

Software Development Career Pathways

Jobs in software design, development,
implementation, and support



WHAT IS SOFTWARE DEVELOPMENT?

Software comprises a set of data, programs, and instructions to perform specific tasks. There are two types of software: system software that help users interact with hardware and include programs such as Windows, device drivers, and web servers, and application software that run on the platforms created by system software. Examples include web browsers, Microsoft Office products, and mobile applications. Workers in this field create, design, develop and support both types of software.

AREAS IN SOFTWARE DEVELOPMENT

The field includes workers who are directly involved in software design and development, as well as workers in infrastructure development and management that contribute to the software development process. Software development professionals who would like to apply their skills in a related IT career may find opportunities in database and project management. With the right combination of education and experience, IT professionals can advance to managerial roles. Most jobs in this career map typically require a bachelor's degree in computer science, but workers can also demonstrate their skills and qualifications by gaining certifications and years of experience.

WORK ENVIRONMENT

Most IT professionals in software development work full-time, and they may need to be available during evenings, weekends, and holidays. Developers in the private sector tend to work longer hours and earn higher salaries than those in the public sector. Job duties associated with software development can be performed in offices. The COVID pandemic has accelerated the trend toward telecommuting, which can add flexibility in work schedules.

EMPLOYMENT OUTLOOK

Given the increasing number of businesses that use applications and web products, the demand for jobs in software development has been on the rise and the field continues to grow. All jobs in this career map have “favorable” or “very favorable” employment growth prospects from 2018 through 2028 according to the New York State Department of Labor.

SOFTWARE DEVELOPMENT
JOBS & POSSIBLE ENTRY POINTS

SYSTEM, APPLICATION,
AND WEB PROGRAMMING
& DEVELOPMENT

IT workers in software development create all types of software products, including systems, applications, and web products. Workers with little or no background can enter the field as a computer programmer analyst trainee and advance to become a senior computer programmer. They acquire knowledge, skills, and competence in software development while performing supportive tasks such as writing basic codes, attending design meetings, and fixing bugs. Alternatively, workers can gain skills from coding bootcamps and various online programs to transition into the software development field.

Experienced workers can advance to become computer associates or computer specialists in software, or even become experts who work on complex application solutions as certified IT developers (applications).* Their job duties span the entire software project life cycle, including requirement analysis to translate client needs into a technical plan, design, development, implementation, testing and troubleshooting, and maintenance. Accordingly, workers in these civil service titles can hold a variety of business titles, including business analysts, programmers, software developers, software engineers, QA (quality assurance) testers, QA engineers, and software architects.

Critical skills: interpersonal, detail-oriented, analytic, problem-solving, and teamwork skills; creativity and concentration; knowledge of system design, programming, and software development

INFRASTRUCTURE
DEVELOPMENT

These senior positions provide high-level solutions for applications, systems, networks, and other IT components. Senior IT architects and IT infrastructure engineers design, build, implement, manage, and optimize IT infrastructure, a foundational platform that hosts system and application software and supports software connections with IT hardware, networks, and facilities. IT automation and monitoring engineers use software to eliminate human-induced errors and problems in software development. A common application of IT automation in software development is in QA, which involves the process of using automated testing tools rather than human testers to evaluate developed products.

Engineers and architects work together with software developers to ensure the products comply with infrastructural standards or provide automation support in software development processes.

Critical skills: interpersonal, detail-oriented, analytic, creative problem-solving, leadership, and management skills; knowledge of IT infrastructure design, software development, artificial intelligence, and machine learning

RELATED OPPORTUNITIES IN IT

Experience in software development can lead to a career focused on database design and management. Because databases are an essential back-end feature of most application programs, many software development tasks involve building and maintaining databases to ensure all application functions are created and reflected in the database structure. Software developers with a special interest in databases can make the lateral move or advance to become a certified IT administrator (database) who is responsible for the design, implementation, management, maintenance, and security of database systems. The certified IT administrator (database) position requires at least one certification in database management.*

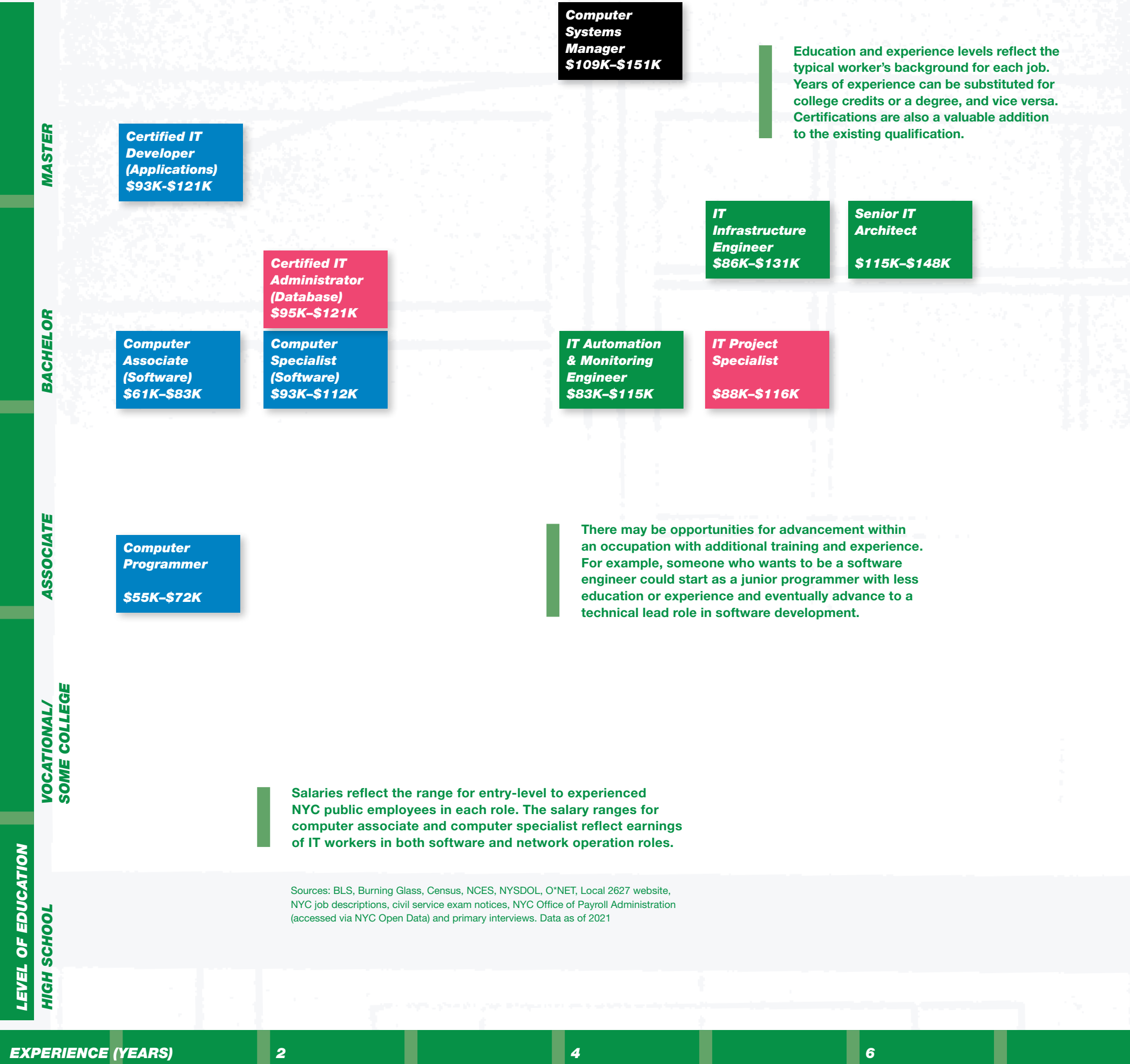
Workers with a background in software development can also become a project manager. Any type of software project requires management skills to streamline workflows and ensure successful completion within the established scope, budget, and timeline. Project management duties fall under the title of IT project specialist, which can also include subject matter experts from any IT domain.

Critical skills: interpersonal, detail-oriented, leadership, collaboration, time management, multitasking, analytic, and problem-solving skills; knowledge of database design and management, project and risk management

MANAGERIAL

All computer systems managers have administrative responsibilities to plan, organize, and oversee activities of IT units within or across city agencies, but other duties associated with the role vary depending on the requirements of the specific position. They can work as technical leads that develop and manage complex IT projects, supervise IT operations, or both. With leadership qualities, managerial skills, and experience, several mid-level positions, including computer specialists (software), certified IT developers (applications), and certified IT administrators (database), can advance to this management title.

Critical skills: communication, leadership, business, organizational, decision making, multitasking, analytic, and problem-solving skills; project and budget management; expertise in certain IT domain(s)



* Check NYC's Local 2627 and Department of Citywide Administrative Services websites for the list of acceptable certifications.

Software Development Programs in Public Institutions		Certificate / Training	Associate Degree	Bachelor's Degree	Advanced Certificate	Master's Degree	Doctoral Degree
NYC							
CUNY BOROUGH OF MANHATTAN CC	Digital Marketing/CS/CIS		●				
CUNY CITY COLLEGE	Computer Engineering/CS			●		●	
	IS/Data Science and Engineering					●	
CUNY CITY TECH	CS		●				
	CIS/Computer Engineering Technology		●	●			
CUNY COLLEGE OF STATEN ISLAND	CS			●		●	
	Computer Technology		●				
	IS and Informatics			●			
CUNY GRADUATE CENTER	CS						●
CUNY KINGSBOROUGH CC	CIS/CS		●				
CUNY LAGUARDIA CC	CS/Programming and Software Development		●				
CUNY LEHMAN COLLEGE	CS			●		●	
	CIS			●			
CUNY QUEENS COLLEGE	CS			●		●	
HUDSON VALLEY							
ROCKLAND CC	CIS		●				
SUNY NEW PALTZ	Computer Engineering			●			
	CS			●		●	
SUNY WESTCHESTER CC	Interactive Technologies/CS		●				
	Web Development/Computer Programming		●				
LONG ISLAND							
NASSAU CC	CS			●			
	IT		●	●			
	Website Design		●				
STONY BROOK UNIVERSITY	Computer Engineering/CS			●		●	●
	IS			●			
SUNY OLD WESTBURY	Computer & Information Science/MIS			●			
NEW JERSEY							
BERGEN CC	CS & IT/Game Programming/Web Dev and Mgmt		●				
	Database Programming and Administration		●	●			
HUDSON COUNTY CC	CS/Computer Technology		●				
KEAN UNIVERSITY	CS/IT			●			
	CIS					●	
	Computational Science & Engineering			●		●	
MIDDLESEX COUNTY COLLEGE	Business Information Systems/CIS/CS		●				
	Computer Prog/Java and Web Prog/Java Prog		●				
NEW JERSEY CITY UNIVERSITY	CS			●			
NEW JERSEY INSTITUTE OF TECHNOLOGY	IS			●		●	●
	Business and Information Systems			●	●	●	
	CS			●	●	●	●
	IT/Web IS			●			
	Computing and Business			●		●	
	Software Engineering, Analysis, and Design/ Web Systems Development					●	
	Software Engineering					●	
UNION COUNTY COLLEGE	CS/CIS & Technology		●				
ONLINE							
COLORADO STATE UNIVERSITY-GLOBAL CAMPUS	IT			●		●	
	MIS & Business Analytics			●			
	Web Application Development/Computer Programming		●				
PENNSYLVANIA STATE UNIVERSITY-WORLD CAMPUS	IS and Technology		●	●	●	●	
	Software Engineering			●		●	
UNIVERSITY OF ARKANSAS EVERSITY	IT		●	●			
UNIVERSITY OF FLORIDA-ONLINE	CS			●			
UNIVERSITY OF WISCONSIN-MILWAUKEE FLEX	Information Science and Technology			●			
CC denotes Community College; CS denotes Computer Science; CIS denotes Computer Information Systems; MIS denotes Management Information Systems; IS denotes Information Systems; IT denotes Information Technology							
Private institutions also offer related programs. Check in your local area or for online programs.							