

# Joint IEEE Computer Society and ACM Steering Committee for the Establishment of Software Engineering as a Profession

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## 1.0 Background

On May 21, 1993, the IEEE Computer Society Board of Governors approved a motion to establish a steering committee for evaluating, planning, and coordinating actions related to establishing software engineering as a profession.

In August 1993 the ACM Council endorsed the establishment of a Commission on Software Engineering to address a number of questions relating to 1) the terminology used to describe software engineering and those who work in the software area; 2) the identification of generally accepted and desired standards of good software practice; and 3) our ability to identify, educate, and train individuals who are competent with software engineering and design.

An ad-hoc committee of the Computer Society, with participation of the ACM worked during the Fall of 1993, defining a process and initial recommendations to accomplish these tasks.

In January 1993 the President of the Computer Society made a proposal to the President of the ACM to streamline the steering committee and to include equal numbers of members appointed by the society presidents. The ACM agreed to the proposal and we have been operating as a Joint Steering Committee.

## 2.0 Mission Statement

To establish the appropriate sets(s) of criteria and norms for professional practice of software engineering upon which industrial decisions, professional certification, and educational curricula can be based.

## 3.0 Initial Recommendations (November 1993)

1. Adopt Standard Definitions
2. Define Required Body of Knowledge and Recommended Practices (in electrical engineering, for example, electromagnetic theory is part of the body of knowledge while the National Electrical Safety Code is a recommended practice.)
3. Define Ethical Standards
4. Define Educational Curricula for (a) undergraduate, (b) graduate (MS), and (c) continuing education (for retraining and migration).

## 4.0 Rationale and Approach

The recommendations have implied dependencies and should be implemented on the order suggested.

To implement these recommendations we will establish and appoint working committees and task forces as necessary to accomplish the steering committee's work.

Rational for recommendations suggested by definition of "Profession" [Webster's New Collegiate Dictionary]

- Profession: A calling requiring specialized knowledge and often long and intensive academic preparation; a principal calling, vocation or employment; the whole body of persons engaged in a calling.
- Professional: (1) Relating to or characteristic of a profession; engaged in one of the learned professions; characterized by or conforming to the technical or ethical standards of a profession. (2) participating for gain or livelihood in an activity or field of endeavor often engaged in by amateurs; engaged in by persons receiving financial returns.
- Professionalism: (1) The conduct aims or qualities that characterize or mark a profession or a professional person. (2) The following of a profession (as athletics) for gain or livelihood.

As defined in IEEE Standard 610.12:

- Software Engineering: (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 is (1).

This definition of software engineering focuses on acquisition and application of technical standards. It does not address the application of ethical standards. We covered this issue with a specific recommendation.

#### 4.1 Revised Charter for Education Task Force (December 1995)

Refine the Body of Knowledge for educational purposes by:

- (a) Identifying critical prerequisite relationships within the body of knowledge
- (b) Identifying appropriate tutorial and reference material for learning the body of knowledge, in the process further refining the specification of the body of knowledge
- (c) identifying, as appropriate, levels of expertise in the practice and the corresponding coverage of the body of knowledge

The basic charter is to identify ways of learning the body of knowledge

It reserves to various educational institutions the definition of specific courses, degrees, or academic programs

- (a) The prerequisite structure should identify critical relationships, leaving as much flexibility as possible
- (b) The educational materials should adequately cover the body of knowledge, but is not necessarily a definitive set of references.
- (c) The levels of expertise are intended to correspond to levels of job responsibility, not to educational levels. I.e., "entry level", "independent professional" rather than "BS" or "MS".

There is a debate as to whether Software Engineering is a part of Computer Science or vice versa. We should not be distracted by this debate from the goal of meeting the needs of industry.

The objective is to seek agreement on the curricula that should be taught and not necessarily on which departments teach it.

### 5.0 Organization

#### Steering Committee

Chair: Felipe Cabrera ([cabrera@microsoft.com](mailto:cabrera@microsoft.com))

Vice-chair: Dennis Frailey ([frailey@dseg.ti.com](mailto:frailey@dseg.ti.com))

Members: Mario Barbacci(\*C), Barry Boehm(A), Doris Carver(\*C), Elliot Chikofsky(C), Tony Cocchi(\*A), Patricia Douglas(\*C), Larry Druffel(C), Stu Feldman(A), Donald Gotterbarn(\*A), Chuck House(\*A), Mary Shaw(A), Leonard Tripp(C), John Werth(\*A)

(\*): Ex-officio member of the steering committee

(A) Association for Computing Machinery

(C) IEEE Computer Society

Task Force "Software Engineering Body of Knowledge and Recommended Practices"

Co-Chairs: Patricia Douglas (pj.douglas@vnet.ibm.com), Tony Cocchi (tony.cocchi@watson.ibm.com)

Task Force "Software Engineering Ethics and Professional Practices"

Chair: Don Gotterbarn (gotterba@etsu.east-tenn-st.edu)

Task Force "Software Engineering Education"

Co-Chairs: Doris Carver (carver@bit.csc.lsu.edu), John Werth (jwerth@cs.utexas.edu)

## 6.0 Task Force Status

### Body of Knowledge and Recommended Practices

- Survey instrument being prototyped
- Initial Survey will be to two focused groups: Real-time Systems and Life-Critical Systems.
- Final edit in progress - 7/96
- Analysis and results planned by 4Q/96
- Improvements and wider distribution TBD

The required body of knowledge and recommended practices are not static because technology evolves and the professionals should keep up with the field.

- The development and maintenance of the set of recommended practices should be structured like a technical standard: adopted by consensus and subject to periodic revision.
- Initial version to be developed by survey of practitioners.

Multiple vehicles for conducting survey

- Intent is to be as inclusive as possible — we are baselining the body of knowledge; we need to reach as many individuals and areas of application as possible
- Survey questions are complex and there are many topics/questions — Respondent will get subsets of questions to reduce burden

- First version will be mailed to IEEE Computer Society, ACM, and DoD mailing lists
- Electronic distribution, collection, and processing soon thereafter

## **6.1 Survey Instrument Development**

- Developed list of topics for survey
- Conducted workshops for expert practitioners to develop questions on each topic
- Received funding for distribution and analysis from E&T Functional Working Group of the DoD Joint Logistics Command
- Small team of experts reviewing final form
- Prototype to ~50 volunteers willing to perform an in-depth review

## **7.0 Task Force Status Ethics and Professional Practices**

- Working groups: Privacy, Reliability and Safety, Security, Social Justice, Institutional Support, Intellectual Property, Professional Competency, Professional Relationships
- Called for wide participation (public CFP)
- Research paper comparing ACM, IEEE, and BCS codes of ethics

## **8.0 Task Force Status Education**

- Task force leadership appointed and ready to start working with task force developing survey of body of knowledge
- Survey results will be important input to developing curricula for Software Engineering (education and training)