arch&tbl 1
Dear Task Force Members,

1. Thank you!
I'd like to thank those who commented on my draft on Functions of Codes of Ethics and who contributed to annotating the code. I would especially like to thank Ed for his effort.

2 Baseline Document
As you may recall, the plan was, while you are commenting on the Functions of Code paper, I would be collating your contributions to annotating the codes and writing a description of its architecture and then I would distribute a draft of this document to you for you comments. The working copy of that document is attached In the interest of good configuration management please use this as the base from which we work and send your comments to the list or to me. The twelve codes we have used in the comparison are sufficient to demonstrate the roots of the proposed codes in other relevant professional codes. We have integrated Ed's results into the baseline document. The comparison is set up as a table for ease of comparison between codes and code elements The table is attached as a Microsoft Word Document.

3 Complete Consensus Functions paper
While you are reviewing the this code comparison and making comments, I will be revising the Functions paper in the light of your comments This will get us well on the way to completing the tasks set for us by the Steering Committee.

4. Additional Help and Suggested Code Modifications
I am fortunate to be at the Center for Computing and Social Responsibility this semester, which is supplying both intellectual and clerical support for this effort. We have received many comments on the draft code. We are integrating the comments with the code and making some of the tentative changes to the code based on these comments. That document should be ready for distribution to you for comment shortly.

5 Tentative Plan
The process of completing a code of ethics and getting it accepted by professional societies is a complex process In broadest terms, the next steps are 1 to submit a revised code to the steering committee for review and comment, 2. Revise the code in the light of their comments, 3 Circulate the code more widely for comment and revise accordingly. 4. Print the Code in the ACM and IEEE publications with a survey asking for comments and voting on each item. This will include a request for revision of an code element when there is disagreement 5 Revisit the code in the light of these comments and votes. 6. This step will be determined by the results of 5.

6, Thanks again for you help.

Regards

Don

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Revision of
DRAFT DOCUMENT RELATING
COMPUTING, ENGINEERING, AND SOFTWARE ENGINEERING CODES. v2 30 Jan 1997

The Architecture of the Draft Software Engineering Code of Ethics and
Its Relations to other Codes of Ethics

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This document was developed in response to a request for the IEEE-CS/ACM Joint Steering Committee for The Professionalization of Software Engineering. The architecture of the draft Software Engineering Code of Ethics (SECEvl) has been modified in the light of comments from the software engineering and computer ethics communities. It should be noted that we use the term software engineer to include the entire software engineering community; those software engineers practicing in the private and public sector and those in software engineering education.

The structure of SECEvI was modeled on the format of the National Society of Professional Engineers Code of Ethics(NSPE) in so far as it addresses the various ethical responsibilities of the professional in terms of the particular relationships in which the professional stands Thus the first version was organized around the software engineer's obligations in product development, obligations to the public, obligations to use professional judgement, obligations to the client and the employer, obligations to the profession of software engineering, obligations to colleagues, and obligation to self as a practicing professional Each of these relationships carry different ethical obligations and the practicing professional must be cognizant of all of these obligations. Following this code Following the NSPE code closely led to many of the statements in the SECEvI closely resembling statements in NSPE (See attached table below for details of this relationship)

The committee then examined other codes including. The .ACM Code of Ethics and Professional Conduct, The IEEE Code of Ethics, Project Management Institute Code of Ethics for the Project Management Profession,. American Institute of Certified Public Accountants Professional Standards Manual, PA State Registration Board of Professional Engineers, Land Surveyors and Geologists The Code of Ethics and the Law, and The Unwritten Laws of Engineering by W J. King American Society of Mechanical Engineers. The members of the committee used these and other codes as models for elements that they thought ought to be included in a code of ethics for software engineers.

SECEvI was then distributed beyond the committee for comment. In the light of those comments and further cork by the Committee tile structure of the code has been revised to reflect more closely some significant aspects of other engineering and computing codes that were not included in SECEvl.

Many codes, such as the British Computer Society's Code of Conduct and Code of Practice, and the ACM's Code of Ethics and Professional conduct, include a preamble describing the roles and functions of the code for the practicing professional. These generally include a description of the use of the code and some very high level ethical imperatives. They also make clear that codes of

ethics are to be used as guidelines for conduct and not as exhaustive lists of the ethical obligations of professionals. For example the preamble to the British Computer Society Code of Practice states "The Code is to be viewed as a whole Individual parts are not intended to be used in isolation to justify errors of omission or commission. The Code is intended to be observed in the spirit and not merely in the word." One of the ways to avoid this misunderstanding of reading the code as an ethics checklist is to organize the code into a hierarchy of Cannons, Rules, Principles, or Ethical Imperatives which form the top level of a hierarchy and attach at lower levels guidelines which by way of example make clear the intent of the top level principles. The structure of SECEv1 has been revised in accordance with this model.

SECEv2 starts with a preamble explaining the roles and functions of the code The Preamble is followed by a set of 7 principles based on the relationship in which a software engineer has ethical obligations. These principles are tied to key words indicating the relationship. The use of keywords is a powerful memory guide for the code Limiting the main body of the code to these seven principles will make it easier to remember and make the code more reflective of the impact of changing technology on the breadth of ethical obligations of the practicing software engineer. For each principle there are several specific examples (many drawn from other codes) which show what these principles require when put in practice. This division of the code makes it consistent with the three levels of professional obligation defined in "Functions of Codes of Ethics"(attached), namely the code contains level 1 ethical obligations based on the humanity of the professional, level 2 ethical obligation based on the higher order of care due by all professionals, and level 3 obligations which are tied directly to the practice of the profession.

As other professions have realized, in developing a code one cannot leave out obligations that are common to all professions and only consider level three- software engineering practice obligations. To leave out level 1 and level 2 obligations reduces software engineering from a profession to a technical practice The revised structure of SECEv1 makes the code comprehensive in that it includes both generic items and profession specific items. Anything short of this would be meaningless and useless in the emergence of software engineering as a profession.

The following table compares 12 different codes of ethics, conduct and practice to the preliminary version of the Software Engineering Code of Ethics(SECEvl). In the 12 codes, four are from computer organizations, five from engineering organizations and the IEEE code which also covers the IEEE-CS.

The original purpose of documenting the architecture of the code to show which parts are derived from other codes and which parts are unique to software engineering presumed that there are clear lines of demarcation between engineering, computing, and software engineering. The results of this study into computing and engineering codes of ethics are not consistent with that presumption.

Several studies have shown that codes of ethics operate on many levels. On the highest level imperatives grounded in our common humanity-- most codes contain ethical principles of honesty and integrity(Level 1). SECEv1 has this kind of imperative in common with all of the other codes examined. Professional codes of ethics also have in common the professional's commitment to a higher level of care(Level 2). These obligations of all professions and practicing professionals are stated in terms of commitment to the public interest over self interest. Again all of the codes have similar imperatives about professionals having a higher order of obligation to the public they serve rather than having the kind of moral obligation demanded of the general public.

The major difference between codes occurs at level 3; the statement of obligations specific to a particular profession. Some imperative may be stated in terms of level 1 in one code while they are stated at level 3 in another code For example Rule 7 of SECEvI is compared with IEEE 6 IEEE 6 states the professional obligation ".. to maintain and improve technical competence and to undertake technological tasks for others only if qualified by training or experience." while Rule 7 addresses the same moral obligation at level 3 and talks about more specific competencies within the practice of software engineering. 7 0-7 6 are software engineering specific (level 3) obligations to maintain knowledge in particular software engineering areas. Most of the cross references for 7.0-7 6 refer to a single level 2 admonition to keep current in your profession. The difference between codes occurring primarily at level 3 also helps explain the sparse number of cross references to Rule 1 SECEvI which is software product specific

Most of the imperatives in SECvl are in several of the codes of ethics used for comparisons. At the moment some imperatives are contained mostly in engineering codes (the outer columns of the chart) and some imperatives are contained mostly in computing codes (the inner columns of the chart). Those elements which currently are sparsely reflected in engineering and computer codes have to do with management issues and some very specific imperatives, some of which are technical issues in software engineering. As the code develops, to include elements that recognize the role of teams in software engineering, there will be more elements at level 3 which distinguish SECEv2 from both computing and engineering codes.

Explanation of the table: The fast column refers to sections of the SECv1. Only those items which closely matched the statements m SECv1 are referenced If the referenced item in the other code is almost a direct quotation, then the reference appears in single quotes.

The codes used for comparison, listed in alphabetical order, are The American association of Engineering Societies, Model Crude for Professional Conduct(AAES), Accreditation Board for Engineering Technology's, Code of Ethics for Engineers(ABET C of E) and Guidelines for The Fundamental Cannon of Ethics(ABET G); The Association of Computing Machinery's Code of Ethics(ACM), and Guidelines for Professional Conduct(ACM G), The British Computer Society Code of Conduct(BCS C to C); The British Computer Society , Code of Practice(BCS C of P): The Institute for the Certification of computing Professionals (ICCP); The Engineer's Council for Professional Development, Faith of the Engineer(ECPD Faith); The Institute of Electronical and Electronics Engineers, Code of Ethics(IEEE C of E), The National Society of Professional Engineers, Code of Ethics for Engineers(NSPE C of E), and the Protect Management Institute "Code of Ethics for the Protect Management Profession (PMT Several of these codes did not contain section and paragraph numbers, so the following reference procedure was followed. If the document was not divided into sections, its paragraphs were simply numbered sequentially starting with 1

If the code was divided into sections and paragraphs, The paragraphs were given an alphabetical designation and the paragraphs within each section were numbered sequentially starting with 1

Most of the codes are in Ethics in Engineering, Martin and Schinzinger, and the ACM BCS, IEEE codes are on the NET

Reference Table Comparing Software Engineering Code v 1.0 to Other Codes of Ethics												
Software Eng C of E vl	AAES M GPC	ABET C of E	ABET G Line	ACM	ACM G Line	BCS C of C	BCS C of P	ICCP	ECPD Faith	IEEE C of E	NSPE C of E	PMI
1 Product												
1.01				3.4								II.b
1.02	A,			3.4								II.b
1.03	C1	B.2	2			20	1.3	2.5		'6'	'II.2.a'	I.b
1.04			1. c. 1		3.4							
1.05					1.2				2			II.b
1.06									2			II.b
1.07							2.4			'3'		II.b
1.08			1.c.1		3.4						'II.2.b'	II.b
1.09			1.c.1	2.5								II.b
1.10				1.8, 3.5 1.7	1.8, 3.5	2	3.5					I. b
1.11					1.7	2	4.6					
1.12	C2, C4	A.1	1. a, 1.c.1	2.3, 3.1	1.1, 1.4	1,7, 8				8		
1.13			4.j						2			
1.14				1.2								
	AAES	ABET	ABET	ACM	ACM	BCS	BCS	ICCP	ECPD	IEEE	NSPE	PMI
2 Public	C.3				1.1				3	1		
2.01	C.9	A1, A2	1.b, 1.c.3, 3.b	1.3	1.2	7		2.7 3.7	3	'1'	II.1.a	TV a
2.02			1.b		1.2	1				1	II.1.a	IV.a
2.03			1. b, 2.c		3.2	21	1.3	2.7			'II.1.b'	I.b
2.04					1.2					7		
2.05	C.3,	B.3	1.b, 2.c, 3.b		2.4	17		3.4		3	I.3, `II,3,a'	II.b
2.06	A, C9,	BI, B3	1, 1.b	1.1					3		II.l.a	
2.07	C.8				1.2,2.4, 2.6	21			3	1	I.1	I.a
	AAES	ABET	ABET	ACM	ACM	BCS	BCS	ICCP	ECPD	IEEE	NSPE	PMI
6.01	C.7	B.7	5.a	3.6	3.6	18	1.2		4	'10'	III.2	II.g
6.02		B.7									'III.8.a'	
6.03	C.8	B.7	7.a	1.6	1.6	16				7	III.10. a	II.f
6.04			4.o			16, 19		2.6		7		
6.05	C.8		5.I, 7.e						3			II.c
6.06			3.c, 5.m	4.1			2.1	2.7			III.11. e	II.c
6.07							2.1, 4.5	2.7			III.11. e	
6.08							1.3, 2.2				III.11. d	
6.09									5			II.c
6.10											III.10. c	
6.11						16					III.11. e	
6.12			4.k	2.7							III.11. e	
6.13			5.d								III.6.b	
6.14			4.n, 7.i			16				8,9		
	AAES	ABET	ABET	ACM	ACM	BCS	BCS	ICCP	ECPD	IEEE	NSPE	PMI
7 Self			7.g				1.1			6		
7.01	B, C.7	A3, B7		2.2		18	1.1	3.1	4	6	III.11. a	Ic
7.02	B, C.7	A3, B7		2.2			1.1	3.1	4	5	IlI.11. a	Ic
7.03	B, C.7	A3, B7	7	2.2			1.1	3.1	4		III.11. a	Ic
7.04	B, C.7	A3, B7		2.2			1.1	3.1	4	5.6	III.11. a	Ic
7.05	B, C.7	A3, B7		2.3		3	1.1	3.1			III.11. a	Ic _
7.06		A3, B7		4.1	4.1					10		Ie