IEEE Computer Society Certified Software Development Professional (CSDP) Exam

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Agenda

✓**What is the IEEE Computer Society?**

✓**A profession of software engineering**

✓**What is certification?**

✓**Why become certified?**

✓**The IEEE Certified Software Development Professional**

✓**History of the CSDP**

✓**SWEBOK**

✓**The Process of Becoming an IEEE CS CSDP**

✓**Questions**

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What is the IEEE Computer Society?

✓ **The IEEE Computer Society is the world's oldest and largest association of computing professionals**

✓ **Its vision is to be …"the leading provider of technical information and services to the world's computing professionals."**

✓ **The IEEE CS is the largest of the societies and councils organized under the IEEE.**

IEEE CS products & services *(continued)*

- ✓ **Publications**
  - • *11 Magazines & 10 Transactions*
  - • *Over 150 Conference Proceedings annually*
- ✓ **157 student and 176 professional chapters worldwide**

- ✓ **Educational Activities, including Computing Curricula, accreditation activities, and continuing education offerings**
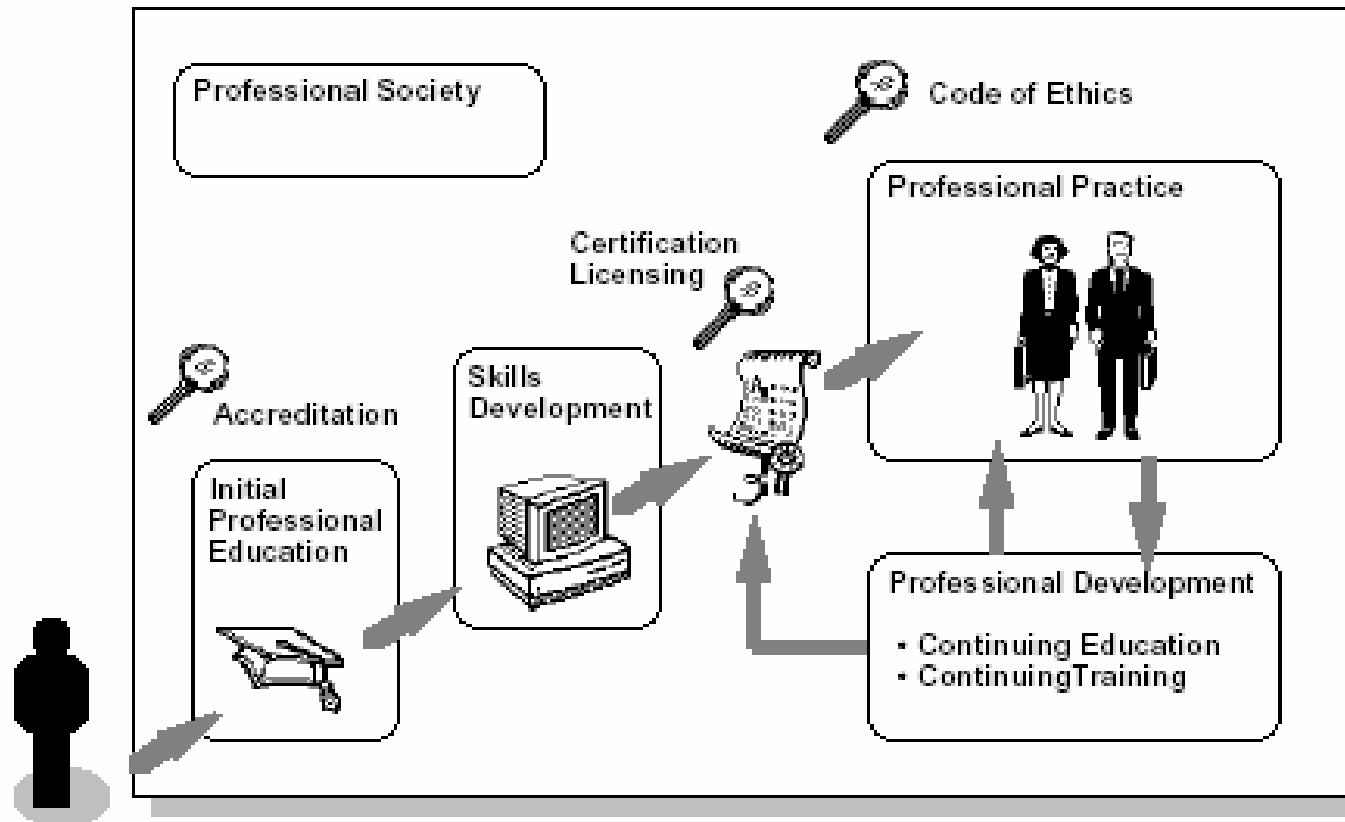
- ✓ **Conferences: over 150 sponsored or cosponsored meetings annually**

IEEE CS products & services

- ✓ **9 Standards Sponsors and over 200 Standards working groups**
  - *Robust software engineering standards activities*

- ✓ **34 technical committees and councils plus plus 9 task forces**

- ✓ **New Member Benefit in 2002**
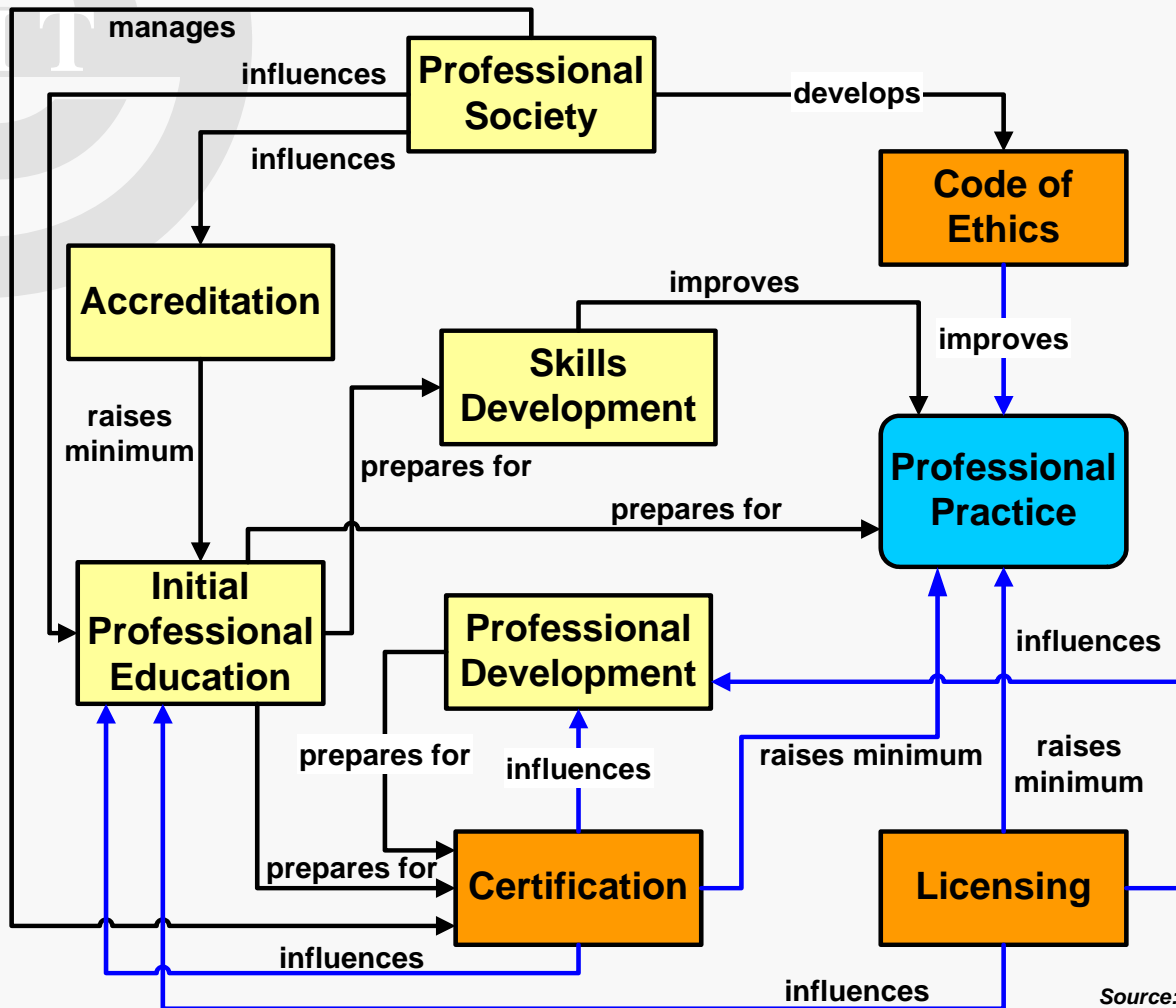 - *100+ Distance Learning Courses free with membership*

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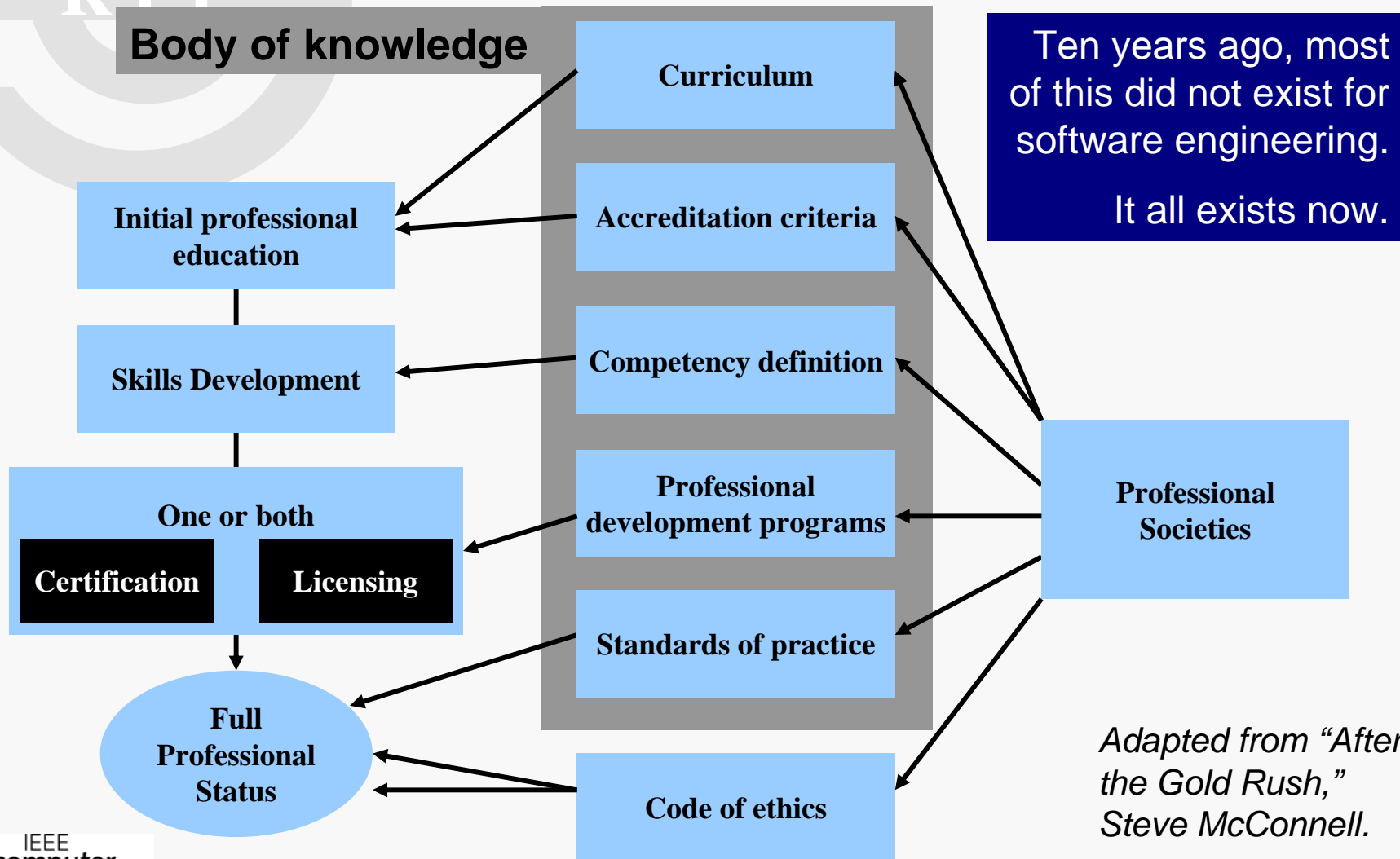
Level components of a profession

Source: Gibbs N., Ford G., A Mature Profession of Software Engineering, CMU/SEI TR-96-004

Roles of Certification, Licensing, Ethics

Source: Ford G., Gibbs N., A Mature Profession of Software Engineering, CMU/SEI TR-96-004

A model of a profession

Body of knowledge

Curriculum

Accreditation criteria

Competency definition

Professional development programs

Standards of practice

Initial professional education

Skills Development

One or both

Certification   Licensing

Full Professional Status

Code of ethics

Ten years ago, most of this did not exist for software engineering.

It all exists now.

Professional Societies

Adapted from "After the Gold Rush," Steve McConnell.

Recognition as engineering *(continued)*

- ✓ **Licensing for software engineers underway in Texas, BC, Ontario, other countries**

- ✓ **RIT, Milwawkee School of engineering, Clarkson University and others grant the first-in-US**
  - *Programs secure ABET accreditation*

- ✓ **Merger of CSAB and ABET completed**

Recognition as engineering

- ✓**IEEE-CS / ACM Computing Curriculum 2001**
  - *Includes an SE component*

- ✓**IEEE-CS / ACM Software Engineering Curriculum (2004)**
  - *http://sites.computer.org/ccse/*

- ✓**IEEE-CS *SWEBOK* published in book form**
  - *http://www.swebok.org/*

- ✓**ACM/IEEE-CS Software Engineering Code of Ethics was completed in 1998**
  - *http://www.acm.org/serving/se/code.htm*

What is certification?

✓ **Recognition that that an individual has demonstrated a proficiency within and comprehension of a specified body of knowledge at a point in time**

✓ **It is peer recognition and not registration or licensure**
- *Registration: listing by & with a body of those individuals or organizations that are certified*
- *Licensure: authorization granted by government body for an individual or organization to practice a business or occupation*

✓ **Certification is voluntary**

Why become certified? *(continued)*

✓**Mark of Excellence:** demonstrates the certified individual has the knowledge to ensure that recognized principles and practices of software engineering are being used

✓**Competition in the Marketplace:** companies and organizations need a work force proficient in principles and practices of software engineering

✓**Recognition:** Customer confidence based on evidence of qualifications and suitability for the task or project

Why become certified?

✓**Investment:** certification is an investment in your career and the future of employer

✓**Continuous improvement:** to remain certified requires continuous education and involvement in software engineering-related work and activities. Skills remain current and flexibility to work on a variety of projects or for a variety of companies improves.

Without certification

✓**Couldn't I do all this without certification?**
- *Perhaps, if properly motivated*

- *An individual could be a great inventor or writer without a formal education, if properly motivated*

- *Certification is not a guarantee, but rather an indicator.*

✓ **Possesses fundamental *knowledge* and *understanding* of computing principles and concepts and their application to the *definition*, *design*, *construction*, *testing* of software**

✓ **Is able to *apply design principles* with *technical* and *economic tradeoffs* to modules, subsystems, and systems in accordance with *standards* of practice, specifications, and principles of behavior of software as required to perform the functions as stated in the software requirements**

✓ **Has met the IEEE CS CSDP education, experience, and examination requirements**

History of effort (continued)

R I T

- ✓ **1976 - IEEE Transactions on Software Engineering**

- ✓ **1978 - Computer Society organizes SE standards committee**

- ✓ **1992 - Computer Society forms ad hoc committee to promote the professionalization of SE**

- ✓ **1997 – 1998 - Computer Society conducts pilot program, "Doing Software Right" to promote SE practices. The CSDP effort starts**

- ✓ **Spring 1999 - Chauncey Group International gets contract**

- ✓ **CSDP Steering committee**

- ✓ **April 1999 – Portland Oregon, job Analysis workshop**

History of effort

✓**Summer 1999**

- *Job analysis reviewed and refined*
- *Job analysis distributed to cross-section*

✓**Fall-Winter 1999**

- *Finalization of tasks and associated knowledge statements to be included in the certification examination*

- *Finalization of test content percentages*

- *Linkages between knowledge and task statements defined to guide test development*

History of effort (continued)

✓ **Spring 2000**

- *Test item writing held in Houston*
- *About 20 participants*
- *Over 600 test items developed and completed their initial technical review*

✓ **Summer 1999-Fall 2000**

- *Worked with the Chauncey Group on job analysis, test item writing & test item review*
- *SWEBOK knowledge areas were used in CSDP bulletin for experience definition and study material list organization*

History of effort *(continued)*

✓ **Spring 2001**

- *79% of beta test participants achieved a passing score*

✓ **A beta test version of the exam was assembled**

- *Participants from Argentina, Brazil, Canada, China, India, Japan, Russia, Switzerland, U.S.A and the U.K.*
- *Average age of participants was 41 with 9.8 years of industry experience.*

✓ **Spring 2002**

- *First regular examination*

History of effort

✓ **2002 -2004**

- *Training course and exam offered in Salt Lake City (Thayer)*
- *2002 - Sample exam effort started (Naveda)*

✓ **2003**

- *CSDP online review course released (Naveda, Seidman)*

- *Software engineering problem book effort started (Naveda and Seidman)*

✓ **Spring 2004**

- *365 individuals have taken and passed the CSDP*

Collateral project: Guide to SWEBOK

R I T

Project sponsor – IEEE Computer Society 1998 – 2001

- ✓ **Editorial team:**
  - *IEEE Computer Society 1998 – 2001*
  - *Alain Abran, James Moore, Robert Dupuis, Pierre Bourque*
- ✓ **Sponsors:**
  - *ACM, Boeing, CCPE, Construx Software, MITRE, NIST, National Research Council Canada, Rational, Raytheon, SAP Labs*
- ✓ **Manager: University of Montreal, Quebec**
- ✓ **Review process**
  - *3 cycles 500 participants from 41 countries produced nearly 10, 000 comments.*
  - ***www.swebok.org***

SWEBOK objectives

- ✓ **Characterize the contents of the Body of Knowledge**

- ✓ **Provide a topical access structure**

- ✓ **Promote a consistent view of software engineering worldwide**

- ✓ **Clarify the place of, and set the boundary with respect to other discipline**

- ✓ **Provide a foundation for education and licensing**

How to become an IEEE / CS CSDP

✓**Application Steps**

✓**Requirements for Certification**

✓**Preparation for Examination**

✓**Examination**

✓**Results from the Examination**

✓**Follow-up Activities**

Application steps

✓**Obtain CSDP candidate brochure from IEEE Computer Society**
http://www.computer.org/certification/

✓**Review requirements**
✓**Complete application**
✓**Send completed application to IEEE CS by deadline with fee**
✓**Acknowledgement of payment**
✓**Review of application**
✓**If accepted, authorization to test sent to candidate**

Requirements for CSDP certification

✓**Education**

- *Baccalaureate or equivalent university degree*

✓**Experience**

- *9,000 hours of experience in 6 of the 11 software engineering knowledge areas listed in the brochure*

✓**Proof of Professionalism**

- *Review and acknowledge the Software Engineering Code of Ethics and Professional Practice*

✓**Examination**

- *Pass the CSDP written examination*

Preparation for the examination

✓ **Depends on level of expertise in areas covered by Body of Knowledge**

✓ **Focus on areas needing the most review**

✓ **Study from the suggested reference material**

✓ **Can take a refresher course (see CSDP website)**

✓ **Unless your background covers most of the Body of Knowledge, allow three months of 2-4 hours a week for study**

✓ **Last week: assemble test access materials**

Examination

✓**Format**

- *180 Multiple-choice questions selected from a pool of questions across each of the knowledge areas*
- *Closed book, calculators provided*
- *Computer-based or paper*

✓**Length**

- *Four hours*

✓**Administration**

- *At a Prometric training center (http://www.2test.com/index.jsp)*

Sample question

Software configuration management involves identifying the configuration of the software:

[a] prior to the beginning of the lifecycle.

[b] at the beginning of the lifecycle only.

[c] at predefined points of time during the lifecycle.

[d] at the end of the lifecycle only.

http://www.computer.org/certification/csdpprep/Sampleques.htm

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Results from the examination

✓ **When**
- *At the end of the examination, the exam results will immediately appear on the computer screen.*
- *A hard copy of the score will be provided at the testing center*
- *Within six weeks after the exam, notification by mail*

✓ **Passing Score**
- *Scale scores range from 120 to 200 with passing score of 170*
- *Systematic procedure, judgment of IEEE CS members and CGI, and IEEE CS Certification Committee all are involved in determining what a passing score is on each individual exam*

Results from the examination

✓**Pass**

- ***Letter of congratulation from Certification Committee, certificate for framing, your name published in the society's flagship magazine, Computer and on our web site***

✓**Fail**

- ***Analysis of the complete exam outline areas on to focus further study, allowed to re-take the exam during the next exam administration***

Results from the examination

✓**Recertification Application**
- *Log all Professional Development Units*

✓**Confidentiality**
- *No information concerning scores distributed to anyone (including exam taker)*

- *No analysis given to those who pass*

- *No information about the certification is divulged to third parties (e.g., employers) except at the written request of the exam taker*

Follow-up activities

✓**Responsibilities of CSDP**
  - *Signed statement to acknowledge review of the Software Engineering Code of Ethics and Professional Practice*

✓**Meaning of Certificate**
  - *IEEE CS certification is not a license, always refer to IEEE in using the term "CSDP", for example say IEEE Computer Society CSDP not just CSDP*

✓**Recertification**
  - *Every 3 years*
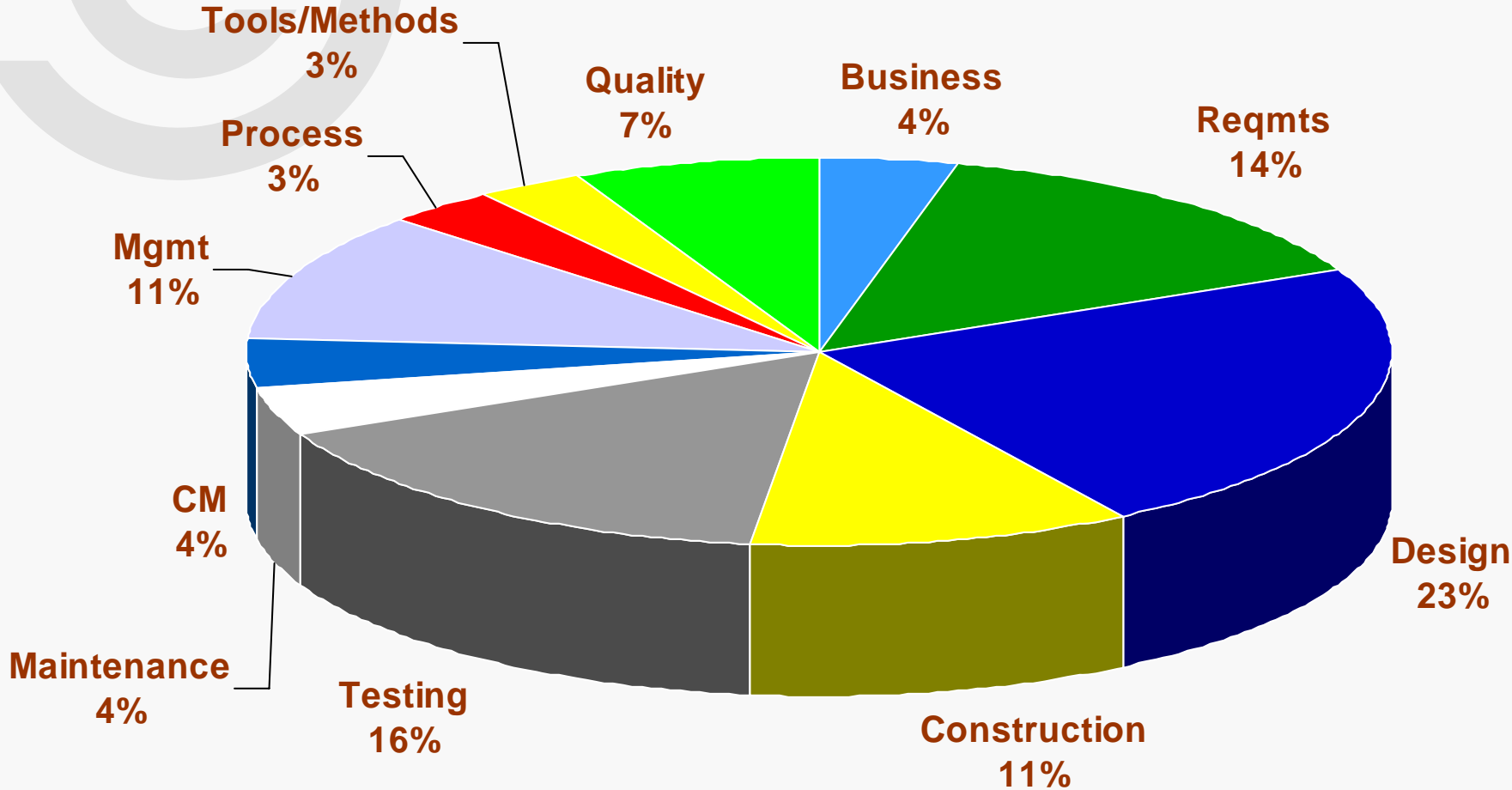 - *Requires 30 recertification credits*
  - *Pay fee*

Question distribution / KA

1. Business practices & econ.	**3 - 4%**
2. Requirements	**13 – 15%**
3. Design	**22 – 24%**
4. Construction	**10 – 12%**
5. Testing	**15 – 17%**
6. Maintenance	**3 – 5%**
7. Conf. Management	**3 – 4%**
8. Eng. Management	**10 – 12%**
9. Eng. Process	**2 – 4%**
10. Tools and methods	**2 – 4%**
11. Quality	**6 – 8%**

In graphical format

Tools/Methods 3%, Process 3%, Mgmt 11%, CM 4%, Maintenance 4%, Testing 16%, Construction 11%, Design 23%, Reqmts 14%, Business 4%, Quality 7%

General references

Software Engineering: A Practitioner's Approach, *Latest ed.,*
Pressman, Roger S., New York, New York: McGraw-Hill.

Software Engineering, *Sommerville, I., Latest* ed.
Reading, Massachusetts: Addison-Wesley.

SE Body of knowledge
http://www.swebok.org

Online review course
http://www.computer.org/certification/DistanceLearning/index.htm

Yahoo study group
http://groups.yahoo.com/group/ieee_csdp/
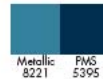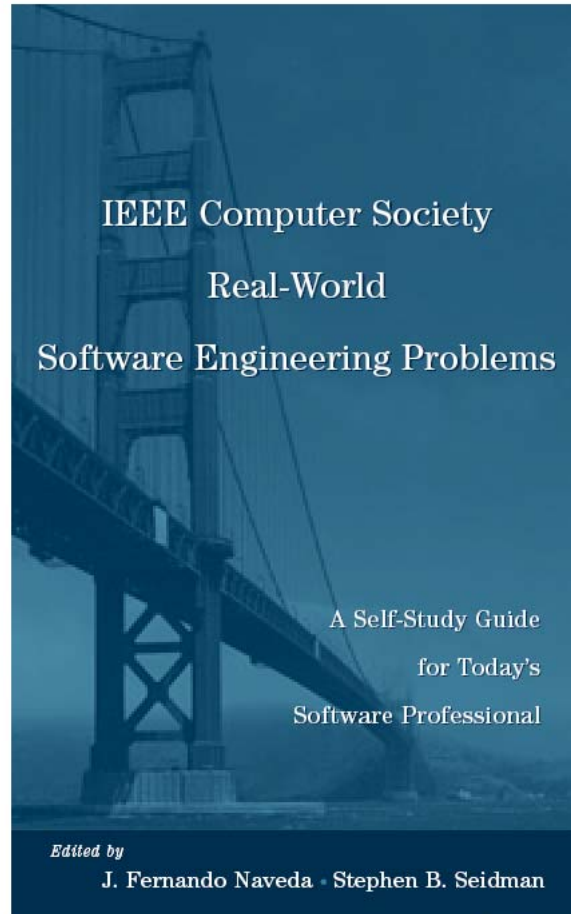
General supplemental reading

Software Engineering Vol. 1: The Development Process, 2nd Edition.
Dorfman, M. & Thayer, R., editors,
Los Alamitos, California: IEEE Computer Society Press, 2002.

Software Engineering Vol. 2: The Supporting Processes, 2nd Edition.
Thayer, R. and M. Christensen, editors,
Los Alamitos,California: IEEE Computer Society Press, 2002.

IEEE Software Engineering Collection, 1999, vols. 1-4.
Piscataway, New Jersey: IEEE.

But the best reference of all

IEEE Computer Society

Real-World

Software Engineering Problems

A Self-Study Guide
for Today's
Software Professional

Edited by
J. Fernando Naveda · Stephen B. Seidman

Yearly test schedule

Testing window	Postmarked application
April 1 – June 30	April 1
September 1 – October 30	August 15

For More Information

✓**Stacy Saul, Continuing Education Coordinator**
- *IEEE Computer Society*
  1730 Massachusetts Ave., NW
  Washington, DC 20036-1992

✓**Voice: +1 202-371-0101**

✓**Fax: +1 202-728-0884**

✓**E-mail address: <u>certification@computer.org</u>**

✓**Web address: *http://computer.org/certification***

Questions?