Guide to the Software Engineering Body of Knowledge
A Project Overview

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James W. Moore, Leonard Tripp

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May 19, 1999

www.swebok.org
Corporate Support by:

Project managed by:
Presentation Goals

- Present the Guide to the Software Engineering Body of Knowledge project
- Obtain feedback from conference attendees
- Seek collaborators for the project
Presentation Plan

- **Project background**
  - Project scope, objectives and audience
  - A three-phase development approach
  - Description of current phase
  - How you can collaborate?
  - Concluding remarks
Software Engineering

- Now 30 years old!
- Millions of pages on the subject!
- Hundreds of conferences and workshops annually!
- Multiple university programs
- Millions of practitioners around the world?

**Is the field really mature?**
Recognized Profession?

Starr*: 

- Knowledge and competence validated by the community of peers
- Consensually validated knowledge rests on rational, scientific grounds
- Judgment and advice oriented toward a set of substantive values

Window of Opportunity?  

- Texas Board of Professional Engineers  
- Computer Science Curriculum 2001  
- Possible liability issues: Y2K, etc.  
- Increased interest in the establishment of a profession
IEEE-CS/ACM Software Engineering Coordinating Committee

- Four task forces
  - Code of ethics
  - Body of knowledge
  - Education
  - Performance norms for software engineers
Key Interrelationships for a Core Body of Knowledge

Development of Software Engineering Curricula

Consensus on a Core Body of Knowledge

Development of Certification / Licensing Criteria and Exams

Development of University Program Accreditation Criteria

Influences

Influences

Influences
What is software engineering?

- IEEE 610.12:
  - “(1) The application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software; that is, the application of engineering to software.
  - (2) The study of approaches as in (1).”
Presentation Plan

- Project background
- **Project scope, objectives and audience**
  - A three-phase development approach
  - Description of current phase
  - How you can collaborate?
  - Concluding remarks
Project Objectives

- Characterize the contents of the Software Engineering Body of Knowledge
- Provide a topical access to the Software Engineering Body of Knowledge
- Promote a consistent view of software engineering worldwide
Project Objectives

- Clarify the place of, and set the boundary of, software engineering with respect to other disciplines (computer science, project management, computer engineering, mathematics, etc.)

- Provide a foundation for curriculum development and individual certification and licensing material
Intended Audience

- Public and private organizations
- Practicing software engineers
- Makers of public policy
- Professional societies
- Software engineering students
- Educators and trainers
What are we not trying to accomplish?

- Not a curriculum development effort!
- Not an all-inclusive description of the sum of knowledge in the field
- Not all categories of knowledge
## Categories of Knowledge in the SWEBOK

<table>
<thead>
<tr>
<th>Specialized</th>
<th>Generally Accepted</th>
<th>Advanced and Research</th>
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Two Underlying Principles of the Project

- **Transparency**: the development process is itself published and fully documented

- **Consensus-building**: the development process is designed to build, over time, consensus in industry, among professional societies and standards-setting bodies and in academia
Presentation Plan

- Project background
- Project scope, objectives and audience

- A three-phase development approach
  - Description of current phase
  - Call for collaborators
  - Concluding remarks
A Three-Phase Approach for Developing the Guide to the SWEBOK

1998  1999  2000  2001

Straw Man Version

Stone Man Version

Iron Man Version

www.swebok.org
Straw Man Phase

- Define the strategy for the project
- Gather momentum in the profession
- Jump-start the Stone Man phase
  - Draft list of Knowledge Areas
  - Draft list of Related Disciplines
Identification Criteria for Straw Man Phase

- Public and verifiable sources of information
- Well documented and reproducible procedure
- As few editorial decisions as possible
- As inclusive as possible
- Focus on the *generally accepted*
The Straw Man Version

- Published in September 1998

Report available at www.swebok.org
Presentation Plan

- Project background
- Project scope, objectives and audience
- A three-phase development approach
- Description of current phase
- How you can collaborate?
- Concluding remarks
Description of Current Phase

- Project Team
- Stone Man Deliverables
- Development and Review Process
- Results to Date
Participants from a Broad Spectrum of Audiences

- Industry
- Professional societies
- Standards setting bodies
- Academia
- Authors
- International representation
Project Team

- Editorial team
- Industrial Advisory Board
- Panel of Experts
- Knowledge Area Specialists
- Reviewers/Review Captains
- Members of the software engineering community
Editorial Team

- Project “Champion”:
  - Leonard Tripp, 1999 President, IEEE Computer Society

- Executive Editors:
  - Alain Abran, UQAM
  - James W. Moore, The MITRE Corp.

- Editors:
  - Pierre Bourque, UQAM
  - Robert Dupuis, UQAM
Roles of the Industrial Advisory Board

- Provide input to ensure relevance to various audiences
- Review and approve strategy and deliverables
- Oversee development process
- Assist in promoting the Guide to the Software Engineering Body of Knowledge
- Lend credibility to the project
Industrial Advisory Board

- Met in Canada in the Fall of 1998
- Conference call every six weeks
- Will meet in Canada in July 1999
- Mario R. Barbacci, Software Engineering Institute, representing the IEEE Computer Society
- Carl Chang, University of Illinois at Chicago, Editor Emeritus, IEEE Software, representing Computing Curricula 2001
Industrial Advisory Board

- François Coallier, Bell Canada, speaking as ISO/IEC JTC 1 / SC7 Chairman
- Morven Gentleman, National Research Council of Canada
- Paula Hawthorn representing the ACM
- Richard Heiman, Raytheon Systems Company
- Laure Le Bars, Saps Labs (Canada)
Industrial Advisory Board

- Bryan Pflug, The Boeing Company
- Dave Rayford, Comerica Inc.
- Larry Reeker, National Institute of Standards and Technology
- Dolores Wallace, National Institute of Standards and Technology
Panel of Experts

- Steve McConnell, Construx Software
- Roger Pressman, R.S. Pressman and Associates
- Ian Sommerville, Lancaster University
Project Funding

- Industry
- Professional societies
- UQAM
Stone Man Deliverables:

- **Consensus** on a list of Knowledge Areas
- **Consensus** on a list of *topics and relevant reference materials* for each Knowledge Area
- **Consensus** on a list of Related Disciplines
- Available free on the web
List of topics

- Brief Description of Topics
- Classification of topics according to an engineering taxonomy
- Classification of topics according to Bloom's taxonomy
- Relevant Knowledge Areas of Related Disciplines

Matrix Topics/Reference Material

Reference Material
Stone Man Review Process

Version 0.1

Limited number of domain experts

Review Cycle 1

Version 0.5

Selected users

Review cycle 2

Version 0.7

Community

Review Cycle 3

Version 0.9
Stone Man Review Process

- Transparency and consensus-building
  - All intermediate versions of documents will be published and archived on www.swebok.org
  - All comments will be made public as well as the identity of the reviewers
  - Detailed comment disposition reports will be produced for Review Cycle 2 and 3
# Version 0.5 Review Strategy

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<th>Educators and Trainers</th>
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<td>Req. Analysis</td>
<td>Five to Ten reviewers</td>
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Results to Date

- Approved by the Industrial Advisory Board:
  - Stone Man Development Plan
  - Baseline List of Knowledge Areas
  - Baseline List of Related Disciplines
  - Nomination of Knowledge Area Specialists
  - Knowledge Area Description Specifications
Baseline List of Knowledge Areas

- Software Requirements Analysis
- Software Design
- Software Construction
- Software Testing
- Software Evolution and Maintenance
Baseline List of Knowledge Areas

- Software Configuration Management
- Software Quality Analysis
- Software Engineering Infrastructure
- Software Engineering Process
- Software Engineering Management
Knowledge Area Specialists

- Antonia Bertolino, Istituto di Elaborazione della Informazione, CNR, Italy
- Terry Bollinger, The MITRE Corporation, USA
- Dave Carrington, Queensland University, Australia
- Khaled El Emam, National Research Council, Canada
- Stephen MacDonell, University of Otago, New-Zealand
- Pete Sawyer and Gerald Kotonya, Lancaster University, UK
- John Scott, The Lawrence Livermore National Laboratory, USA
- Guy Tremblay, UQAM, Canada
- Chris Verhoef, University of Amsterdam, Netherlands
- Dolores Wallace and Larry Reeker, NIST, USA
Baseline List of Related Disciplines

- Computer Science (CC2001)
- Mathematics (CC2001)
- Project Management (PMBOK)
- Computer Engineering
- Cognitive Sciences and Human Factors
- Systems Engineering
- Management and Management Science
Knowledge Area Jumpstart Documents

- Topic breakdown based on the analysis of the four most widely-sold generic software engineering textbooks (amazon.com)
- Proof of concept for Knowledge Area Descriptions
- Method for documenting a form of existing consensus
- Viewed as an enabler not a constraint for Knowledge Area Specialists
- Produced by collaborators in Canada, USA and New Zealand
- Completed in January 1999
Version 0.1 of Knowledge Area Descriptions

- First version by Knowledge Area Specialists of topic breakdown for each Knowledge Area
- Must satisfy criteria specified in Knowledge Area Description Specifications
- Completed in April 1999
- Reviewed by a limited number of domain experts for reasonableness and major omissions
First complete version of Knowledge Area Descriptions

- Breakdown of topics
- Selected Reference Material
- Accompanying texts and specified appendices
Version 0.5 of Knowledge Area Descriptions

- Currently being submitted to the Editorial Team
- Will be reviewed for completeness and depth of coverage
- Reviewed by selected users for completeness and depth of coverage in May, June and July 1999
Presentation Plan

- Project background
- Project scope, objectives and audience
- A three-phase development approach
- Description of current phase
- How you can collaborate?
- Concluding remarks
Reviewers

- Reviewers are responsible for
  - Reading the Knowledge Area Description and consulting the selected reference material
  - Providing comments from one specified viewpoint

- Schedule
  - Review Cycle 2: May, June and July 1999
  - Review Cycle 3: October 1999
Reviewer

Criteria for reviewers are

- Knowledge in the Area
- Availability
- Ability to give articulate, constructive comments
- Representative of: software engineering practitioners, trainers an educators, standards developers, small industry, students, etc.
Review Captains

- Responsible for compiling comments of a group of 5-10 reviewers for a specific Knowledge Area and Review Viewpoint

- Schedule:
  - June and July 1999 timeframe
Institutional Collaboration

- Membership on Industrial Advisory Board
- Participation in review process and uptake of results by national professional societies
- Endorsement of results by national professional societies
Presentation Plan

- Project background
- Project scope, objectives and audience
- A three-phase development approach
- Interim results of current phase
- Description of current phase

**Concluding remarks**
Concluding Remarks

- Consensus on the core body of knowledge is key in all disciplines and pivotal for the evolution of SE toward a professional status
Concluding Remarks

- Involvement of all parties is key for relevancy, credibility and quick uptake:
  - Industry
  - Professional societies
  - Standards setting bodies
  - Academia

- Seeking many collaborators!
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