I. Context

A. Name of unit authorized to offer degrees

Department of Computer Science & Engineering

B. School or College

College of Engineering

C. Exact titles of degrees offered

Bachelor of Science in Computer Science (offered through the College of Arts & Sciences)
Bachelor of Science in Computer Engineering (offered through the College of Engineering)
Master of Science (one degree title covers our traditional full-time program and also our part-time evening/distance Professional Masters Program)
Doctor of Philosophy

Our programs were last reviewed during the 1988-89 academic year

D. Brief description of the field and its history at the University of Washington

The field of computer science & engineering is transforming all aspects of our lives: commerce, education, employment, health care, manufacturing, government, national security, communications, entertainment, science, and engineering. The field of computer science & engineering also is driving our nation's economy – both directly (the IT sector itself) and indirectly (all other sectors that are "powered" by advances in IT).

Twenty years ago there were few cash machines, fax machines, cellular telephones, video games, or CAT scanners. Today there are cash machines in every store, fax machines in every office, cellular telephones in every pocket, video games in every home, and CAT scanners in every hospital. Twenty years ago the personal computer software industry barely existed. Today Microsoft is the most valuable company in the world, and Amazon.com, less than five years old, has a market capitalization of close to 30 billion dollars. Twenty years ago physical experimentation and mathematical analysis were the two fundamental paradigms in science and engineering. Today, computer-based simulation and visualization is firmly established as a third.

In the face of this remarkable transformation, it is startling to recognize that the *real* computing and communications revolution still lies ahead! *The true power of information technology is as a human enabler* – transforming all aspects of our lives. *This power is only beginning to be harnessed.* The next decade will see increasingly powerful and diverse digital devices and information services brought to homes, businesses, educational institutions, and individuals across America and around the world. The result, with visionary leadership, will be increasingly effective, ubiquitous, and equitable access to the world's knowledge, information, and entertainment resources, to health care and other social services, to telecommuting, banking and shopping services, distance learning, and social interaction. The next decade also will see increasing, and increasingly deep, *intellectual partnerships* between computer science & engineering and other disciplines – from architecture to zoology, with art and astronomy and biology and business and engineering and law and librarianship and medicine and music and

public affairs and statistics and many others in between. The result will be a transformation of these disciplines, and a transformation of computer science & engineering as well.

For all of these reasons, it is our firm conviction that *any imaginable vision for the University of Washington of the next decade and beyond, and any imaginable vision for our region, will have an outstanding Department of Computer Science & Engineering as a cornerstone – literally, a sine qua non.* Our departmental vision is to rise to meet this imperative: to lead the way, in partnership with others, in capitalizing on our many advantages, achieving a forefront position in areas of high impact in information technology that will benefit the University, the region, and the nation. *An enormous opportunity exists – one that the University of Washington cannot afford to miss.*

The University of Washington's Department of Computer Science & Engineering began as an inter-college graduate program in 1967. Jerre Noe was hired from SRI as Chair; he was succeeded in turn by Bob Ritchie, Paul Young, Jean-Loup Baer, and Ed Lazowska (whose term expires in June 2001). In 1975 a Bachelors program in Computer Science was initiated, targeted to graduate 40 students per year. Departmental status was conferred, and shortly thereafter the department was placed under the College of Arts & Sciences, where it thrived under the stewardship of Dean Ernest M. Henley. Eight years later, in 1983, an expansion of the Bachelors program to 80 graduates per year was initiated; during this interval the graduate program became steadily more full-time- and Ph.D.-oriented, and reached a size of roughly 125 students, only slightly smaller than today. In 1989 the department was moved to the College of Engineering, and a second Bachelors program, an ABET-accredited Computer Engineering program targeted to graduate 40 students per year, was initiated. In 1996, an evening/distance Professional Masters Program targeted to enroll 120 part-time students was initiated. In 1999 an expansion of the Bachelors program in Computer Engineering to 80 graduates per year (160 total Bachelors graduates per year, equally divided between Computer Science and Computer Engineering) was initiated. Enrollment in our two freshman-level programming courses has grown from a few hundred students per year to more than 2,500 per year in the past decade; a new freshman-level offering, "*Fluency with Information Technology*," has just been launched.

Growth in our educational programs has been accompanied by growth in our faculty authorization, our research activity and diversity, and our interactions. Since its inception, our department has viewed its mission as *leadership* and *impact* in information technology – institutionally, regionally, nationally, and internationally – in education, in research, and in service. We have pursued this mission within a special culture that we strive to preserve and enhance – an open and collaborative culture in which we invest in and support one another and the department, and recognize that our role as faculty is first and foremost to be educators, helping our students to reach their full potential. We believe that the synergistic combination of these elements continues to be essential. The challenge is to preserve this synergy – to maintain and enhance our leadership, impact, and culture – in a rapidly changing world.

We feel ourselves under tremendous pressure today – pulled every which way and stretched exceedingly thin. Part of this is the nature of the field – overwhelming opportunities and overwhelming demands. Part of it is our own nature – wanting to do everything that's worthwhile, and wanting to do it as well as it possibly can be done. Part of it is the constant, seemingly unnecessary struggle that seems to characterize life at the University of Washington

today. If we are to meet our imperative – if we are to serve effectively as a cornerstone for the University of Washington in the coming years – something needs to give.

E. Administrative structure of the department

An overview of the administrative structure of the department should prove useful to the Review Committee and the Administration.

The department leadership consists of the Chair (Ed Lazowska), two Associate Chairs (Gaetano Borriello, who focuses on educational activities, and Hank Levy, who focuses on facilities), and an Executive Committee consisting of these three individuals plus four elected members (Richard Anderson, Paul Beame, Susan Eggers, and David Notkin).

The Chair is appointed by the Dean for a five-year term; Lazowska was appointed in 1993, and in 1998 agreed to a 3-year extension, which ends in June 2001. The Associate Chairs are appointed by the Chair for short terms (several years) and for duties that correspond with current departmental needs and individual interests. Additional members of the Executive Committee are elected for one-year terms with a one-year reprieve after two consecutive terms.

The general duties of the Executive Committee are to be "in the loop" on all issues, to deal with straightforward issues without engaging the department as a whole, to ensure that the department as a whole is engaged on all issues of import, and to serve as a two-way communication channel. The Executive Committee also has specific duties related to faculty and staff merit evaluation and salary recommendations.

The department has about 30 tenure-line faculty members. We had been authorized for 29 until three years ago, when we received 5 new positions in connection with the introduction of our Professional Masters Program. Filling these positions has been hampered by retirements, departures, the enormous energy that we put into assimilating each new hire, and the delayed arrival of many new hires. We have just been authorized for an additional 9 positions, taking us to a total authorization of 43. The good news is that we have the opportunity to shape our future through the way in which we fill these 13 vacancies. The bad news is that we have roughly 30 tenure-line faculty members carrying the workload of 34 (with invaluable contributions from an outstanding set of Lecturers, Research Faculty, and visitors), with the workload sufficient to consume an additional 9 headed our way.

The department has roughly 20 administrative staff members and 15 technical staff members. The staff is divided into four "clusters" (organization charts are included as Appendix G):

- Technical Support (largely centralized, rather than associated with specific faculty or groups)

- Academic Advising (for the Bachelors, Professional Masters, and Full-Time Graduate programs)

- Central Administrative Support (the Business Office, the Assistant to the Chair, the Receptionist, the External Relations Coordinator, and some hourly work-study assistants)

- Faculty Support (administrative staff providing direct support to clusters of faculty members)

Each staff member has a designated supervisor. In addition, annually the staff as a whole elects two faculty members and two staff members as Staff Ombudspeople to assist individuals with any issues that prove difficult to resolve "through channels."

We recently formed an External Advisory Committee, which met in June 1999. The members in attendance were David Dobkin (Princeton, Committee Chair), Barbara Grosz (Harvard), John Hopcroft (Cornell), Prabhakar Raghavan (IBM Research), Jeff Ullman (Stanford), and Bill Wulf (Virginia and NAE). Other members are Fran Allen (IBM Research), Randy Katz (UC Berkeley), and Carver Mead (Caltech). The recommendations of this committee, and our responses, will be discussed subsequently; the report of the Committee is included as Appendix H.