

October 25, 1973

Request for an Undergraduate Degree Program in Computer Science

Summary

This document summarizes a more detailed request for the establishment of a Department of Computer Science, and for authority to offer a program of studies leading to the degree of Bachelor of Science in Computer Science. The nucleus for the new department will be formed by the faculty of the Computer Science Group; the department will continue to offer the M.S. and Ph.D. programs currently offered by that Group.

Program Objectives

The objective of the new undergraduate program is to develop Computer Science professionals who may either enter a career or continue with more advanced graduate work. At present, a coherent program does not exist at the University of Washington, although undergraduate computer courses are offered by a number of departments. The growing need for professionals trained in Computer Science argues strongly for the establishment of a logical and comprehensive program.

In addition to the new undergraduate major program, the department will work with other departments toward a restructuring and consolidation of the many computer service courses, which are currently offered by several university departments.

Growth of Computer Science

Nationwide, the number of Computer Science Departments offering undergraduate degree programs has grown from 30 in 1967 to 70 in 1972. This is not surprising in view of the increasing demand for thoroughly trained computer scientists. The computer industry ranks among the top 5 in the country; the demand is expected to increase with the continued growth of that industry. In Western Washington, and particularly in the Seattle-Tacoma area, a large base of computer-related activities exists; the proposed undergraduate program will help satisfy the needs of these activities.

Other Programs in the State of Washington

Currently, the only comprehensive undergraduate program in the State of Washington is administered by the Department of Computer Science at Washington State University, which offers also M.S. and Ph.D. programs. The size of the undergraduate program at WSU is approximately 90 students, the size of the graduate

programs approximately 60. The undergraduate program has been in existence for the last three years, and has been steadily growing. In addition, there is a Computer Science option in the Department of Mathematics at Western Washington State College; it graduated 8 seniors in 1973.

Job Market

A recent study shows a nationwide demand for computer science professionals with a B. S. degree. A yearly need of about 55,000 people at this level is contrasted with an estimated 1973 supply of only about 6,000. The same study estimates that over 900 people will be required annually in the State of Washington, with an estimated 1973 supply of only 30. Jobs are now being filled by inadequately trained people.

The success of the 6-year old graduate program in Computer Science at the University of Washington is indicative of the expectations for the proposed undergraduate program. None of our graduating students had difficulty in finding a job fitting his or her skills. We expect that our B. S. graduates will find employment in a broad segment of the industry, including computer manufacturers, software developers, user industries, and government installations.

Enrollment Expectations

We expect a significant demand for enrollment in the proposed program; this prediction is based on the number of inquiries received, on the size of the University of Washington, and the number of students electing computer courses at the present time. No accurate predictions can be made, but we expect an enrollment of 40 students per year during the initial start-up period of 1975-78. Assuming that most students declare their major at the end of the freshman year, we expect a student body of approximately 120 students. In order to build a strong program, we need to grow gradually, and propose to restrict the number of students to about 120 during the developmental phase of the program if this becomes necessary.

Major Curriculum: New and Existing Courses

The proposed curriculum consists of 180 credits, divided into four components. The general education component (80 credits) consists of basic coursework prescribed by either the College of Arts and Sciences or the College of Engineering, and 40 credits of free electives. The preparatory component (46 credits) consists of necessary background courses in Mathematics, Physics, and Electrical Engineering.

The Computer Science core component (39 credits) consists of the basic core material for the major program. The elective component (15 credits) consists of approved electives in Computer Science or other fields.

All courses in the general education and preparatory components are currently available on campus; the courses in the Computer Science core component have to be newly developed; none of the existing computer courses on campus fit into the core curriculum. In the interest of economy some of the proposed courses will be jointly developed with the Department of Mathematics and Electrical Engineering. A number of electives will also have to be developed, some of them jointly with the above two departments as well as the School of Business Administration.

Major Curriculum: Input from two Colleges and Community Colleges

The proposed program is designed to fit into the basic requirements of both the Colleges of Arts and Sciences and Engineering. It is important for the program to include students with interests in the theoretical, applied, and engineering aspects of the field, and thus it must be open to students who satisfy the basic requirements of either college.

The major curriculum also provides for the transfer of students from Community Colleges. Only one Computer Science core course is required during the first two years of college work.

Resources for the Undergraduate Major Program

Faculty and Staff

The establishment of a new program with new courses requires resources in addition to those available to the existing graduate program. Our analysis, based on our enrollment predictions and an offering of each class once a year, shows a need for 4 full-time faculty and 2 teaching assistants over a period of 4 years; in addition, 2 secretaries will be required. It is important that these four new faculty members (one per year of growth of the program) be trained in Computer Science since they will be largely responsible for the core curriculum.

Space

The present graduate program occupies 7500 square feet and has a current need for another 1000 square feet. Growth to the planned level of 80 to 90

graduate students will increase the space requirement to a total of 11,000 square feet.

Addition of the undergraduate program and service courses (discussed later in this summary) would create a requirement for a further 2500 square feet, raising the total to 13,500 square feet. A chart summarizing these needs and several alternative ways of satisfying them will be found in the detailed request.

Library and Computer Services

Library resources are currently available in various campus locations; our principal hope is for consolidation in a single location. As there is currently no library budget available for the Computer Science Group, such funds need to be allocated in the future in order to continue the growth of the collection.

Computer services are available from the Computer Center and the Computer Science Teaching Laboratory.

Budget

Over a four-year period, the additional estimated budget should grow to the following annual level:

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|---------------------------------|------------------|
| Faculty (4 x 15,000) | \$60,000/yr. |
| Teaching Assistants (2 x 4,000) | 8,000/yr. |
| Secretaries (2 x 7,000) | 14,000/yr. |
| Operations | 6,000/yr. |
| Library additions | <u>2,000/yr.</u> |
| | \$90,000/yr. |

(This does not include any estimates associated with obtaining the required space.)

Service Courses

At present, a number of computer service courses are being offered by various academic units on campus. There appears to be some duplication and overlap among these offerings; and a significant number of student credit hours could be saved by an appropriate restructuring. During the development of this proposal, we have studied this problem in some detail. Once the Computer Science undergraduate major program has been established, we propose to discuss with the affected units various alternatives leading to a better distribution of service courses, hopefully resulting

in substantial savings. One possible plan has been incorporated into the detailed proposal.

Resources for Service Courses

Faculty and Staff

In the area of service courses, the requirement for new faculty members formally trained in Computer Science is not as important as for the major curriculum. To help realize savings to the university, we envision that the faculty now teaching these courses play a contributory role, through joint or adjunct appointments with Computer Science. The development of the restructured service courses will be undertaken by regular Computer Science faculty in conjunction with faculty in other departments, including the faculty now teaching service courses. As at present, the service courses will be partially staffed by teaching assistants.

Secretarial help for the service area will be required, and could probably be obtained by a transfer from the departments now performing the service function.

Space

It will be important to provide space for the service function within the same area that serves the major curriculum. The additional 1,500 sq. ft. needed has been included in the space summary on a previous page of this memo.

Other Resources

Other resources, e.g. computer services, library materials, and operating budget, that are currently available to the departments offering the service courses, are dependent on enrollment and should not increase due merely to the proposed change in organization. They could continue to be supplied through the departments of the adjunct or joint faculty, or could be transferred to the Computer Science department.