https://en.wikipedia.org/wiki/Wikipedia:Manual_of_Style/Words_to_watch" \l "Unsupported_attributions)*] authorities disagree on the grounds that only careers with legal licensing requirements count as a profession).

Programmers' work varies widely depending on the type of business for which they are writing programs. For example, the instructions involved in updating financial records are very different from those required to duplicate conditions on an aircraft for pilots training in a flight simulator. Simple programs can be written in a few hours, more complex ones may require more than a year of work, while others are never considered 'complete' but rather are continuously improved as long as they stay in use. In most cases, several programmers work together as a team under a senior programmer's supervision.

<https://en.wikipedia.org/wiki/File:Coding_Shots_Annual_Plan_high_res-5.jpg>

A software engineer writing [JavaScript](https://en.wikipedia.org/wiki/JavaScript)

Programmers write programs according to the specifications determined primarily by more senior programmers and by [systems analysts](https://en.wikipedia.org/wiki/Systems_analyst). After the design process is complete, it is the job of the programmer to convert that design into a logical series of instructions that the computer can follow. The programmer codes these instructions in one of many programming languages. Different programming languages are used depending on the purpose of the program. [COBOL](https://en.wikipedia.org/wiki/COBOL), for example, is commonly used for business applications that typically run on [mainframe](https://en.wikipedia.org/wiki/Mainframe_computer) and [midrange](https://en.wikipedia.org/wiki/Minicomputer) computers, whereas [Fortran](https://en.wikipedia.org/wiki/Fortran) is used in science and engineering. [C++](https://en.wikipedia.org/wiki/C%2B%2B) and [Python](https://en.wikipedia.org/wiki/Python_(Programming_Language)) are widely used for both scientific and business applications. [Java](https://en.wikipedia.org/wiki/Java_(programming_language)), [C#](https://en.wikipedia.org/wiki/C_Sharp_(programming_language)), [JS](https://en.wikipedia.org/wiki/JavaScript) and [PHP](https://en.wikipedia.org/wiki/PHP) are popular programming languages for Web and business applications. Programmers generally know more than one programming language and, because many languages are similar, they often can learn new languages relatively easily. In practice, programmers often are referred to by the language they know, e.g. as *Java programmers*, or by the type of function they perform or the environment in which they work: for example, *[database](https://en.wikipedia.org/wiki/Database) programmers*, *mainframe programmers*, or [Web developers](https://en.wikipedia.org/wiki/Web_developer).

When making changes to the [source code](https://en.wikipedia.org/wiki/Source_code) that programs are made up of, programmers need to make other programmers aware of the task that the routine is to perform. They do this by inserting comments in the [source code](https://en.wikipedia.org/wiki/Source_code) so that others can understand the program more easily and by [documenting their code](https://en.wikipedia.org/wiki/Software_documentation). To save work, programmers often use [libraries](https://en.wikipedia.org/wiki/Library_(computing)) of basic code that can be modified or customized for a specific application. This approach yields more reliable and consistent programs and increases programmers' productivity by eliminating some routine steps.

### **Testing and debugging**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=4)]

Programmers test a program by running it and looking for [bugs](https://en.wikipedia.org/wiki/Software_bug) (errors). As they are identified, the programmer usually makes the appropriate corrections, then rechecks the program until an acceptably low level and severity of bugs remain. This process is called [testing](https://en.wikipedia.org/wiki/Software_testing) and [debugging](https://en.wikipedia.org/wiki/Debugging). These are important parts of every programmer's job. Programmers may continue to fix these problems throughout the life of a program. Updating, repairing, modifying, and expanding existing programs is sometimes called *maintenance programming*. Programmers may contribute to [user guides](https://en.wikipedia.org/wiki/User_guide) and [online help](https://en.wikipedia.org/wiki/Online_help), or they may work with [technical writers](https://en.wikipedia.org/wiki/Technical_writer) to do such work.

### **Application versus system programming**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=5)]

Computer programmers often are grouped into two broad types: application programmers and systems programmers. Application programmers write programs to handle a specific job, such as a program to track inventory within an organization. They also may revise existing packaged software or customize generic applications which are frequently purchased from [independent software vendors](https://en.wikipedia.org/wiki/Independent_software_vendor). Systems programmers, in contrast, write programs to maintain and control computer systems software, such as [operating systems](https://en.wikipedia.org/wiki/Operating_system) and [database management systems](https://en.wikipedia.org/wiki/Database_management_system). These workers make changes in the instructions that determine how the network, workstations, and [CPU](https://en.wikipedia.org/wiki/Central_processing_unit) of the system handle the various jobs they have been given and how they communicate with peripheral equipment such as [printers](https://en.wikipedia.org/wiki/Computer_printer) and [disk drives](https://en.wikipedia.org/wiki/Data_storage_device).

### **Qualifications and skills**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=6)]

A software developer needs to have deep technical expertise with certain aspects of computing. Some positions will require a degree in a relevant field such as computer science, information technology, engineering, programming, or any other IT related post-graduate studies.[[10]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-10) An ideal software developer is a self-motivated professional carrying a dynamic hands-on experience on key languages of programming such as [C++](https://en.wikipedia.org/wiki/C%2B%2B), [C#](https://en.wikipedia.org/wiki/C_Sharp_(programming_language)), [PHP](https://en.wikipedia.org/wiki/PHP), [Java](https://en.wikipedia.org/wiki/Java_(programming_language)), [C](https://en.wikipedia.org/wiki/C_(programming_language)), [JavaScript](https://en.wikipedia.org/wiki/JavaScript), [Visual Basic](https://en.wikipedia.org/wiki/Visual_Basic), [Python](https://en.wikipedia.org/wiki/Python_(programming_language)), and [Smalltalk](https://en.wikipedia.org/wiki/Smalltalk).

According to developer Eric Sink, the differences between system design, [software development](https://en.wikipedia.org/wiki/Software_development), and programming are more apparent. Already in the current market place, there can be found a segregation between programmers and developers, in that one who implements is not the same as the one who designs the [class](https://en.wikipedia.org/wiki/Class_(computer_science)) structure or hierarchy. Even more, so that developers become [software architects](https://en.wikipedia.org/wiki/Software_architect) or [systems architects](https://en.wikipedia.org/wiki/Systems_architect), those who design the multi-leveled architecture or component interactions of a large software system.[[11]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-Sourcegear_2005-11)

### **Types of software**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=7)]

Programmers in software development companies may work directly with experts from various fields to create software – either programs designed for specific clients or packaged software for general use – ranging from [video games](https://en.wikipedia.org/wiki/Video_game) to educational software to programs for [desktop publishing](https://en.wikipedia.org/wiki/Desktop_publishing) and financial planning. Programming of packaged software constitutes one of the most rapidly growing segments of the computer services industry. Some companies or organizations – even small ones – have set up their own IT team to ensure the design and development of in-house software to answer to very specific needs from their internal end-users, especially when existing software are not suitable or too expensive. This is, for example, the case in [research laboratories](https://en.wikipedia.org/wiki/Research_laboratories).[*[citation needed](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)*]

In some organizations, particularly small ones, people commonly known as *programmer analysts* are responsible for both the systems analysis and the actual programming work. The transition from a mainframe environment to one that is based primarily on [personal computers](https://en.wikipedia.org/wiki/Personal_computers) (PCs) has blurred the once rigid distinction between the programmer and the user. Increasingly, adept end-users are taking over many of the tasks previously performed by programmers. For example, the growing use of packaged software, such as spreadsheet and database management software packages, allows users to write simple programs to access data and perform calculations.[*[citation needed](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)*]

In addition, the rise of the Internet has made [web development](https://en.wikipedia.org/wiki/Web_development) a huge part of the programming field. Currently, more software applications are [web applications](https://en.wikipedia.org/wiki/Web_application) that can be used by anyone with a [web browser](https://en.wikipedia.org/wiki/Web_browser).[*[citation needed](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)*] Examples of such applications include the [Google](https://en.wikipedia.org/wiki/Google) search service, the [Outlook.com](https://en.wikipedia.org/wiki/Outlook.com) e-mail service, and the [Flickr](https://en.wikipedia.org/wiki/Flickr) photo-sharing service.

Programming editors, also known as [source code editors](https://en.wikipedia.org/wiki/Source_code_editor), are text editors that are specifically designed for programmers or developers for writing the source code of an application or a program. Most of these editors include features useful for programmers, which may include color [syntax highlighting](https://en.wikipedia.org/wiki/Syntax_highlighting), auto indentation, [auto-complete](https://en.wikipedia.org/wiki/Auto-complete), bracket matching, [syntax check](https://en.wikipedia.org/wiki/Syntax_checker), and allows [plug-ins](https://en.wikipedia.org/wiki/Plug-in_(computing)). These features aid the users during coding, [debugging](https://en.wikipedia.org/wiki/Debugging) and testing.[[12]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-12)

## Globalization[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=8)]

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| --- | --- |
|  | The examples and perspective in this article **deal primarily with the United States and do not represent a [worldwide view](https://en.wikipedia.org/wiki/Wikipedia:WikiProject_Countering_systemic_bias) of the subject**. You may [improve this article](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit), discuss the issue on the [talk page](https://en.wikipedia.org/wiki/Talk:Programmer), or [create a new article](https://en.wikipedia.org/wiki/Wikipedia:Article_wizard), as appropriate. *(December 2010)* *([Learn how and when to remove this template message](https://en.wikipedia.org/wiki/Help:Maintenance_template_removal))* |

### **Market changes in the UK**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=9)]

According to BBC News, 17% of computer science students could not find work in their field 6 months after graduation in 2009 which was the highest rate of the university subjects surveyed while 0% of medical students were unemployed in the same survey.[[13]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-13) The UK category system does, however, class such degrees as [information technology](https://en.wikipedia.org/wiki/Information_technology) and [game design](https://en.wikipedia.org/wiki/Game_design) as 'computer science', industries in which jobs can be extremely difficult to find, somewhat inflating the actual figure.[[14]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-14)

### **Market changes in the US**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=10)]

Computer programming, [offshore outsourcing](https://en.wikipedia.org/wiki/Offshore_outsourcing), and [Foreign Worker Visas](https://en.wikipedia.org/wiki/Foreign_Worker_Visa) became a controversial topic after the crash of the [dot-com bubble](https://en.wikipedia.org/wiki/Dot-com_bubble) left many programmers without work or with lower wages. Programming was even mentioned in the 2004 US Presidential debate on the topic of [offshore outsourcing](https://en.wikipedia.org/wiki/Offshore_outsourcing).[[15]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-15)

Large companies claim there is a [skills shortage](https://en.wikipedia.org/wiki/Skills_shortage) with regard to programming talent. However, US programmers and unions counter that large companies are exaggerating their case in order to obtain cheaper programmers from developing countries and avoid previously employer-paid training using industry-specific technologies not covered in most accredited degree programs.[[16]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-16)[[17]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-17) Other reasons for employers claiming skill shortages is the result of their own cost-saving combining of several disparate skill sets previously held by several specialized programmers into fewer generalized [multifaceted](https://en.wikipedia.org/wiki/Mechatronics) positions that are unlikely to have enough [" qualified" candidates](https://en.wikipedia.org/wiki/Purple_squirrel) with the desired experience.[[18]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-18)

Enrollment in computer-related degrees in the US has dropped for years, especially for women[[19]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-19), due to lack of general interests in science and mathematics and also out of an apparent fear that programming will be subject to the same pressures as manufacturing and agriculture careers.[[20]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-20) This situation has resulted in confusion about whether the US economy is entering a "post-[information](https://en.wikipedia.org/wiki/Quaternary_sector_of_the_economy) age" and the nature of US [comparative advantages](https://en.wikipedia.org/wiki/Comparative_advantage). Most academic institutions have an [Institutional research](https://en.wikipedia.org/wiki/Institutional_research) office that keeps past statistics of degrees conferred which shows several dips and rises in Computer Science degrees over the past 30 years. The overall trend shows a slightly overall decline in growth (especially when compared to other STEM degree growth) since certain peaks of [1986](https://en.wikipedia.org/wiki/Early_1980s_recession_in_the_United_States), [1992](https://en.wikipedia.org/wiki/Early_1990s_recession_in_the_United_States), [2002](https://en.wikipedia.org/wiki/Dot-com_bubble), and [2008](https://en.wikipedia.org/wiki/Great_Recession) showing periods of flat growth or even declines.[[21]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-21), In addition, the U.S. Bureau of Labor Statistics Occupational Outlook 2016-26 a decline of 7 percent and a decline of 9 percent from 2019 to 2029 [[22]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-22) is expected for Computer Programmers because [Computer programming](https://en.wikipedia.org/wiki/Computer_programming) can be done from anywhere in the world, so companies sometimes hire programmers in countries where wages are lower.[[23]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-23)

### **Country comparison**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=11)]

[Russia](https://en.wikipedia.org/wiki/Russia) and [China](https://en.wikipedia.org/wiki/China) are the countries that are ranked very high when it comes to talent in computer programming.[[24]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-24)[[25]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-25)

## See also[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=12)]

* ***[Computer programming portal](https://en.wikipedia.org/wiki/Portal:Computer_programming)***



* [Game programmer](https://en.wikipedia.org/wiki/Game_programmer)
* [List of programmers](https://en.wikipedia.org/wiki/List_of_programmers)
* [Real Programmer syndrome](https://en.wikipedia.org/wiki/Real_Programmer_syndrome)
* [Software development process](https://en.wikipedia.org/wiki/Software_development_process)
* [Software engineering](https://en.wikipedia.org/wiki/Software_engineering)
* [System administrator](https://en.wikipedia.org/wiki/System_administrator)

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11. **[^](https://en.wikipedia.org/wiki/Programmer" \l "cite_ref-Sourcegear_2005_11-0)** [Eric Sink](https://en.wikipedia.org/wiki/Eric_Sink). ["Small ISVs: You need Developers, not Programmers"](http://software.ericsink.com/No_Programmers.html). Sourcegear. Retrieved 6 June 2008. A programmer is someone who does nothing but code new features and (if you're lucky) fix bugs. They don't write specs. They don't write automated test cases. They don't help keep the automated build system up to date. They don't help customers work out tough problems. They don't help write documentation. They don't help with testing. They don't even read code. All they do is write new code.
12. **[^](https://en.wikipedia.org/wiki/Programmer" \l "cite_ref-12)** ["BBC Bitesize - GCSE Computer Science - Programming software and the IDE - Revision 4"](https://www.bbc.co.uk/education/guides/zgmpr82/revision/4). *www.bbc.co.uk*. Retrieved 16 September 2017.
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## Further reading[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=14)]

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## External links[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=15)]

* The [US Department of Labor](https://en.wikipedia.org/wiki/US_Department_of_Labor) description of:
* [Computer Programmers](http://www.bls.gov/ooh/computer-and-information-technology/computer-programmers.htm)
* [Software developer](http://www.bls.gov/ooh/computer-and-information-technology/software-developers.htm)

[Categories](https://en.wikipedia.org/wiki/Help:Category):

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* [People in information technology](https://en.wikipedia.org/wiki/Category:People_in_information_technology)



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### In other projects

* [Wikimedia Commons](https://commons.wikimedia.org/wiki/Category:Programmers)
* [Wikinews](https://en.wikinews.org/wiki/Category:Programmers)

### Languages

* [Español](https://es.wikipedia.org/wiki/Programador)
* [हिन्दी](https://hi.wikipedia.org/wiki/कंप्यूटर_प्रोग्रामर)
* [Hrvatski](https://hr.wikipedia.org/wiki/Programer)
* [Română](https://ro.wikipedia.org/wiki/Programator)
* [Shqip](https://sq.wikipedia.org/wiki/Programues)
* [Slovenčina](https://sk.wikipedia.org/wiki/Programátor)
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# Programmer

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| --- | --- |
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*This article is about people who write computer software. For other uses, see [Programmer (disambiguation)](https://en.wikipedia.org/wiki/Programmer_(disambiguation)).*

*For someone who performs coding in the social sciences, see [Coding (social sciences)](https://en.wikipedia.org/wiki/Coding_(social_sciences)).*

*For someone who performs medical coding, see [Medical coding](https://en.wikipedia.org/wiki/Medical_coding).*

*For the unincorporated community in Pennsylvania, see [Coder, Pennsylvania](https://en.wikipedia.org/wiki/Coder,_Pennsylvania).*

<https://en.wikipedia.org/wiki/File:IBM_Electronic_Data_Processing_Machine_(9467782802).jpg>

Two programmers working on an [IBM 704](https://en.wikipedia.org/wiki/IBM_704) at [NACA](https://en.wikipedia.org/wiki/National_Advisory_Committee_for_Aeronautics), 1954

A **computer programmer**, sometimes called a **software developer**, a **programmer** or more recently a **coder** (especially in more informal contexts), is a person who creates [computer software](https://en.wikipedia.org/wiki/Computer_software). The term *computer programmer* can refer to a specialist in one area of [computers](https://en.wikipedia.org/wiki/Computers), or to a generalist who writes code for many kinds of software.

A programmer's most oft-used [computer language](https://en.wikipedia.org/wiki/Computer_language) (e.g., [Assembly](https://en.wikipedia.org/wiki/Assembly_language), [COBOL](https://en.wikipedia.org/wiki/COBOL), [C](https://en.wikipedia.org/wiki/C_(programming_language)), [C++](https://en.wikipedia.org/wiki/C%2B%2B), [C#](https://en.wikipedia.org/wiki/C_Sharp_(programming_language)), [JavaScript](https://en.wikipedia.org/wiki/JavaScript_(programming_language)), [Lisp](https://en.wikipedia.org/wiki/Lisp_(programming_language)), [Python](https://en.wikipedia.org/wiki/Python_programming_language)) may be prefixed to the term *programmer*. Some who work with [web](https://en.wikipedia.org/wiki/World_Wide_Web) programming languages also prefix their titles with *web*.

## **Contents**

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## History[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=1)]

*See also: [Computer program § History](https://en.wikipedia.org/wiki/Computer_program" \l "History), [Computer programming § History](https://en.wikipedia.org/wiki/Computer_programming" \l "History), and [Programming language § History](https://en.wikipedia.org/wiki/Programming_language" \l "History)*

<https://en.wikipedia.org/wiki/File:Ada_Lovelace_portrait.jpg>

[Ada Lovelace](https://en.wikipedia.org/wiki/Ada_Lovelace) is considered by many to be the first computer programmer.[[1]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-1)

British [countess](https://en.wikipedia.org/wiki/Count) and mathematician [Ada Lovelace](https://en.wikipedia.org/wiki/Ada_Lovelace) is often considered to be the first computer programmer, as she was the first to publish part of a program (specifically an [algorithm](https://en.wikipedia.org/wiki/Algorithm)) intended for implementation on [Charles Babbage](https://en.wikipedia.org/wiki/Charles_Babbage)'s [analytical engine](https://en.wikipedia.org/wiki/Analytical_engine), in October 1842. The algorithm was used to calculate [Bernoulli numbers](https://en.wikipedia.org/wiki/Bernoulli_number).[[2]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-2) Because Babbage's machine was never completed as a functioning standard in Lovelace's time, she unfortunately never had the opportunity to see the algorithm in action.

The first person to execute a program on a functioning, modern, electronic computer was the renowned [computer scientist](https://en.wikipedia.org/wiki/Computer_scientist) [Konrad Zuse](https://en.wikipedia.org/wiki/Konrad_Zuse), in 1941.

<https://en.wikipedia.org/wiki/File:Two_women_operating_ENIAC_(full_resolution).jpg>

[Betty Jennings](https://en.wikipedia.org/wiki/Jean_Bartik) and [Fran Bilas](https://en.wikipedia.org/wiki/Frances_Spence), part of the first [ENIAC](https://en.wikipedia.org/wiki/ENIAC) programming team

The [ENIAC](https://en.wikipedia.org/wiki/ENIAC) programming team, consisting of [Kay McNulty](https://en.wikipedia.org/wiki/Kathleen_Antonelli), [Betty Jennings](https://en.wikipedia.org/wiki/Jean_Bartik), [Betty Snyder](https://en.wikipedia.org/wiki/Betty_Holberton), [Marlyn Wescoff](https://en.wikipedia.org/wiki/Marlyn_Meltzer), [Fran Bilas](https://en.wikipedia.org/wiki/Frances_Spence) and [Ruth Lichterman](https://en.wikipedia.org/wiki/Ruth_Teitelbaum) were the first regularly working programmers.[[3]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-3)[[4]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-4) International Programmers' Day is celebrated annually on 7 January.[[5]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-5) In 2009, the [government of Russia](https://en.wikipedia.org/wiki/Government_of_Russia) decreed a professional annual holiday known as [Programmers' Day](https://en.wikipedia.org/wiki/Programmers'_Day) to be celebrated on 13 September (12 September in leap years). It had already been an *unofficial* holiday before that in many countries.

### **Software**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=2)]

The word *software* was used as early as 1953, but did not regularly appear in print until the 1960s.[[6]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-6) Before this time, computers were programmed either by customers or the few commercial computer manufacturers of the time, such as [UNIVAC](https://en.wikipedia.org/wiki/UNIVAC) and [IBM](https://en.wikipedia.org/wiki/IBM). The first company founded to specifically provide software products and services was the [Computer Usage Company](https://en.wikipedia.org/wiki/Computer_Usage_Company), in 1955.[[7]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-7)

The software industry expanded in the early 1960s, almost immediately after computers were first sold in mass-produced quantities. Universities, governments, and businesses created a demand for software. Many of these programs were written in-house by full-time staff programmers; some were distributed freely between users of a particular machine for no charge. And others were developed on a commercial basis. Other firms, such as [Computer Sciences Corporation](https://en.wikipedia.org/wiki/Computer_Sciences_Corporation) (founded in 1959) also started to grow. The computer/[hardware](https://en.wikipedia.org/wiki/Computer_hardware) manufacturers soon started bundling [operating systems](https://en.wikipedia.org/wiki/Operating_systems), [system software](https://en.wikipedia.org/wiki/System_software) and programming environments with their machines.[*[citation needed](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)*]

The industry expanded greatly with the rise of the [personal computer](https://en.wikipedia.org/wiki/Personal_computer) ("PC") in the mid-1970s, which brought computing to the average office worker. In the following years the PC also helped create a constantly-growing market for games, applications and utilities software.[[8]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-8)

In the early years of the 21st century, another successful [business model](https://en.wikipedia.org/wiki/Business_model) has arisen for hosted software, called [software-as-a-service](https://en.wikipedia.org/wiki/Software-as-a-service), or SaaS. From the point of view of producers of some [proprietary software](https://en.wikipedia.org/wiki/Proprietary_software), SaaS reduces the concerns about [unauthorized copying](https://en.wikipedia.org/wiki/Software_copyright), since it can only be accessed through the Web, and by definition, no [client software](https://en.wikipedia.org/wiki/Client_software) is loaded onto the end user's PC. SaaS is typically run out of the [cloud](https://en.wikipedia.org/wiki/Cloud_computing).[[9]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-hardiman2014-9)

## Nature of the work[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=3)]

*Some of this section is from the [Occupational Outlook Handbook](http://www.bls.gov/oco/ocos110.htm), 2006–07 Edition, which is in the [public domain](https://en.wikipedia.org/wiki/Public_domain) as a [work of the United States Government](https://en.wikipedia.org/wiki/Work_of_the_United_States_Government).*

Computer programmers write, test, [debug](https://en.wikipedia.org/wiki/Debug), and maintain the detailed instructions, called [computer programs](https://en.wikipedia.org/wiki/Computer_programs), that computers must follow to perform their functions. Programmers also conceive, design, and test logical structures for solving problems by computer. Many technical innovations in programming — advanced computing technologies and sophisticated new languages and programming tools — have redefined the role of a programmer and elevated much of the programming work done today. Job titles and descriptions may vary, depending on the organization.

Programmers work in many settings, including corporate [information technology](https://en.wikipedia.org/wiki/Information_technology) ("IT") departments, big [software companies](https://en.wikipedia.org/wiki/Software_companies), small service firms and government entities of all sizes. Many professional programmers also work for consulting companies at client sites as [contractors](https://en.wikipedia.org/wiki/Independent_contractor). [Licensing](https://en.wikipedia.org/wiki/License) is not typically required to work as a programmer, although [professional certifications](https://en.wikipedia.org/wiki/Professional_certification) are commonly held by programmers. Programming is widely considered a [profession](https://en.wikipedia.org/wiki/Profession) (although some[*[who?](https://en.wikipedia.org/wiki/Wikipedia:Manual_of_Style/Words_to_watch" \l "Unsupported_attributions)*] authorities disagree on the grounds that only careers with legal licensing requirements count as a profession).

Programmers' work varies widely depending on the type of business for which they are writing programs. For example, the instructions involved in updating financial records are very different from those required to duplicate conditions on an aircraft for pilots training in a flight simulator. Simple programs can be written in a few hours, more complex ones may require more than a year of work, while others are never considered 'complete' but rather are continuously improved as long as they stay in use. In most cases, several programmers work together as a team under a senior programmer's supervision.

<https://en.wikipedia.org/wiki/File:Coding_Shots_Annual_Plan_high_res-5.jpg>

A software engineer writing [JavaScript](https://en.wikipedia.org/wiki/JavaScript)

Programmers write programs according to the specifications determined primarily by more senior programmers and by [systems analysts](https://en.wikipedia.org/wiki/Systems_analyst). After the design process is complete, it is the job of the programmer to convert that design into a logical series of instructions that the computer can follow. The programmer codes these instructions in one of many programming languages. Different programming languages are used depending on the purpose of the program. [COBOL](https://en.wikipedia.org/wiki/COBOL), for example, is commonly used for business applications that typically run on [mainframe](https://en.wikipedia.org/wiki/Mainframe_computer) and [midrange](https://en.wikipedia.org/wiki/Minicomputer) computers, whereas [Fortran](https://en.wikipedia.org/wiki/Fortran) is used in science and engineering. [C++](https://en.wikipedia.org/wiki/C%2B%2B) and [Python](https://en.wikipedia.org/wiki/Python_(Programming_Language)) are widely used for both scientific and business applications. [Java](https://en.wikipedia.org/wiki/Java_(programming_language)), [C#](https://en.wikipedia.org/wiki/C_Sharp_(programming_language)), [JS](https://en.wikipedia.org/wiki/JavaScript) and [PHP](https://en.wikipedia.org/wiki/PHP) are popular programming languages for Web and business applications. Programmers generally know more than one programming language and, because many languages are similar, they often can learn new languages relatively easily. In practice, programmers often are referred to by the language they know, e.g. as *Java programmers*, or by the type of function they perform or the environment in which they work: for example, *[database](https://en.wikipedia.org/wiki/Database) programmers*, *mainframe programmers*, or [Web developers](https://en.wikipedia.org/wiki/Web_developer).

When making changes to the [source code](https://en.wikipedia.org/wiki/Source_code) that programs are made up of, programmers need to make other programmers aware of the task that the routine is to perform. They do this by inserting comments in the [source code](https://en.wikipedia.org/wiki/Source_code) so that others can understand the program more easily and by [documenting their code](https://en.wikipedia.org/wiki/Software_documentation). To save work, programmers often use [libraries](https://en.wikipedia.org/wiki/Library_(computing)) of basic code that can be modified or customized for a specific application. This approach yields more reliable and consistent programs and increases programmers' productivity by eliminating some routine steps.

### **Testing and debugging**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=4)]

Programmers test a program by running it and looking for [bugs](https://en.wikipedia.org/wiki/Software_bug) (errors). As they are identified, the programmer usually makes the appropriate corrections, then rechecks the program until an acceptably low level and severity of bugs remain. This process is called [testing](https://en.wikipedia.org/wiki/Software_testing) and [debugging](https://en.wikipedia.org/wiki/Debugging). These are important parts of every programmer's job. Programmers may continue to fix these problems throughout the life of a program. Updating, repairing, modifying, and expanding existing programs is sometimes called *maintenance programming*. Programmers may contribute to [user guides](https://en.wikipedia.org/wiki/User_guide) and [online help](https://en.wikipedia.org/wiki/Online_help), or they may work with [technical writers](https://en.wikipedia.org/wiki/Technical_writer) to do such work.

### **Application versus system programming**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=5)]

Computer programmers often are grouped into two broad types: application programmers and systems programmers. Application programmers write programs to handle a specific job, such as a program to track inventory within an organization. They also may revise existing packaged software or customize generic applications which are frequently purchased from [independent software vendors](https://en.wikipedia.org/wiki/Independent_software_vendor). Systems programmers, in contrast, write programs to maintain and control computer systems software, such as [operating systems](https://en.wikipedia.org/wiki/Operating_system) and [database management systems](https://en.wikipedia.org/wiki/Database_management_system). These workers make changes in the instructions that determine how the network, workstations, and [CPU](https://en.wikipedia.org/wiki/Central_processing_unit) of the system handle the various jobs they have been given and how they communicate with peripheral equipment such as [printers](https://en.wikipedia.org/wiki/Computer_printer) and [disk drives](https://en.wikipedia.org/wiki/Data_storage_device).

### **Qualifications and skills**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=6)]

A software developer needs to have deep technical expertise with certain aspects of computing. Some positions will require a degree in a relevant field such as computer science, information technology, engineering, programming, or any other IT related post-graduate studies.[[10]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-10) An ideal software developer is a self-motivated professional carrying a dynamic hands-on experience on key languages of programming such as [C++](https://en.wikipedia.org/wiki/C%2B%2B), [C#](https://en.wikipedia.org/wiki/C_Sharp_(programming_language)), [PHP](https://en.wikipedia.org/wiki/PHP), [Java](https://en.wikipedia.org/wiki/Java_(programming_language)), [C](https://en.wikipedia.org/wiki/C_(programming_language)), [JavaScript](https://en.wikipedia.org/wiki/JavaScript), [Visual Basic](https://en.wikipedia.org/wiki/Visual_Basic), [Python](https://en.wikipedia.org/wiki/Python_(programming_language)), and [Smalltalk](https://en.wikipedia.org/wiki/Smalltalk).

According to developer Eric Sink, the differences between system design, [software development](https://en.wikipedia.org/wiki/Software_development), and programming are more apparent. Already in the current market place, there can be found a segregation between programmers and developers, in that one who implements is not the same as the one who designs the [class](https://en.wikipedia.org/wiki/Class_(computer_science)) structure or hierarchy. Even more, so that developers become [software architects](https://en.wikipedia.org/wiki/Software_architect) or [systems architects](https://en.wikipedia.org/wiki/Systems_architect), those who design the multi-leveled architecture or component interactions of a large software system.[[11]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-Sourcegear_2005-11)

### **Types of software**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=7)]

Programmers in software development companies may work directly with experts from various fields to create software – either programs designed for specific clients or packaged software for general use – ranging from [video games](https://en.wikipedia.org/wiki/Video_game) to educational software to programs for [desktop publishing](https://en.wikipedia.org/wiki/Desktop_publishing) and financial planning. Programming of packaged software constitutes one of the most rapidly growing segments of the computer services industry. Some companies or organizations – even small ones – have set up their own IT team to ensure the design and development of in-house software to answer to very specific needs from their internal end-users, especially when existing software are not suitable or too expensive. This is, for example, the case in [research laboratories](https://en.wikipedia.org/wiki/Research_laboratories).[*[citation needed](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)*]

In some organizations, particularly small ones, people commonly known as *programmer analysts* are responsible for both the systems analysis and the actual programming work. The transition from a mainframe environment to one that is based primarily on [personal computers](https://en.wikipedia.org/wiki/Personal_computers) (PCs) has blurred the once rigid distinction between the programmer and the user. Increasingly, adept end-users are taking over many of the tasks previously performed by programmers. For example, the growing use of packaged software, such as spreadsheet and database management software packages, allows users to write simple programs to access data and perform calculations.[*[citation needed](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)*]

In addition, the rise of the Internet has made [web development](https://en.wikipedia.org/wiki/Web_development) a huge part of the programming field. Currently, more software applications are [web applications](https://en.wikipedia.org/wiki/Web_application) that can be used by anyone with a [web browser](https://en.wikipedia.org/wiki/Web_browser).[*[citation needed](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)*] Examples of such applications include the [Google](https://en.wikipedia.org/wiki/Google) search service, the [Outlook.com](https://en.wikipedia.org/wiki/Outlook.com) e-mail service, and the [Flickr](https://en.wikipedia.org/wiki/Flickr) photo-sharing service.

Programming editors, also known as [source code editors](https://en.wikipedia.org/wiki/Source_code_editor), are text editors that are specifically designed for programmers or developers for writing the source code of an application or a program. Most of these editors include features useful for programmers, which may include color [syntax highlighting](https://en.wikipedia.org/wiki/Syntax_highlighting), auto indentation, [auto-complete](https://en.wikipedia.org/wiki/Auto-complete), bracket matching, [syntax check](https://en.wikipedia.org/wiki/Syntax_checker), and allows [plug-ins](https://en.wikipedia.org/wiki/Plug-in_(computing)). These features aid the users during coding, [debugging](https://en.wikipedia.org/wiki/Debugging) and testing.[[12]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-12)

## Globalization[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=8)]

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|  | The examples and perspective in this article **deal primarily with the United States and do not represent a [worldwide view](https://en.wikipedia.org/wiki/Wikipedia:WikiProject_Countering_systemic_bias) of the subject**. You may [improve this article](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit), discuss the issue on the [talk page](https://en.wikipedia.org/wiki/Talk:Programmer), or [create a new article](https://en.wikipedia.org/wiki/Wikipedia:Article_wizard), as appropriate. *(December 2010)* *([Learn how and when to remove this template message](https://en.wikipedia.org/wiki/Help:Maintenance_template_removal))* |

### **Market changes in the UK**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=9)]

According to BBC News, 17% of computer science students could not find work in their field 6 months after graduation in 2009 which was the highest rate of the university subjects surveyed while 0% of medical students were unemployed in the same survey.[[13]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-13) The UK category system does, however, class such degrees as [information technology](https://en.wikipedia.org/wiki/Information_technology) and [game design](https://en.wikipedia.org/wiki/Game_design) as 'computer science', industries in which jobs can be extremely difficult to find, somewhat inflating the actual figure.[[14]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-14)

### **Market changes in the US**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=10)]

Computer programming, [offshore outsourcing](https://en.wikipedia.org/wiki/Offshore_outsourcing), and [Foreign Worker Visas](https://en.wikipedia.org/wiki/Foreign_Worker_Visa) became a controversial topic after the crash of the [dot-com bubble](https://en.wikipedia.org/wiki/Dot-com_bubble) left many programmers without work or with lower wages. Programming was even mentioned in the 2004 US Presidential debate on the topic of [offshore outsourcing](https://en.wikipedia.org/wiki/Offshore_outsourcing).[[15]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-15)

Large companies claim there is a [skills shortage](https://en.wikipedia.org/wiki/Skills_shortage) with regard to programming talent. However, US programmers and unions counter that large companies are exaggerating their case in order to obtain cheaper programmers from developing countries and avoid previously employer-paid training using industry-specific technologies not covered in most accredited degree programs.[[16]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-16)[[17]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-17) Other reasons for employers claiming skill shortages is the result of their own cost-saving combining of several disparate skill sets previously held by several specialized programmers into fewer generalized [multifaceted](https://en.wikipedia.org/wiki/Mechatronics) positions that are unlikely to have enough [" qualified" candidates](https://en.wikipedia.org/wiki/Purple_squirrel) with the desired experience.[[18]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-18)

Enrollment in computer-related degrees in the US has dropped for years, especially for women[[19]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-19), due to lack of general interests in science and mathematics and also out of an apparent fear that programming will be subject to the same pressures as manufacturing and agriculture careers.[[20]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-20) This situation has resulted in confusion about whether the US economy is entering a "post-[information](https://en.wikipedia.org/wiki/Quaternary_sector_of_the_economy) age" and the nature of US [comparative advantages](https://en.wikipedia.org/wiki/Comparative_advantage). Most academic institutions have an [Institutional research](https://en.wikipedia.org/wiki/Institutional_research) office that keeps past statistics of degrees conferred which shows several dips and rises in Computer Science degrees over the past 30 years. The overall trend shows a slightly overall decline in growth (especially when compared to other STEM degree growth) since certain peaks of [1986](https://en.wikipedia.org/wiki/Early_1980s_recession_in_the_United_States), [1992](https://en.wikipedia.org/wiki/Early_1990s_recession_in_the_United_States), [2002](https://en.wikipedia.org/wiki/Dot-com_bubble), and [2008](https://en.wikipedia.org/wiki/Great_Recession) showing periods of flat growth or even declines.[[21]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-21), In addition, the U.S. Bureau of Labor Statistics Occupational Outlook 2016-26 a decline of 7 percent and a decline of 9 percent from 2019 to 2029 [[22]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-22) is expected for Computer Programmers because [Computer programming](https://en.wikipedia.org/wiki/Computer_programming) can be done from anywhere in the world, so companies sometimes hire programmers in countries where wages are lower.[[23]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-23)

### **Country comparison**[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=11)]

[Russia](https://en.wikipedia.org/wiki/Russia) and [China](https://en.wikipedia.org/wiki/China) are the countries that are ranked very high when it comes to talent in computer programming.[[24]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-24)[[25]](https://en.wikipedia.org/wiki/Programmer" \l "cite_note-25)

## See also[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=12)]

* ***[Computer programming portal](https://en.wikipedia.org/wiki/Portal:Computer_programming)***



* [Game programmer](https://en.wikipedia.org/wiki/Game_programmer)
* [List of programmers](https://en.wikipedia.org/wiki/List_of_programmers)
* [Real Programmer syndrome](https://en.wikipedia.org/wiki/Real_Programmer_syndrome)
* [Software development process](https://en.wikipedia.org/wiki/Software_development_process)
* [Software engineering](https://en.wikipedia.org/wiki/Software_engineering)
* [System administrator](https://en.wikipedia.org/wiki/System_administrator)

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## External links[[edit](https://en.wikipedia.org/w/index.php?title=Programmer&action=edit&section=15)]

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