



Certifications Part Three: Programming Certifications

By Shawn Conaway

Pursuing a programming certification has many benefits, including helping you strengthen your programming skills, getting you programming experience, improving your marketability and maybe even helping you earn more money as a consultant. Shawn Conaway takes a close look at the many programming certifications available in the IT industry today.

Do you enjoy **AMPL** amounts **Java** at the **Assembly** with **Alan** and **Rexx**? When you **C** a **Python** do you **SQL**? Would you give **Miranda** a **Ruby** at the **Eiffel**, or is her object a **BASIC** **Perl** from **Dylan**? If all this **Smalltalk** made you **JOVIAL**, you probably already realize that there are lots of different programming languages. Along with the multitude of languages are hosts of programming positions that roughly divide into two categories: programmer and software engineer.

Programmers write and test programs based on a set of specifications. Software engineers also write programs, but focus more on analyzing users' needs and developing program specifications. Halfway in between is the programmer-analyst, who both analyzes users' needs and writes the programs.

Programmers can be loosely assembled into two groups: applications programmers, who write programs like games, word processors and spreadsheets; and systems programmers, who write programs that control your computer system. Using the same logic, computer engineers also fall into two general categories: applications software engineers and systems software engineers. Applications software engineers analyze users' needs and then create applications to meet those needs. The systems software engineers analyze users' needs and propose computer systems to meet those needs, such as payroll systems or e-mail systems.

The standard route to becoming a programmer is through college. According to the Bureau of Labor Statistics, 70% of the

mers may qualify for certain jobs with 2-year degrees or certificates ... in a language such as C++ or Java."

Certification is best for people with some programming experience. Since just 12% of programmers have only a high school diploma, a certification without a degree or some significant work experience may not land you a job as a programmer. Pursuing a programming certification is ideal for:

- ▼ Strengthening your programming skills
- ▼ Getting programming experience
- ▼ Getting your foot in the door
- ▼ Improving your marketability
- ▼ Earning more money as a consultant
- ▼ Validating current programming skills.

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This article offers a sample of some popular programming certifications, of which there are many. The IEEE estimates that over one million people have earned credentials in the 400 technical certifications currently available. Also, much of programming has to do with manipulating, storing and retrieving data in databases. This article only briefly covers database-programming certifications in favor of a deeper investigation of programming certifications.

BRAINBENCH

Getting certified with Brainbench is like buying soup from the grocery store—they have a huge selection of tests ranging from the

585,000 programmers in the country have a college degree, with 47% having a bachelor's degree. They say, "Bachelor's degrees are commonly required, although some program-

common to the esoteric, with prices that range from nothing to very expensive. Most tests cost \$49.95, although some are less expensive or free. Brainbench offers a number of 'job role' certification tracks geared specifically for programmers.

- ▼ .NET Programmer—This track is geared towards people responsible for writing and revising .NET programs, writing technical documentation, and testing and debugging programs. There are 11 tests in this track.
- ▼ Computer Programmer—The curriculum is geared towards people who are responsible for analyzing project workflow and converting it to code, optimizing existing programs, writing technical documentation, and testing and debugging programs. There are nine tests in this track.
- ▼ Java Programmer—This nine-test track focuses on programming tasks such as converting project specifications into Java code, testing and troubleshooting Java applications, flow control, exception handling, and object-oriented design principles.
- ▼ Software Tester—The objective of this seven-test track is to prove the software tester's skill at verifying system requirements, writing test plans, and identifying and reporting defects.
- ▼ Mainframe Programmer—The intent of this certification is to gauge a programmer's proficiency at tasks like converting project specifications into mainframe applications using programming languages such as COBOL and CICS, optimizing and updating programs, and writing technical documentation. Seven tests are required for this certification.
- ▼ The Brainbench Certified Internet Professional (BCIP) Web Developer—This eight-test track is intended for those who want to validate their skills in Internet-related technologies such as programming with XML, HTML, object-oriented design, scripting, and database integration.

CIW

CIW has developed two programming certifications—the CIW Web Developer Certification and the Master CIW Enterprise Developer Certification.

The CIW Web Developer certification is intended for developers who use programming and scripting to create Java-based Web applications that interact with business services, databases and Web services. This certification is earned by passing the CIW Web Developer exam.

The Master CIW Enterprise Developer Certification is aimed at professionals who build, according to CIW, "n-tier database and legacy connectivity solutions for Web applications using Java, Java APIs, Java Database Connectivity (JDBC) solutions, middleware tools, and distributed object models such as CORBA/ORB and IIOP." The eight exams that are required for this certification are:

- ▼ CIW Foundations
- ▼ CIW JavaScript Fundamentals
- ▼ CIW Perl Fundamentals
- ▼ CIW Application Developer
- ▼ Sun Certified Programmer for Java 2
- ▼ CIW Object-Oriented Analysis and Design with UML
- ▼ CIW Database Specialist
- ▼ CIW Enterprise Specialist

IBM

IBM Certified Solution Developer - XML and Related Technologies

A developer with this certification designs and implements applications that make use of Extensible Markup Language (XML) and related technologies such as XML Schema, Extensible Stylesheet Language Transformation (XSLT) and XML Path Language (XPath). The developer is strong with XML fundamentals.

Individuals wanting this certification must pass the multiple-choice test 141 (XML and related technologies) with a passing score of 58%. The test is 90 minutes long and consists of approximately 57 questions.

IBM Certified Enterprise Developer - WebSphere Studio, V5.0

This certification is geared for Java 2 Platform, Enterprise Edition (J2EE) 1.3 developers who create, maintain and deploy J2EE components. Potential candidates should have experience with IBM WebSphere Studio Application Developer/Enterprise Developer V5.

Before attempting this certification, IBM recommends gaining a thorough knowledge of Java APIs (Application Programming Interface) such

as Enterprise JavaBeans (EJB) 2.0, Servlet API 2.3, JavaServer Pages (JSP) 1.2, Java 2 Software Development Kit (SDK) 1.3.X, and Java Database Connectivity (JDBC) 2.1. IBM also recommends a basic knowledge of Java Message Service (JMS) 1.0.2, Java Connector Architecture (JCA) 1.0, and Java Transaction API (JTA) 1.0. They also recommend having a thorough knowledge of object-oriented analysis and design.

Four tests are required for this certification: Through SUN:

- ▼ 310-025 - Sun Certified Programmer for the Java 2 Platform 1.2 or 310-035, Sun Certified Programmer for the Java 2 Platform 1.4

Through IBM:

- ▼ 486: Object-Oriented Analysis and Design with UML
- ▼ 484: Enterprise Connectivity with J2EE V1.3
- ▼ 287: Enterprise Application Development with IBM WebSphere Studio, V5.0

These multiple choice tests last 90 to 135 minutes, have approximately 52 to 59 questions, and require passing scores between 61 and 67%.

IBM Certified Specialist - AS/400 RPG IV Programmer

This certification was formerly known as 'AS/400 RPG Programmer - Level 1.' The target audience is people who create, test and debug RPG III and IV programs. IBM recommends that candidates for this certification should have six months' experience with the AS/400 hardware and a working knowledge of OS/400. IBM also suggests a basic understanding of program development tools and DB2 for OS/400 and experience with Command Language and AS/400 work management.

Certification is achieved by passing test 266 (AS/400 RPC Programmer), which focuses primarily at the RPG IV level and at the V4R2 level. The multiple-choice test consists of approximately 74 questions, which must be answered within 120 minutes.

IEEE COMPUTER SOCIETY

Certified Software Development Professional (CSDP)

The aim of the CSDP is to measure an individual's mastery with software engineering.

The CSDP is achieved through four steps: passing the exam, experience, continuing education, and accepting the code of ethics.

1. Passing the exam – The 3.5 hour-long exam consists of 180 questions. The exam score is scaled on a range from 120 to 200, with a passing score of 170. The scaled score does not directly relate to the number of questions answered correctly. The exam costs \$100 for the application fee plus \$300 for IEEE or \$400 for non-members.
2. Experience – Candidates have a bachelor’s degree or equivalent. Additionally, they must have a minimum of 9,000 hours of software engineering experience with six of these areas:
 - ▶ Business Practices and Engineering Economics
 - ▶ Software Requirements
 - ▶ Software Design
 - ▶ Software Construction
 - ▶ Software Testing
 - ▶ Software Maintenance
 - ▶ Software Engineering Management
 - ▶ Software Configuration Management
 - ▶ Software Engineering Process
 - ▶ Software Engineering Tools and Methods
 - ▶ Software Quality
3. Codes of Ethics – Candidates are required to accept the Software Engineering Code of Ethics and Professional Practice.
4. Continuing Education – CSDPs must complete 30 Professional Development Units every three years.

ORACLE CORPORATION

Since the business of Oracle is based on databases written in SQL, most of Oracle’s certifications involve programming in some form or fashion. Three Oracle certifications that focus mainly on programming are:

- ▼ Oracle Forms 6i Developer Certified Professional
- ▼ Oracle9i PL/SQL Developer Certified Associate
- ▼ Oracle9i Forms Developer Certified Professional

The Oracle Forms 6i Developer Certified Professional certification was developed for Oracle Certified Professionals (OCP) who manage large-scale databases or develop

applications that use large-scale databases. Four exams are required to receive this certification:

- ▼ Introduction to Oracle: SQL and PL/SQL or Introduction to Oracle9i: SQL
- ▼ Develop PL/SQL Program Units
- ▼ Build Internet Applications I
- ▼ Build Internet Applications II

The Oracle9i PL/SQL Developer Certified Associate certification is meant for technical professionals who have developed a basic understanding of Oracle. Two exams are required for achieving this certification:

- ▼ Introduction to Oracle9i: SQL or Introduction to Oracle: SQL and PL/SQL
- ▼ Oracle9i: Program with PL/SQL

The Oracle9i PL/SQL Developer Certified Associate certification is also part of The Oracle9i Forms Developer track, which leads to Oracle9i Forms Developer Certified Professional status instead of Associate status. One exam is required to advance to professional status:

- ▼ Oracle9i Forms Developer: Build Internet Applications

Most exams cost \$125 to take. However, the exam ‘Introduction to Oracle9i: SQL’ only costs \$90.

Introduction to Oracle: SQL and PL/SQL; Introduction to Oracle9i: SQL; and Develop PL/SQL Program Units are two hours long, consist of 57 questions, and require a passing rate of 60-70%. Build Internet Applications I and II are 1.5 hours long, consist of 60 questions, and require a 75-77% pass rate. The Oracle Forms Developer exam is 1.5 hours long, has 60 questions, and requires a 57% rating to pass.

SUN

Sun offers an extensive certification program that includes five certification tracks for Java programmers:

- ▼ Sun Certified Programmer for the Java 2 Platform
- ▼ Sun Certified Developer for the Java 2 Platform
- ▼ Sun Certified Web Component Developer for the Java 2 Platform, Enterprise Edition (J2EE)

- ▼ Sun Certified Business Component Developer for the Java 2 Platform, Enterprise Edition
- ▼ Sun Certified Enterprise Architect for the Java 2 Platform, Enterprise Edition

Sun Certified Programmer for the Java 2 Platform

Programmers who want to display their knowledge of Java 2 fundamentals should attempt this certification. The test, which covers basic syntax and structure of the Java programming language, is broken into nine sections:

- ▼ Declarations and Access Control
- ▼ Flow control, Assertions and Exception Handling
- ▼ Garbage Collection
- ▼ Language Fundamentals
- ▼ Operators and Assignments
- ▼ Overloading, Overriding, Runtime Type and Object Orientation
- ▼ Threads
- ▼ Fundamental Classes in the java.lang Package
- ▼ The Collections Framework

One multiple-choice and short-answer test covering the Java 2 Platform 1.2 or 1.4 is required for certification. Sun recommends testers have six to 12 months of Java programming experience before attempting the \$150 test. Two hours is allotted for completing the 61 questions with a passing score of 52%.

Sun Certified Developer for the Java 2 Platform

According to Sun, this performance-based certification is meant for “programmers and developers who are already familiar with the basic structure and syntax of the Java programming language, and who have a need to demonstrate advanced proficiency in developing complex, production-level applications using Java 2 Platform, Standard Edition (J2SE technology).”

Candidates must first be designated as a Sun Certified Programmer for Java 2 Platform. The remaining two requirements are to complete a programming assignment and an essay exam.

The programming assignment requires the programmer to write a Java application that includes the following elements:

- ▼ A graphical user interface
- ▼ A network connection
- ▼ A network server
- ▼ A database

The programming assignment costs \$250 and requires a passing score of 320 out of 400 points. The two-hour long, four-question essay exam costs \$150. Sun is vague on the passing score for the essay, saying it is subject to evaluation.

Sun Certified Web Component Developer for J2EE Platform

Candidates who already hold Sun's core Sun Certified Programmer for the Java 2 Platform certification only have to pass one test to earn the Web Component Developer certification. The certification is intended for programmers who create Java servlets and JavaServer Pages. The exam costs \$150. Ninety minutes is allowed for answering 59 questions.

Exam objectives include:

- ▼ The Servlet Model
- ▼ Designing and Developing Secure Web Applications
- ▼ Designing and Developing Reusable Web Components

Sun Certified Business Component Developer for the Java 2 Platform, Enterprise Edition 1.3

The J2EE Business Component certification focuses on using J2EE to "develop server-side components that encapsulate the business logic of an application." The target audience consists of programmers and developers who create Enterprise JavaBeans (EJB) applications. One exam is required in addition to the Sun Certified Programmer for Java 2 Platform certification.

This multiple choice and drag and drop exam costs \$150. Two hours is allowed for answering 45 of 70 questions.

Some of the exam objectives are:

- ▼ EJB Overview
- ▼ Enterprise Bean Environment
- ▼ Security Management

Sun Certified Enterprise Architect for J2EE

Like the title implies, the Enterprise Architect certification is designed for professionals who architect and design J2EE compliant applications.

The certification has three requirements: an exam, an assignment, and an essay.

The Sun Certified Enterprise Architect for J2EE Technology, Knowledge-Based Multiple-Choice Exam contains multiple choice, short answer, and drag and drop components. Seventy-five minutes are allowed to complete the 48-question exam. The passing score is 68%. The cost is \$150.

Some of the objectives for the exam, assignment and essay are:

- ▼ Common Architectures
- ▼ Enterprise JavaBeans Technology
- ▼ Protocols
- ▼ Design Patterns
- ▼ Messaging
- ▼ Internationalization
- ▼ Security

The second requirement is a written assignment, which requires a passing score of 70% and costs \$250. The final requirement is a four-question essay. Ninety minutes are allowed to complete the essay, which costs \$150.

SYBASE

Sybase has created the PowerBuilder Developer certification as part of their Certified Professional Program. The program certifies that developers understand PowerBuilder basics as well as more complex programming techniques. Developers who desire this certification should have one or two years' experience using PowerBuilder.

The newest Sybase certification exam is the PowerBuilder Professional 9.0 Certification Exam. Candidates with no less than 12 months' experience with PowerBuilder 9.0 should expect to spend at least 80 hours preparing for this exam. Sybase provides a free 30-question sample exam online. They also sell a practice exam with 200 randomly generated questions for \$69. Ninety minutes is allotted for the multiple-choice, 60-question exam. A 70% is required to pass. The test costs \$150.

The exam covers topics such as Exam Study Guidelines and Related Technology including:

- ▼ Relational Databases

Painters and Tools including:

- ▼ Application
- ▼ Debugger
- ▼ DataWindow
- ▼ Project
- ▼ User Object

and PowerScript which includes:

- ▼ Controls
- ▼ Windows
- ▼ Components
- ▼ 4GL Web Pages
- ▼ XML in PowerBuilder

MICROSOFT

Microsoft Certified Application Developer (MCAD) for Microsoft .NET certification is designed for programmers who have a year or two building, deploying and maintaining "department-level applications, components, Web or desktop clients, or database and network services using Microsoft tools and technologies." People holding the MCAD commonly are programmers, programmer/analysts or software developers.

Candidates for the MCAD must pass three exams:

One Web or Windows Application Development exam:

- ▼ Developing and Implementing Web Applications with Microsoft (Visual Basic® .NET or Visual C#™) and Microsoft Visual Studio® .NET
- ▼ Developing and Implementing Windows-based Applications with Microsoft (Visual Basic® .NET or Visual C#™) and Microsoft Visual Studio .NET

One XML Web Services and Server Components Development exam:

- ▼ Developing XML Web Services and Server Components with Microsoft (Visual Basic .NET or Visual C#) and the Microsoft .NET Framework

One elective exam:

- ▼ Designing and Implementing Databases with Microsoft SQL Server™ 2000 Enterprise Edition
- ▼ Designing and Implementing Solutions with Microsoft BizTalk Server® 2000 Enterprise Edition
- ▼ Designing and Implementing Solutions with Microsoft Commerce Server 2000

One of the Web or Windows Application Development Exams can also count for an elective exam.

The Microsoft Certified Solution Developer (MCSD) for Microsoft .NET certification was created for “advanced developers who design and develop leading-edge enterprise solutions, using Microsoft development tools and technologies as well as the Microsoft .NET Framework.” The MCSD is meant for lead developers with two or more years’ experience analyzing business requirements. MCSDs often hold the titles of software engineer, software architect or consultant.

Five tests are required for the MCSD certification:

One Web Application Development exam:

- ▼ Developing and Implementing Web Applications with Microsoft (Visual Basic® .NET or Visual C#™) and Microsoft Visual Studio® .NET

One Windows Application Development exam:

- ▼ Developing and Implementing Windows®-based Applications with Microsoft (Visual Basic .NET or C# .NET) and Microsoft Visual Studio .NET

One XML Web Services and Server Components Development exam (same choices as MCAD)

Solution Architecture:

- ▼ Analyzing Requirements and Defining Microsoft .NET Solution Architectures

One elective exam (same choices as MCAD)


MCSDs automatically earn the MCAD certification when becoming MCSD certified. Once certified, an MCSA or MCSD will receive a certificate, product discounts, invitations to conferences and training sessions, and access to special events. Additionally, they get access to the Microsoft Certified Professional Magazine site.

CONCLUSION

Most certifying organizations would like you to believe that their certifications will leave you rolling in a big green pile of money. The reality is that certification is one of many factors affecting your earning power, the main factors being education and work experience.

The Bureau of Labor Statistics collected data on salaries for programmers and software engineers and found that the median salary for the 585,000 computer programmers was \$61,500¹. The middle 50 percent earned between \$47,870 and \$79,520¹. Robert Half International (RHI) said starting salaries for applications development programmers/developers is \$60,700 to \$93,400¹ and \$56,000 to \$80,700¹ for software development programmers/analysts.

The statistics of the Bureau show 55% of the 697,000 software engineers are applications software engineers and 45% are systems software engineers. The median salary for software engineers is \$72,200¹ for applications and \$74,200¹ for systems. The middle 50% of software engineers earned between \$57,000 and \$91,250¹ for applications and \$58,000 and \$92,350¹ for systems. Starting salaries for software engineers in software development ranged from \$62,750 to \$92,000¹ per RHI.

The bad news for programmers is that the Bureau predicts employment growth will be slower than other computer specialties because of the availability of pre-packaged software. The good news is they predict software engineers will be the fastest growing occupation between 2000 and 2010. This reflects well on programmers, too, since many experienced programmers advance to become software engineers who have their own big green pile of money. 



NaSPA member Shawn Conaway is a Systems Administrator for a Fortune 100 retailer. He currently holds the Microsoft Certified Systems Engineer, Citrix Certified Administrator, and A+ certifications. Send questions or comments to s.conaway@naspa.com.

¹ Data is from 2000 and 2001, adjusted for inflation to 2003.