

## Chapter Fifteen

# Computer Careers and Certification

## **Discovering Computers 2012**

**Your Interactive Guide  
to the Digital World**



# Objectives Overview

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Describe career opportunities available in various segments of the computer industry

Discuss functions of jobs available in an IT department

Distinguish between trade schools and colleges

Differentiate among various computer-related majors for college students

Identify ways to stay current with changing technology after graduation

# Objectives Overview

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List the benefits of certification for employers, employees, and vendors

Identify ways to prepare for certification

List the general areas of IT certification

Name some specific IT certifications in various certification areas

# The Computer Industry

- A demand for computer professionals continues to grow
  - IT is predicted to be the fastest growing industry for the next several years



# Careers in the Computer Industry

- Job opportunities in the computer industry generally are available in one or more of these areas:

General business  
and government  
organizations and  
their IT departments

Computer  
equipment field

Computer software  
field

Computer service  
and repair field

Computer sales

Computer education  
and training field

IT consulting

# Careers in the Computer Industry

- Employees in the **IT department** work together as a team to meet the information requirements of their organization
- Employees also are responsible for keeping all the computer operations and networks running



# Careers in the Computer Industry

- Jobs in the IT department typically are divided into six main areas

Management

System development and programming

Technical services

Operations

Training

Security



# Careers in the Computer Industry

**IT Department Jobs**

Area	Job Title	Function	Usual Education Required	Annual Base Salary Range
Management	<b>Chief information officer (CIO)/chief technology officer (CTO)</b>	Directs the company's information service and communications functions	Bachelor's degree in Management Information Technology	\$136,000 to \$306,000
	<b>E-commerce director</b>	Supervises the development and execution of Internet or e-commerce systems; works with the company's marketing and customer service divisions	Bachelor's degree in Computer Information Systems or Management Information Technology	\$89,000 to \$190,000
	<b>Network administrator/wireless network administrator</b>	Installs, configures, and maintains LANs, WANs, wireless networks, intranets, and Internet systems; identifies and resolves connectivity issues	Bachelor's degree in Computer Information Systems or Electrical Engineering Technology	\$39,000 to \$158,000
	<b>Project leader/manager</b>	Oversees all assigned projects; allocates resources; selects teams; performs systems analysis and programming tasks; conducts performance appraisals	Bachelor's degree in Management Information Technology	\$53,000 to \$120,000
System development and programming	<b>Computer games designer/programmer</b>	Designs computer games and translates the design into a computer program using an appropriate computer language	Bachelor's degree in Computer Science or Software Engineering	\$49,000 to \$107,000
	<b>Computer scientist</b>	Researches, invents, and develops innovative solutions to complex software requirements or problems	Bachelor's or master's degree in Computer Science or Engineering	\$55,000 to \$144,000
	<b>Database analyst</b>	Uses data modeling techniques and tools to analyze, tune, and specify data usage within an application area	Bachelor's degree in Computer Science or Computer Information Systems	\$33,000 to \$133,000
	<b>Desktop or mobile application programmer/developer</b>	Converts the system design into the appropriate computer language, such as Visual Basic, Java, C#, F#, and C++	Associate's or bachelor's degree in Computer Information Systems	\$42,000 to \$123,000
	<b>Software engineer</b>	Specifies, designs, implements, tests, and documents high-quality software in a variety of fields, including robotics, operating systems, animation, and applications	Bachelor's degree in Computer Science or Software Engineering	\$45,000 to \$130,000
	<b>Systems analyst</b>	Works closely with users to analyze their requirements, designs and develops new information systems, and incorporates new technologies	Bachelor's degree in Computer Information Systems	\$42,000 to \$120,000
	<b>Systems programmer</b>	Installs and maintains operating system software and provides technical support to the programming staff	Bachelor's degree in Computer Science or Computer Information Systems	\$39,000 to \$122,000
	<b>Technical lead</b>	Guides design, development, and maintenance tasks; serves as interface between programmer/developer and management	Bachelor's degree in Computer Science	\$57,000 to \$131,000
	<b>Technical writer</b>	Works with the analyst, programmer, and user to create system documentation and user materials	Associate's or bachelor's degree in Computer Information Systems or in English	\$35,000 to \$94,000
	<b>Web software developer</b>	Analyzes, designs, implements, and supports Web applications; works with HTML, Ajax, JavaScript, and multimedia	Bachelor's degree in Computer Information Systems	\$49,000 to \$100,000

**IT Department Jobs (continued)**

Area	Job Title	Function	Usual Education Required	Annual Base Salary Range
Technical services	<b>Computer technician</b>	Installs, maintains, and repairs hardware; installs, upgrades, and configures software; troubleshoots hardware problems	Associate's degree in Computer Information Systems or Electrical Engineering	\$33,000 to \$71,000
	<b>Database administrator</b>	Creates and maintains the data dictionary; monitors database performance	Bachelor's degree in Computer Information Systems or Management Information Technology	\$63,000 to \$107,000
	<b>Desktop publisher/compositor</b>	Formats and combines text and graphics to produce publication-ready materials	Certificate or bachelor's degree in Graphic Design or Communications	\$29,000 to \$60,000
	<b>Digital forensics examiner</b>	Collects and analyzes evidence found on computers and networks	Bachelor's degree in Computer Science	\$50,000 to \$125,000
	<b>Graphic designer/illustrator</b>	Develops visual impressions of products for advertisements and marketing materials	Certificate or bachelor's degree in Graphic Design or Communications	\$35,000 to \$72,000
	<b>Quality assurance specialist</b>	Reviews programs and documentation to ensure they meet the organization's standards	Bachelor's degree in Computer Information Systems	\$45,000 to \$104,000
	<b>Storage administrator/analyst</b>	Installs, maintains, and upgrades storage systems; analyzes an organization's storage needs	Bachelor's degree in Computer Science or Computer Information Systems	\$60,000 to \$86,000
	<b>Web designer</b>	Develops graphical content using Photoshop, Flash, and other multimedia tools	Bachelor's degree in Computer Information Systems	\$50,000 to \$110,000
	<b>Webmaster/Web administrator</b>	Maintains an organization's Web site; creates or helps users create Web pages; oversees Web site performance	Bachelor's degree in Computer Information Systems	\$46,000 to \$90,000
	<b>Computer operator</b>	Performs equipment-related activities such as monitoring performance, running jobs, backup, and restore	Associate's degree in Computer Information Systems	\$26,000 to \$59,000
Operations	<b>Data communications analyst/VoIP specialist</b>	Installs and monitors communications equipment and software; maintains Internet/WAN connections	Bachelor's degree in Computer Information Systems or Electrical Engineering Technology	\$39,000 to \$111,000
	<b>Computer science/IT instructor</b>	Teaches students computer science and information technology skills	Master's degree in Computer Science, Computer Information Systems, Information Technology, or Computer Engineering	\$34,000 to \$168,000
Training	<b>Corporate trainer</b>	Teaches employees how to use software, design and develop systems, program, and perform other computer-related activities	Certificate or bachelor's degree in Computer Information Systems	\$44,000 to \$82,000
	<b>Help desk specialist</b>	Answers computer-related questions in person, on the telephone, or in a chat room	Associate's degree in Computer Information Systems	\$35,000 to \$56,000
	<b>Chief security officer (CSO)</b>	Responsible for physical security of an organization's property and people; in charge of securing computing resources	Bachelor's degree in Computer Science or Management Information Technology	\$108,000 to \$220,000
Security	<b>Computer security specialist/mobile security specialist</b>	Responsible for the security of data and information stored on computers and mobile devices within an organization	Bachelor's degree in Computer Information Systems or Computer Science	\$47,000 to \$115,000
	<b>Network security administrator</b>	Configures routers and firewalls; specifies Web protocols and enterprise technologies	Bachelor's degree in Computer Science or Computer Information Systems	\$50,000 to \$128,000
	<b>Security administrator</b>	Administers network security access; monitors and protects against unauthorized access	Bachelor's degree in Computer Science or Computer Information Systems	\$49,000 to \$118,000



# Careers in the Computer Industry

- The **computer equipment field** consists of manufacturers and distributors of computers and computer-related hardware
- Careers in this field are available with companies that design, manufacture, and produce computers and devices



# Careers in the Computer Industry

- The **computer software field** consists of companies that develop, manufacture, and support a wide range of software
- Job titles might include:

Project leader

Project manager

Desktop or mobile  
application  
programmer/developer

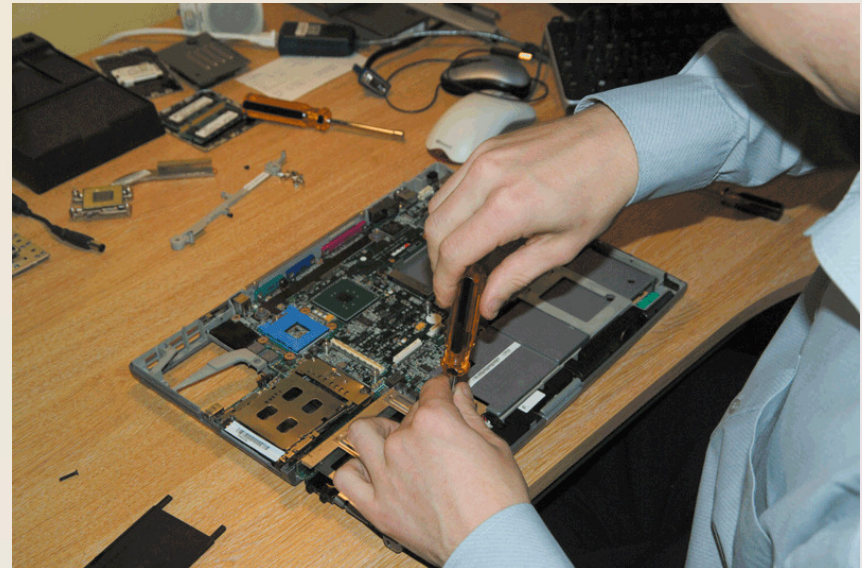
Technical lead

Software engineer

Computer scientist

# Careers in the Computer Industry

- The **computer service and repair field** provides:
  - Preventive maintenance
  - Component installation
  - Repair services
- Requires a knowledge of electronics



# Careers in the Computer Industry

- **Computer salespeople** must possess a general understanding of computers and a specific knowledge of the products they are selling
  - Some work for computer equipment and software manufacturers, and others work for retailers






# Careers in the Computer Industry

- Corporate trainers teach employees how to use software, design and develop systems, write programs, and perform other computer-related activities



# Careers in the Computer Industry

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**An IT consultant**  
provides computer  
services to his or  
her clients

# Preparing for a Career in the Computer Industry

- A **trade school** typically offers programs in:

Programming

Web design  
and  
development

Graphics  
design

Hardware  
maintenance

Networking

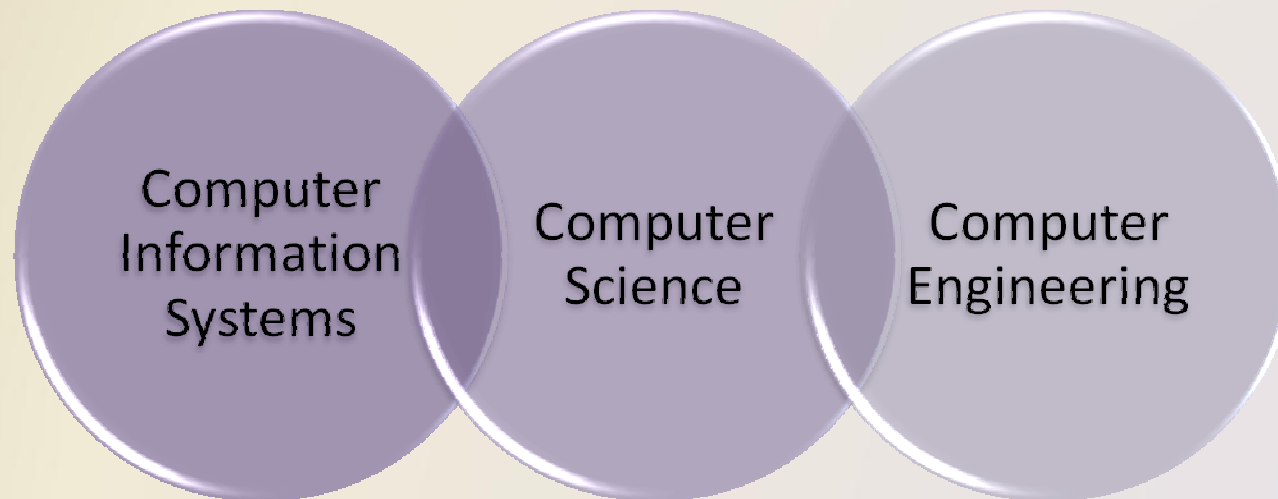
Personal  
computer  
support

Security



# Preparing for a Career in the Computer Industry

- If you attend a two-year college, check for an articulation agreement with a four-year university
- Three broad disciplines produce the greatest number of entry-level employees



# Preparing for a Career in the Computer Industry

## Computer Discipline Differences

Computer Information Systems*	Computer Science	Computer Engineering
Practical and application oriented	Theory oriented	Design oriented
Business and management oriented	Mathematics and science oriented	Mathematics and science oriented
Understand how to design and implement information systems	Understand the fundamental nature of hardware and software	Understand the fundamental nature of hardware and electronics
Certificates Degrees include A.A., A.A.S., A.S., B.A., B.S., M.S., Ph.D.	Degrees include B.S., M.S., Ph.D.	Degrees include B.S., M.S., Ph.D.

\*Sometimes called Information Technology or Management Information Systems

# Preparing for a Career in the Computer Industry

## Computer information systems

- Programming
- Operating systems
- Systems analysis and design
- Databases
- Networking
- Web development

## Computer Science

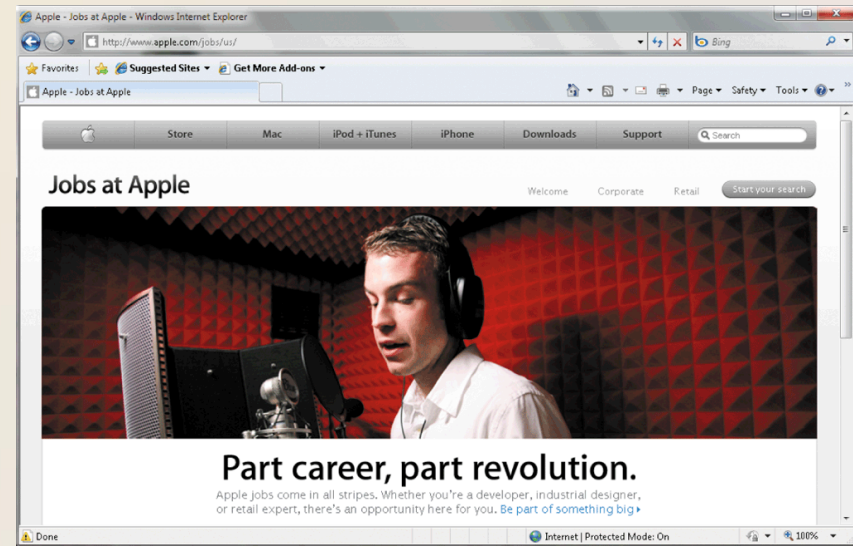
- Artificial intelligence
- Data communications
- Data and file structures
- Operating systems
- Application and systems programming
- Systems analysis and design

## Computer Engineering

- Application and systems programming
- Data and file structures
- Networks
- Operating systems

# Preparing for a Career in the Computer Industry

- Many companies list their job openings, internship opportunities, and career opportunities on their Web sites
- Job seekers can create a **video resume**



# Preparing for a Career in the Computer Industry

## How to Use Monster to Search for a Job

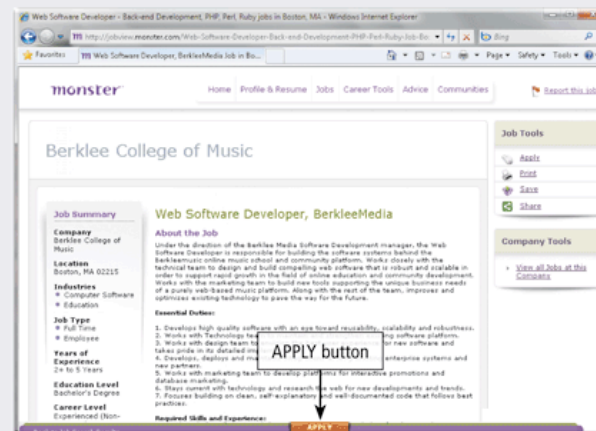
### Step 1

Display the Monster Web page on the screen. Type Web software developer in the New Search text box and then point to the Search button.



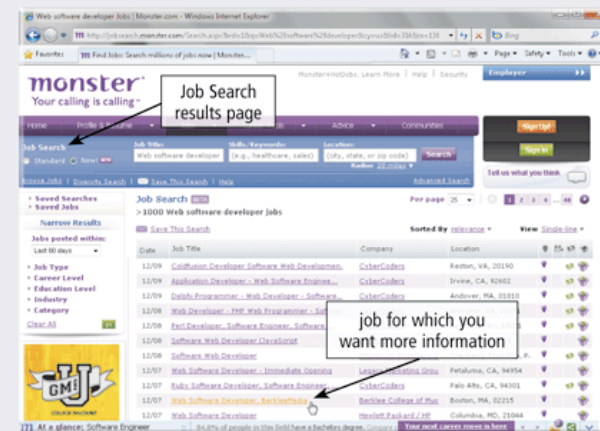
### Step 3

Click the job title to display information about the available job. Read the job description. If it appeals to you, click the APPLY button and then follow the on-screen instructions.



### Step 2

Click the Search button to display the Job Search results page and then point to the job title for which you would like more information.



# Preparing for a Career in the Computer Industry

- It is important to keep up to date on industry trends and technologies and to develop new skills

Professional organizations and personal networks

Professional growth and continuing education

Computer publications

Certification

# Preparing for a Career in the Computer Industry

- Computer professionals with common interests and a desire to extend their proficiency form computer-related professional organizations

## Professional Computer Organizations

Association for Computing Machinery (ACM)

Association for Information Systems (AIS)

Association for Women in Computing (AWC)

Association of Information Technology Professionals (AITP)

IEEE Computer Society

Independent Computer Consultants Association (ICCA)

International Systems Security Association (ISSA)

Institute of Electrical and Electronics Engineers (IEEE)

International Association for Computer Systems Security (IACSS)

National Association of Programmers (NAP)



# Preparing for a Career in the Computer Industry

- A user group is a collection of people with common computer equipment or software interests
- Can be an effective and rewarding way to learn about and continue career development

## Examples of User Groups

Apple User Groups

Association of Personal Computer User Groups (APCUG)

C/C++ Users Group (CUG)

Independent Oracle Users Group (IOUG)

Java Users Groups (JUG)

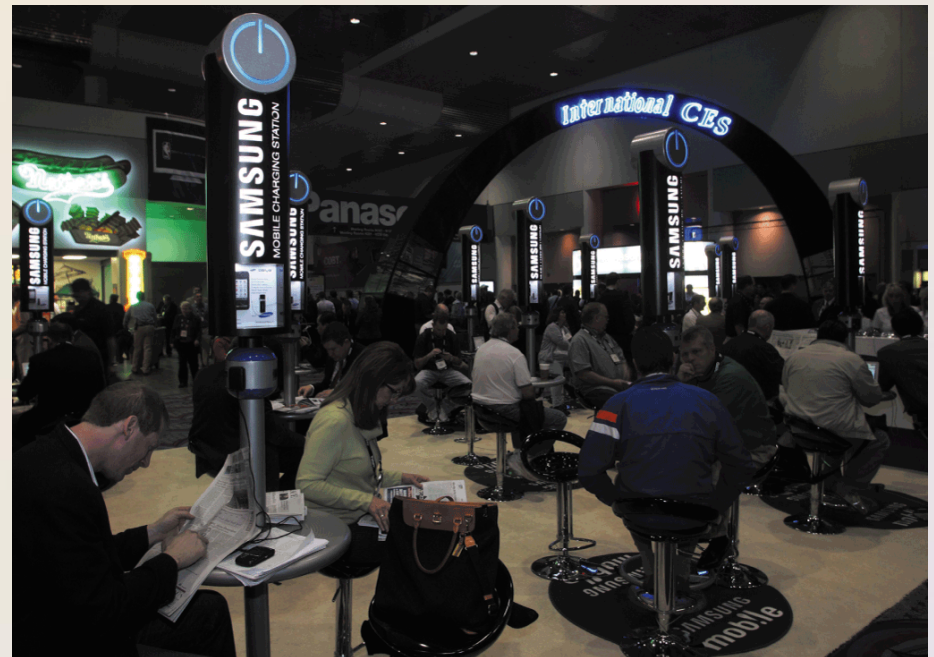
Linux Users Groups WorldWide (LUGWW)

.NET User Groups

UNIX/Linux User Groups

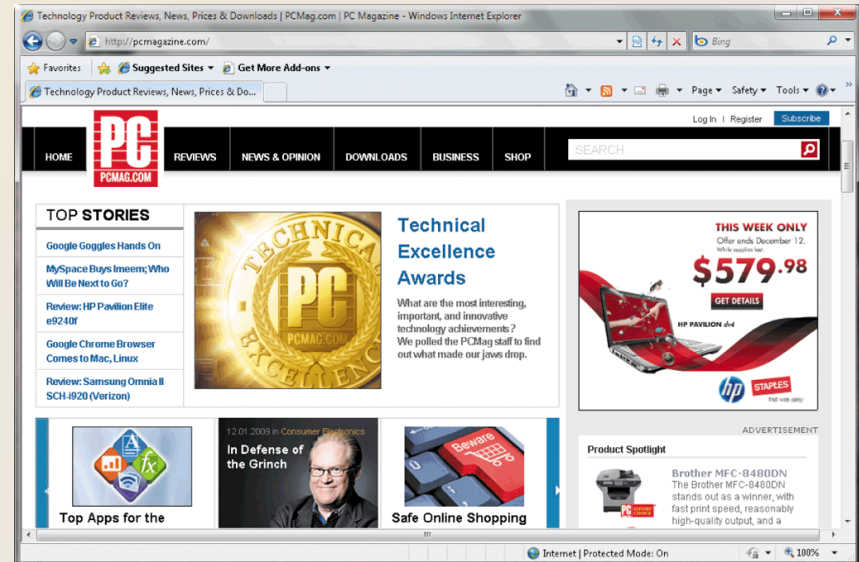
# Preparing for a Career in the Computer Industry

- Conferences, conventions, and trade shows are a great way to stay aware of new products and services
  - International Consumer Electronics Show (CES)



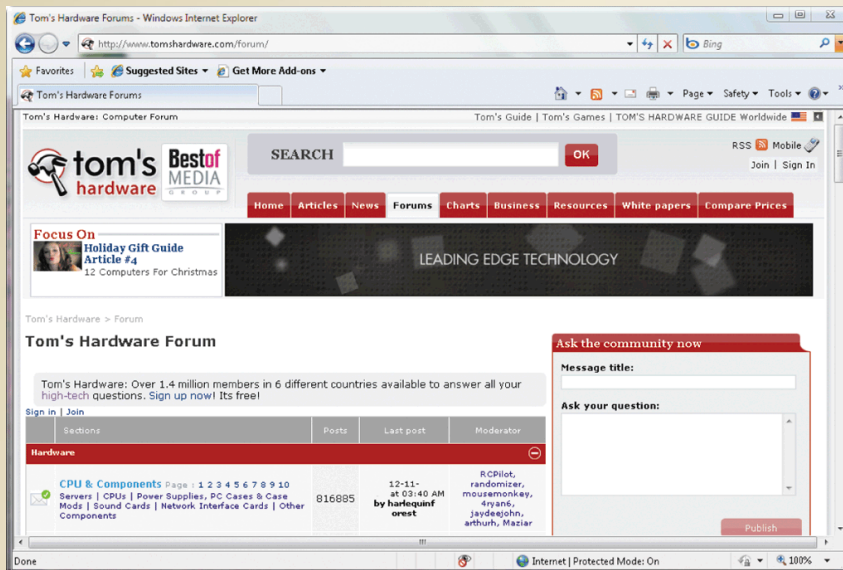
# Preparing for a Career in the Computer Industry

- Hundreds of computer industry publications are available online
  - *Computerworld*
  - *InfoWorld*
  - *PC Magazine*
  - *PC World*



# Preparing for a Career in the Computer Industry

- Web sites discuss or share opinions, analysis, reviews, or news about technology
  - Slashdot
  - The Register
  - AnandTech
  - Tom's Hardware Guide



# Certification

- **Certification** is the process of verifying the technical knowledge of an individual who has demonstrated competence in a particular area
- Computer certifications are available in these areas:

Application  
software

Operating  
systems

Programming

Hardware

Networking

Digital  
forensics

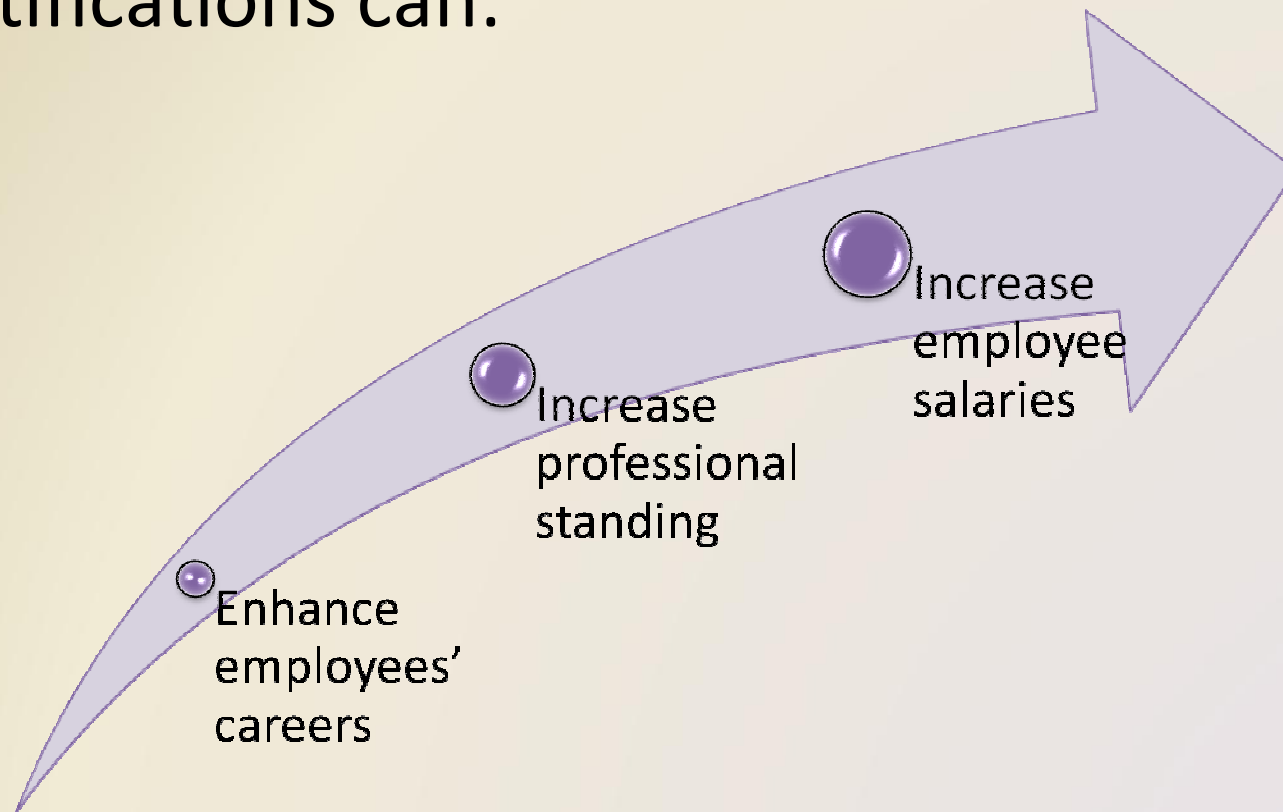
Security

The Internet

Database  
systems

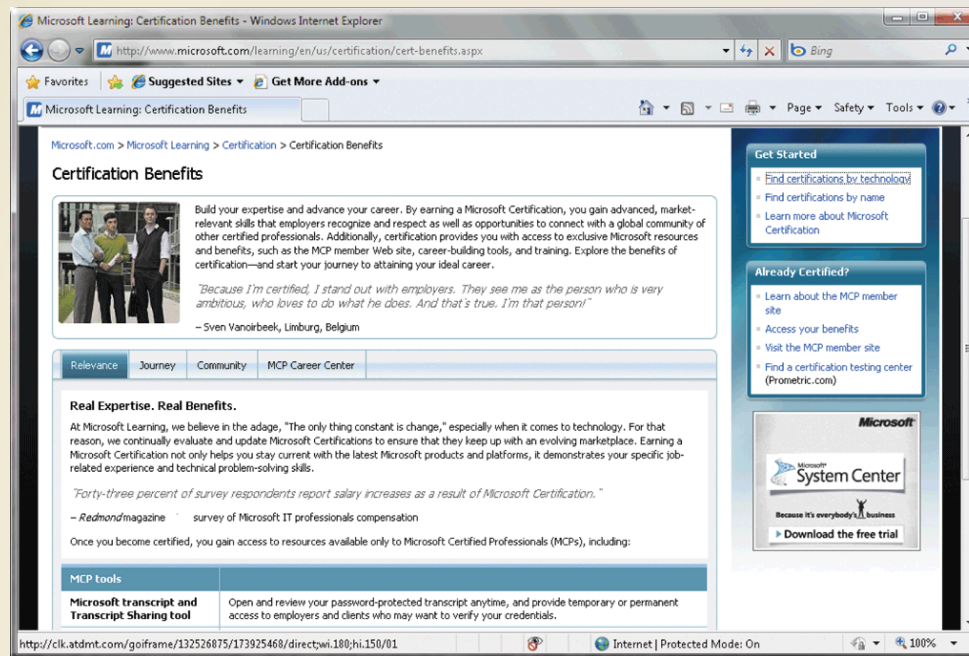
# Certification

- IT certifications can:



# Certification

- Vendor-sponsored certifications offer many special benefits as incentives
- Professional organizations also offer certifications





# Certification

- Selecting a certification requires careful thought and research

## Factors to Consider in Selecting a Certification

- Consider the expenses and the time involved to obtain the certification, including how often it must be renewed
- Examine employment projections
- Look at job listings to see what certifications are sought
- Read evaluations of certifications
- Talk to people in the industry
- Think about complementary combinations of certifications to meet your goals

# Certification

- Certification training options are available to suit every learning style

## Self-study

- Requires high motivation
- Least expensive

## Online training classes

- Students set their own pace
- Can be one-third the price of instructor-led programs

## Instructor-led training

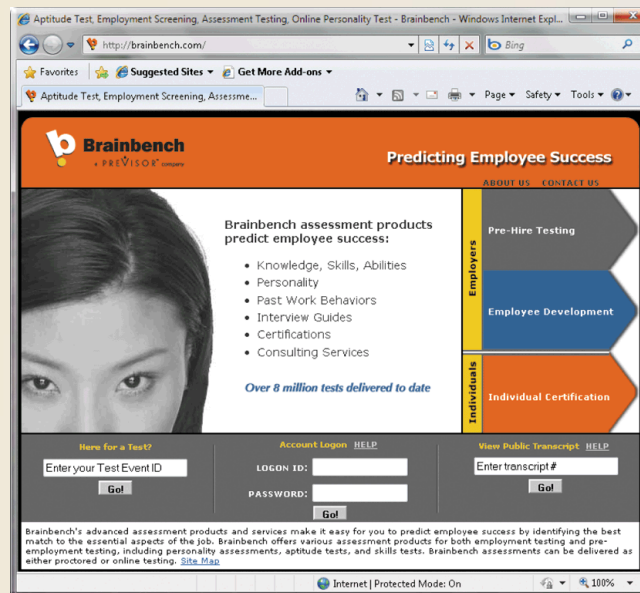
- Typically span from several days to several months
- Some sponsors hold their own sessions

## Web resources

- May include detailed course objectives, training guides, sample test questions, chat rooms, and discussion groups

# Certification

- Certifications are typically taken on a computer at a testing center
- With computerized adaptive testing (CAT), the tests analyze a person's responses while taking the test



# A Guide to Certification

- Application Software Certifications

Microsoft Office  
Specialist (MOS)

Microsoft Office  
Specialist (MOS) -  
Expert

Microsoft Certified  
Desktop Support  
Technician (MCDST)

Adobe Certified  
Associate

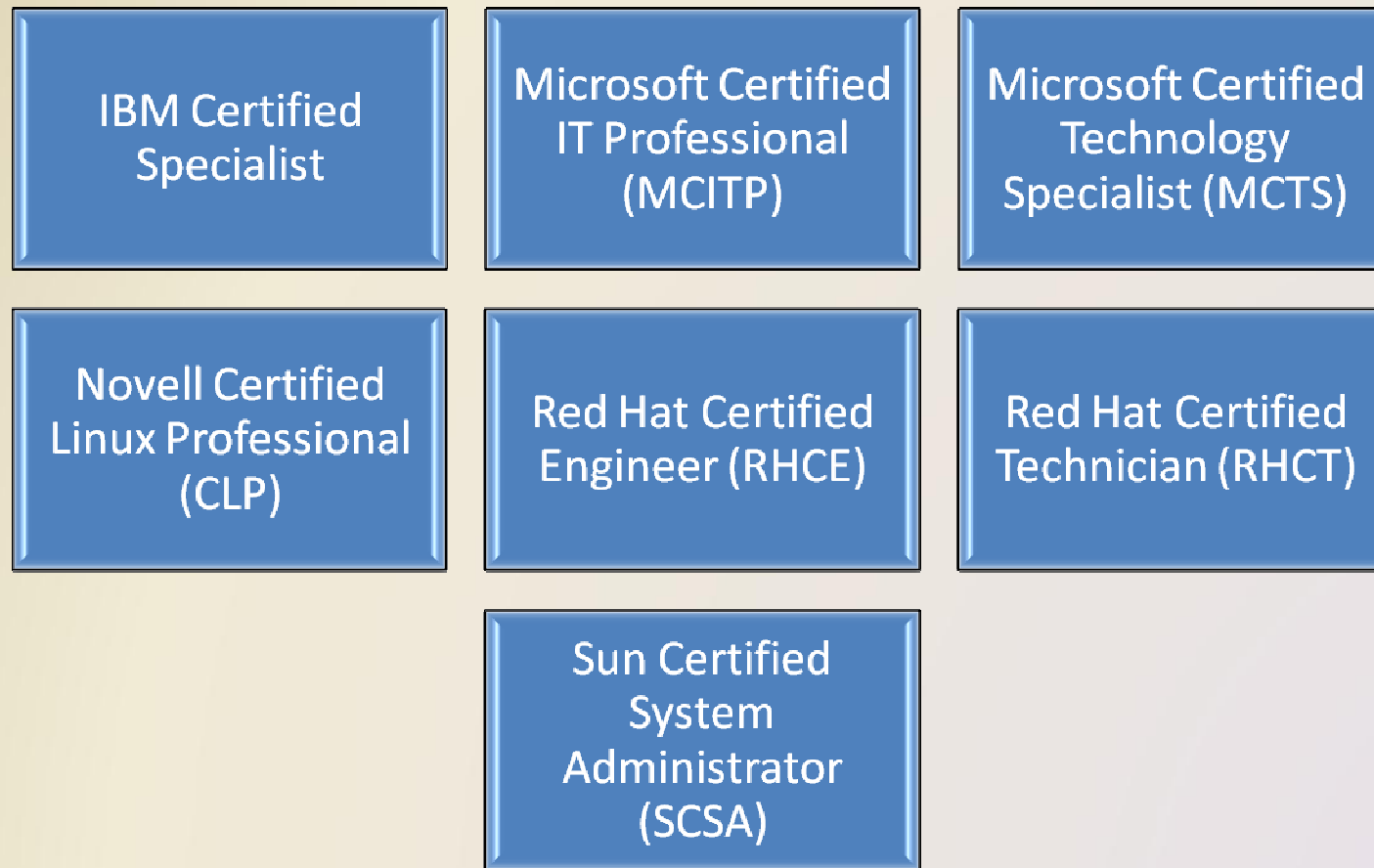
Adobe Certified  
Expert (ACE)

Adobe Certified  
Instructor (ACI)

IBM Certified  
Professional for  
Lotus Software

# A Guide to Certification

- Operating System Certifications



# A Guide to Certification

- Programmer/Developer Certifications

Certified Software  
Development  
Associate (CSDA)

Certified Software  
Development  
Professional (CSDP)

IBM Certified  
Solution Developer

Microsoft Certified  
Professional  
Developer (MCPD)

Sun Certified  
Enterprise Architect  
(SCEA)

Sun Certified Java  
Developer (SCJD)

Sun Certified Java  
Programmer (SCJP)

Sun Certified  
Mobile Application  
Developer (SCMAD)

# A Guide to Certification

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- Hardware Certifications

A+

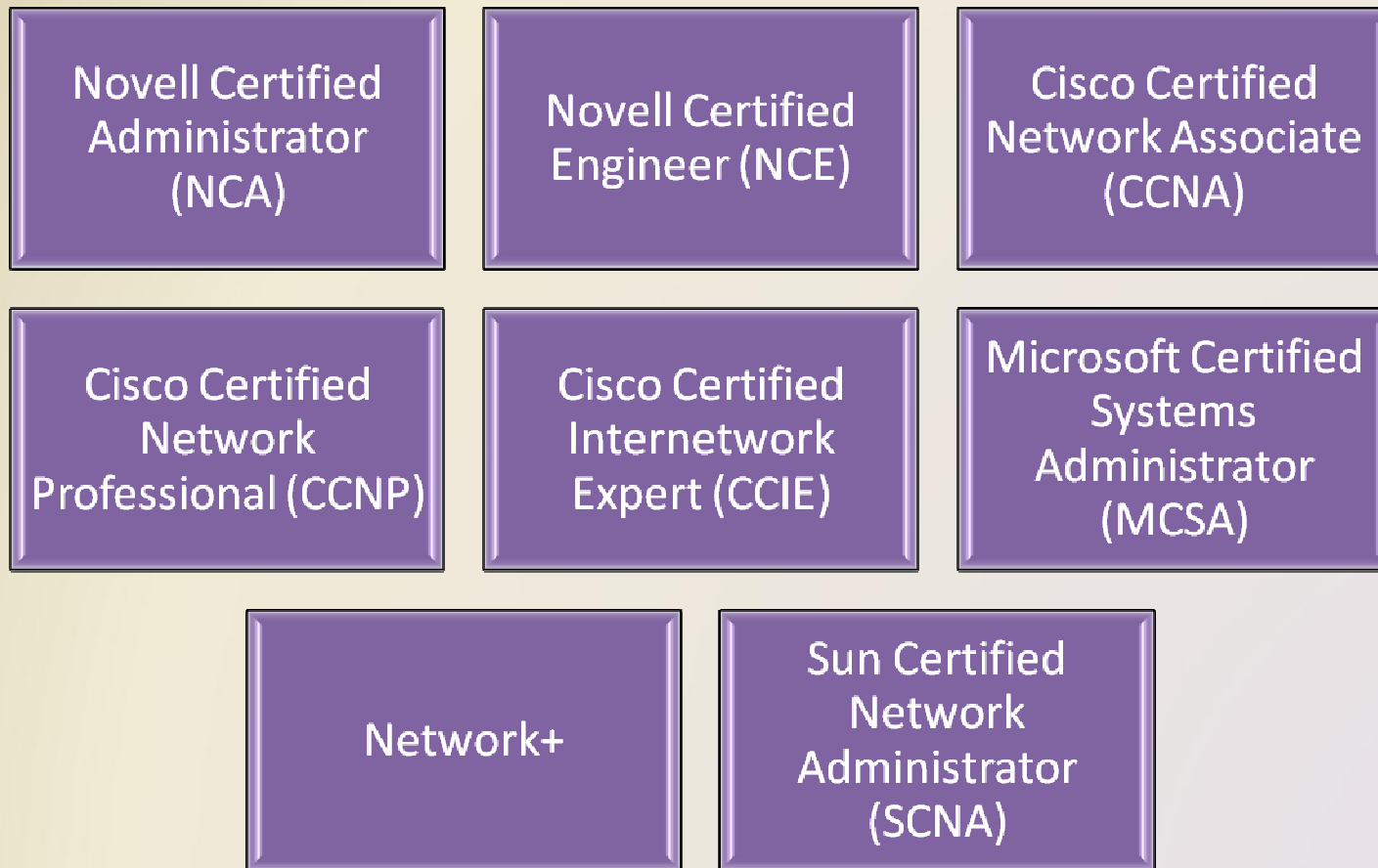
Dell Certified  
Systems  
Expert

IBM eServer  
Certified  
Specialist



# A Guide to Certification

- Networking Certifications



# A Guide to Certification

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- Digital Forensics Certifications

Certified Computer  
Examiner (CCE)

Certified Computer  
Forensics Examiner  
(CCFE)

Certified Electronic  
Evidence  
Collection  
Specialist (CEECS)

Certified  
Information  
Forensics  
Investigator (CIFI)

# A Guide to Certification

- Security Certifications

Certified  
Information  
Systems Security  
Professional (CISSP)

Security Certified  
Network Architect  
(SCNA)

Security Certified  
Network  
Professional (SCNP)

Security Certified  
Network Specialist  
(SCNS)

Systems Security  
Certified  
Practitioner (SSCP)

# A Guide to Certification

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- Internet Certifications

Certified Internet  
Webmaster  
(CIW)

Certified Web  
Professional  
(CWP)

# A Guide to Certification

- Database System Certifications

IBM Certified  
Solutions Expert –  
DB2

IBM Certified  
Solutions Expert –  
Informix

Microsoft Certified  
IT Professional  
(MCITP)

Oracle Certified  
Professional (OCP)

Sybase Certified  
Professional

# Summary

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Strong demand for computer and IT professionals

Variety of available computer-related careers

Computer education at trade schools, computer-related majors at colleges and universities, job searches, career development planning, professional organizations, and professional growth

Certification preparation, examinations, and resources

Specific certifications

## Chapter Fifteen

# Computer Careers and Certification

## Discovering Computers 2012

**Your Interactive Guide  
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**Chapter 15 Complete**

