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Bachelor of Science Degree in Computer Science

University of Rhode Island Faculty Senate

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*Chairman
Lott 11-7-74*

Serial Number 74-75--6

UNIVERSITY OF RHODE ISLAND
Kingston, Rhode Island

FACULTY SENATE
BILL

Adopted by the Faculty Senate

RECEIVED
UNIVERSITY OF R. I.
OCT 1 1974
OFFICE OF THE PRESIDENT

TO: President Frank Newman
FROM: Chairman of the Faculty Senate

1. The attached BILL, titled Bachelor of Science Degree in Computer Science

_____ is forwarded for your consideration.

- 2. The original and two copies for your use are included.
- 3. This BILL was adopted by vote of the Faculty Senate on September 26, 1974 (date)
- 4. After considering this bill, will you please indicate your approval or disapproval. Return the original or forward it to the Board of Regents, completing the appropriate endorsement below.
- 5. In accordance with Section 8, paragraph 2 of the Senate's By-Laws, this bill will become effective on October 17, 1974 (date), three weeks after Senate approval, unless: (1) specific dates for implementation are written into the bill; (2) you return it disapproved; (3) you forward it to the Board of Regents for their approval; or (4) the University Faculty petitions for a referendum. If the bill is forwarded to the Board of Regents, it will not become effective until approved by the Board.

September 30, 1974 (date) Albert J. Lott
Albert J. Lott
Chairman of the Faculty Senate

ENDORSEMENT 1.

TO: Chairman of the Faculty Senate
FROM: President of the University

- 1. Returned.
- 2. Approved Disapproved _____

3. (If approved) In my opinion, transmittal to the Board of Regents is not necessary.
11/17/74 (date) Frank Newman
President

*See letters to C. Hoyle 5/12/75
conditional approval - see letter dated 11/17/74 to Dr. Lott*

RECEIVED
NOV 7 1974
UNIVERSITY OF RHODE ISLAND
FACULTY SENATE

ALTERNATE ENDORSEMENT 1.

TO: Chairman of the Board of Regents

FROM: The University President

1. Forwarded.
2. Approved.

(date)

President

ENDORSEMENT 2.

TO: Chairman of the Faculty Senate

FROM: Chairman of the Board of Regents, via the University President.

1. Forwarded.

(date)

(Office)

ENDORSEMENT 3.

TO: Chairman of the Faculty Senate

FROM: The University President

1. Forwarded from the Chairman of the Board of Regents.

(date)

President

Original received and forwarded to the Secretary of the Senate and Registrar for filing in the Archives of the University.

(date)

Chairman of the Faculty Senate

PROPOSAL

Bachelor of Science Concentration in Computer Science

Catalog Listing

The Department of Computer Science and Experimental Statistics offers the Bachelor of Science (B.S.) degree in computer science. The Master of Science (M.S.) degree programs in computer science or experimental statistics are described in the Graduate School Bulletin.

Faculty: Professor Hemmerle, chairman. Professors Carney, Merenda and L. T. Smith; Associate Professor Lawing; Assistant Professors Carrano, Hanumara, Heltshe, Tetreault and Weiderman.

The curriculum is designed to provide a broad based introduction to computer science fundamentals. Emphasis is on computer software and applications. The required mathematics preparation provides a basis for advanced work. Students will be well prepared for graduate study in computer science or for careers in computer related areas.

Students selecting this curriculum must complete 42 credits as follows:

MTH 141	Introductory Calculus with Analytic Geometry	3
MTH 142	Intermediate Calculus with Analytic Geometry	3
MTH 215	Introduction to Algebraic Structures	3
MTH 243	Calculus and Analytic Geometry of Several Variables	3
CSC 201	Introduction to Computing	3
CSC 311	Machine and Assembly Language Programming	3
CSC 410	Introduction to Computer Science and Algorithmic Processes	3
CSC 411	Computer Organization and Programming	3

Choice of:

EST 220	Statistics in Modern Society	
	or	
EST 409	Statistical Methods in Research I	3

Additional credits selected from: 9

CSC 220	Computers in Society	
MTH 471	Introduction to Numerical Analysis I	
MTH 472	Introduction to Numerical Analysis II	
	Any CSC course at the 300 level or above	

Additional credits selected from:

6

MTH 244 Differential Equations

IDE 432 Operations Research I

IDE 433 Operations Research II

Any EST or MTH course at the 300 level or above

42

Total credits required: 130

The following courses are possible electives for the student who wishes to gain some insight into or experience with business applications: MGS 383, 445, 476.

Rationale

Bachelor of Science in Computer Science

Increased student interest in computer science is reflected in significant enrollment increases in introductory computer science courses offered by the Department of Computer Science and Experimental Statistics. In comparing the 1971-72 and 1972-73 academic years, an increase in enrollment of 77% in the 200-level CSC courses is noted. Of the students enrolled in these courses during the spring 1973 semester, 45% chose them as free electives.

The demand for professionals with the baccalaureate or higher degree in computer science has remained high even though recent employment prospects for other fields were dim. A recent survey¹ indicates that approximately 15% of the labor force is required to have some understanding of computers, while 30% of the labor force use computers in their work. One projection² indicates that by 1985 these figures will be 25% and 65% respectively. Thus, it is possible that 40% of the labor force will rely upon computer software produced by someone else, yet will have no knowledge of computer science. Past experience has demonstrated that computer software is not sufficiently reliable to be used in this fashion. An increased number of people knowledgeable in computer science is, therefore, desirable. The proposed program in computer science stresses computer software as opposed to computer design.

The number of universities who offer or plan to offer undergraduate programs in computer science is rapidly increasing. A recent inventory³ (June 1971) lists 49 universities in the U.S. which offer undergraduate degrees in computer science by departments

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- 1 "A National Survey of the Public's Attitudes Towards Computers," AFIPS and Time, Inc., November 1971.
 - 2 Barry W. Boehm, "Software and Its Impact: A Quantitative Assessment," Datamation 19,5 (May 1973), 48-59.
 - 3 John W. Hamblen, "Degree Programs in Computer Science, Data Processing, etc. Offered by Institutions of Higher Education During 1969-70, 1970-71, 1971-72," SIGCSE Bulletin 4,2 (July 1972), 29-39.

established for this purpose. (In addition, 97 universities offer undergraduate degrees involving computer related areas sponsored by various other departments.) Of the state universities in New England only two have departments of computer science (URI and the University of Massachusetts). None of our sister institutions offer undergraduate degrees in computer science although two programs⁴ exist where computer science is an option. Neither of these programs permits a sufficient study of the field. The Department of Computer Science and Experimental Statistics at URI has offered the M.S. degree in computer science for 6 years. (The Department also offers the M.S. degree in experimental statistics).

In formulating the proposed curriculum, the recommendations of the Association for Computing Machinery set forth in its "Curriculum 68"⁵ were considered. In addition several undergraduate computer science programs offered at various colleges and universities were studied.

-
- 4 The University of Connecticut offers a B.S. degree in Electrical Engineering with a Computer Science option. The University of New Hampshire offers a B.S. degree in Mathematics with a Computer Science option.
- 5 ACM Curriculum Committee on Computer Science, "Curriculum 68," Comm. ACM 11,3 (March 1968), 151-197.

UNIVERSITY OF RHODE ISLAND
Kingston, Rhode Island

FACULTY SENATE

The following material supplements the Bachelor of Science Degree in Computer Science Proposal found on pages 109 to 148 of the Addendum to the Agenda for Meeting #16, May 9, 1974.

M E M O

FROM THE DESK OF

EDWARD J. SCHROEDER

7/19/74

Lena Lucicetti —

The attachment should be added to the JEPAC folder relative to the new program in Computer Science.

Given the conditions, stated by Dr. Hammerle it has my endorsement.

EJS

cc Dr. Hammerle

PROPOSAL

Bachelor of Science Concentration in Computer Science

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New costing figures (attached)	

UNIVERSITY OF RHODE ISLAND
KINGSTON, R. I. 02881

Department of Resource Economics

December 17, 1973

Dr. William Hemmerle
Chairman, Department of Computer Science and
Experimental Statistics
Tyler Hall
Campus

Dear Bill:

I have just reviewed your joint proposal with the Department of Mathematics for three new bachelor's programs in applied math, statistics and computer science.

My absence from campus has prevented my stating my views earlier.


First, all three programs seem to me overdue. I consider them desirable on two counts (both of which you have mentioned).

1. Undergraduate training in the three programs would be excellent preparation for work in the social sciences, particularly economics (not only the subset econometrics). I have frequently expressed the view that economists should major in math as undergraduates. However, the typical mathematics programs lacked the applied flavor that your new programs provide.
2. During the past 12 years we in this department have been regular employers of people with training in math, computer science and statistics. For the most part we have had to develop most of their skills on the job. I cannot but believe the programs you propose would produce the skills we would find highly desirable. Moreover, the general expansion opportunities in this area (beyond our department) seems assured.

The three programs you have outlined would certainly provide the direction required for the interest in applied programs in math, statistics and computer science, a direction that cannot be found in existing programs.

Last, I can see no possible conflict with existing programs. If such exist they should be resolved by providing the opportunity for students represented by these programs and not by pretending the opportunity exists elsewhere, when it does not.

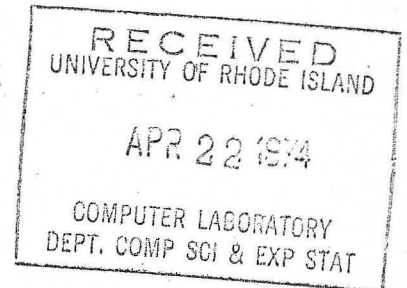
Sincerely,


Harlan C. Lampe
Professor

UNIVERSITY OF RHODE ISLAND
KINGSTON • R. I. 02881

Department of Industrial Engineering • Gilbreth Hall • 401-792-2455

April 19, 1974



Professor George R. Parks, Chairman
Curricula Affairs Committee
University Library

Subject: Proposal for Degree Programs in
Applied Mathematics, Computer
Science, and Statistics

Dear Professor Parks:

Professor Hemmerle asked that I review the proposed
curricula referred to above.

There appears to be no cause for the Department of
Industrial Engineering to offer any resistance to
the proposals. There does not appear to be any
conflict or overlapping with our courses, our
curricula, or our objectives. The curricula, if
approved, may, in fact, provide additional
enrollment for our operations research courses.

Sincerely,

A handwritten signature in cursive script, appearing to read "C.F. James, Jr.".

Charles F. James, Jr.
Chairman

BCC: Dr. William J. Hemmerle
Chairman
Computer Science Department

XC: Dr. Laddas

UNIVERSITY OF RHODE ISLAND

OFFICE MEMORANDUM

To: CAC

Date: April 17, 1974

From: Richard Mojena *RM*

SUBJECT: Special Meeting of CAC with Professors Hemmerle and Ladas

I will be unable to attend the meeting on April 22, 1974 as I will be presenting a paper in Boston at the meeting of a professional society.

On April 16, I and Arun Sanghvi (another member of my department) met with representatives of the Department of Mathematics and the Department of Computer Science and Experimental Statistics.

A compromise on the recommendations of page 2 (memo of December 27, 1973 to George R. Parks from Thomas E. Vollmann) which seemed to satisfy us all included the deletion of items (1) and (2) under (A) and (C) and of MGS 370 under (3) in (C). The remaining MGS courses under items (A), (B), and (C) were to be included in the proposal and on a list of elective courses for advisees.

The participants also indicated a willingness to solicit appropriate electives from other departments in the university.

Given the adoption of this compromise by the Departments of Mathematics and Computer Science and Experimental Statistics, the preparation of a meaningful and explicit list of university-wide electives for advisement, and a commitment to keep communications channels open, I see no reason why we should further delay the approval of these programs at this time.

R. M.

cc Department of Management Science

Department of Mathematics

✓ Department of Computer Science and Experimental Statistics

RECEIVED
UNIVERSITY OF RHODE ISLAND

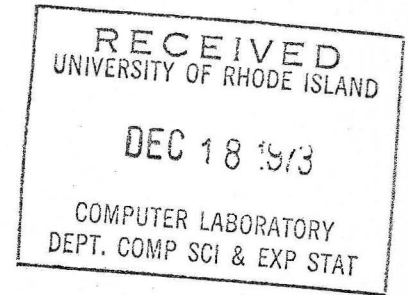
APR 22 1974

COMPUTER LABORATORY
DEPT. COMP SCI & EXP STAT

UNIVERSITY OF RHODE ISLAND
KINGSTON, R. I. 02881

Department of Psychology

December 14, 1973



William Hemmerle, Ph.D., Chairman
Department of Computer Science
and Experimental Statistics
Campus

Dear Dr. Hemmerle:

I am responding to your request to comment on item #7 of Dr. Parks' memorandum to you relating to statements from chairmen of departments offering courses in Statistics in connection with the joint proposal for Bachelor of Science concentrations in Applied Mathematics with Computer Science, Computer Science, and Statistics. The following statement is being made after consultation with Professor Peter Merenda who holds a joint appointment in your department.

The Department of Psychology is in accord with the proposal and endorses the concentrations for the reasons stated in your 26 September 1973 document. It is considered to be a valuable program designed to meet the needs of both undergraduate students with interests in these areas, and the current labor market which seeks to utilize baccalaureate degree holders possessing these knowledges and skills.

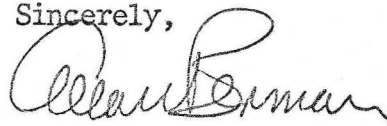
The Department of Psychology offers two courses in Statistics at the upper undergraduate levels, i.e. 300-400. These two courses, Quantitative Methods in Psychology I (Psych. 300) and Quantitative Methods in Psychology II (Psych. 400) are both applied courses in statistics which require specific prerequisites in the subject matter of psychology. Psychology 300 is, itself, a prerequisite for Psychology 301, Experimental Psychology and for Psychology 434, Introduction to Psychological Testing. The primary objective, therefore, of this course is to prepare students both to understand and conduct, at least at an elementary level, research and experimentation in psychology; and, at the same time, to prepare psychology majors and other interested students to interpret scores and other data generated through the administration of psychological tests.

We in the Department of Psychology see no effect upon our program should the proposed concentrations be adopted in the undergraduate curriculum. The students who are likely to become majors in these concentrations will not, in most likelihood, be those whose principal interests are in psychology. Psychology students are not ordinarily

oriented toward mathematics. Practically all psychology majors take only a single course in mathematics: Math 107, 108, or 109, and then only because it is a prerequisite for Psych 300. Those students who will become majors in one of the three proposed concentrations not only will be engaged in substantial courses in mathematics, but will also be involved in courses in statistics whose approach is more theoretical than applied, especially to any one specific discipline.

In the light of the foregoing, I endorse the proposed joint program in mathematics, computer science and statistics without any concern that it would in any way affect - or is related to - the statistics offerings in the Department of Psychology.

Sincerely,

A handwritten signature in cursive script, appearing to read "Allan Berman".

Allan Berman, Ph.D.
Acting Chairman

cc. George Parks, Chairman
Curriculum Affairs Committee

TO: George R. Parks, Chairman
Curricular Affairs Committee

FROM: Thomas E. Vollmann, Chairman
Department of Management Science

TEU

DATE: December 27, 1973

SUBJECT: Department of Mathematics and Department of Computer Science and
Experimental Statistics Joint Programs in (1) Applied Mathematics
with Computer Science, (2) Computer Science, and (3) Statistics.

The Department of Management Science agrees with the rationale for establishing the above three programs, as stated by the Curriculum Committee of the College of Arts and Sciences in Report Ser. A No. 1, November 5, 1973. In addition, there is a departmental consensus that the programs are housed in the appropriate departments.

We strongly take issue, however, with the notion that no other department on campus is qualified to judge these programs, as intimated in item 7, p. 3 of the memorandum dated December 12, 1973 addressed to you from William J. Hemmerle and Gerasimos E. Ladas. We feel that not only our department is capable of passing judgment but also others, e.g., Industrial Engineering, Psychology, Resource Economics.

The field of Management Science is concerned with the development and application of statistical and mathematical techniques to the solution of problems faced by the managers of public and private organizations. Specifically, theory and methodology in mathematics, probability and statistics, and computer science are either developed or adapted and applied in the identification, formulation, solution, implementation, control, and evaluation of administrative decision-making processes in commercial, educational, governmental, and non-profit institutions. Given this thrust, the members of our department: (1) have doctorates in areas such as Statistics, Operations Research, Management Science, or Quantitative Analysis coupled with minors in mathematics and mathematical statistics; (2) have engaged numerous positions in or consulted with organizations (private and public) which required the application of mathematics and statistics; and (3) have been active in the meetings and journals of professional societies which support this mission, viz., American Statistical Association, Operations Research Society, and The Institute of Management Sciences.

Given this background, we find that the actions of the Department of Mathematics and the Department of Computer Science and Experimental Statistics were either uninformed or precipitate in not seeking formal meetings with the departments which are concerned with the applications of mathematics and statistics. With respect to our department, this is especially unsettling when one considers that (1) the proposals stress applications in mathematics and statistics, (2) the student in these programs will be exposed to applications through electives, (3) a significant field of applications available through our department has been omitted totally in the proposals, and (4) a stated purpose of the proposed B.S. programs is to equip these students to work in business and governmental institutions.

The Department of Management Science recommends approval of these programs by the CAC after the implementation of the suggestions which follow.

(A) APPLIED MATHEMATICS WITH COMPUTER SCIENCE

- (1) Establishment of a permanent coordinating committee for applied courses consisting of representatives from the Department of Mathematics, Computer Science and Experimental Statistics, Industrial Engineering, Resource Economics, Management Science, and any other departments which express a desire to be included.
- (2) A report from the committee of item (1) which explicitly lists elective courses in departments which offer applications of mathematics. Said courses should become part of the proposal, should be incorporated in the catalogue, and should serve as a basis for advising students who select this concentration.
- (3) For the record, the following MGS courses appear appropriate as electives:

MGS 365-366	Management Science I, II
MGS 375	Bayesian Statistics in Business
MGS 445	Managerial Applications of Simulation

(B) COMPUTER SCIENCE

The inclusion in the proposal and in the catalogue of the following courses as electives:

MGS 383	Data Processing Systems
MGS 445	Managerial Applications of Simulation
MGS 476	Management System Analysis

(C) STATISTICS

- (1) Revival of the defunct campus coordinating committee in statistics, with membership as indicated on p. 189 of the 1973-74 Undergraduate Bulletin.
- (2) A report from this committee which explicitly lists elective courses in departments which offer applications of statistics. Said courses should become part of the proposal, should be incorporated in the catalogue, and should serve as a basis for advising students who select this concentration.
- (3) For the record, the following MGS courses appear appropriate as electives:

MGS 365-366	Management Science I, II
MGS 370	Topics in Managerial Statistics
MGS 375	Bayesian Statistics in Business
MGS 445	Managerial Applications of Simulation

In summary, we feel that the theoretical core of courses offered by the Departments of Mathematics and Computer Science and Experimental Statistics is needed and is properly housed, but that applications and explicit opportunities for exposure are wanting, especially in programs (A) and (C). Furthermore, we hope that the implementation of the two committees will provide an opportunity for open dialogue, coordination, and cooperation among the concerned departments. Lastly, we believe that the result will be more effective interdisciplinary programs for the students.

T. E. V.

cc Department of Computer Science and Experimental Statistics
✓ Department of Mathematics
Department of Industrial Engineering
Department of Psychology
Department of Resource Economics
Department of Economics

UNIVERSITY OF RHODE ISLAND, DEPARTMENT OF COMPUTER SCIENCE AND EXPERIMENTAL STATISTICS - INCREMENTAL COST OF NEW PROGRAM LEADING TO BACHELOR OF SCIENCE (B.S.) DEGREE WITH CONCENTRATION IN COMPUTER SCIENCE

PRIOR COST SHEET

<u>Item</u>	<u>Description of Need</u>	<u>A</u> 1974-75	<u>B</u> 1975-76	<u>C</u> Col. A+B	<u>D</u> 1976-77	<u>E</u> Col. A+B+D	<u>F</u> 1977-78	<u>G</u> Col. A+B
1	Faculty - New							
	Assistant Professor	10,780	\$11,642	\$22,422	\$12,574	\$34,996	\$13,580	\$ 48,576
	Assistant Professor				10,780	10,780	11,642	22,422
2	Clerical - New							
	Secretary (1/2-74-75/1/2-75-76)	2,600	2,725	5,325	5,450	10,775	5,700	16,475
3	Graduate Assistants							
4	Other Fees and Services							
5	Consultants, Lecturers, Other							
6	Student Help							
7	Fringe Benefits (1+2x14.5%)	1,940	2,083	4,023	4,176	8,199	4,483	12,682
	Total Personal Services	<u>\$15,320</u>	<u>\$16,450</u>	<u>\$31,770</u>	<u>\$32,980</u>	<u>\$64,750</u>	<u>\$35,405</u>	<u>\$100,155</u>

MODIFIED COST SHEET

<u>Item</u>	<u>Description of Need</u>	<u>A</u> 1974-75	<u>B</u> 1975-76	<u>C</u> Col. A+B	<u>D</u> 1976-77	<u>E</u> Col. A+B+D	<u>F</u> 1977-78	<u>G</u> Col. A+B+D
1	Faculty - New							
	Assistant Professor							
	Assistant Professor				\$10,780	\$10,780	\$11,642	\$22,422
2	Clerical - New							
	Secretary (half time)	\$2,600	\$2,725	\$5,325	2,725	8,050	2,850	10,900
3	Graduate Assistants							
4	Other Fees and Services							
5	Consultants, Lecturers, Other							
6	Student Help							
7	Fringe Benefits (1+2x14.5%)	377	395	772	1,958	2,730	2,101	4,831
	Total Personal Services	<u>\$2,977</u>	<u>\$3,120</u>	<u>\$6,097</u>	<u>\$15,463</u>	<u>\$21,560</u>	<u>\$16,593</u>	<u>\$38,153</u>

TO: George R. Parks, Chairman
Curricular Affairs Committee

FROM: Thomas E. Vollmann, Chairman
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TEU

DATE: December 27, 1973

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UNIVERSITY OF RHODE ISLAND
Kingston, Rhode Island

FACULTY SENATE

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① ② ③ ④

FROM THE DESK OF

EDWARD J. SCHROEDER

7/19/74

Lena Lucietto —

The attachment should be added to the JEPAC folder related to the new program in Computer Science.

Given the conditions, stated by Dr. Hammerle it has my endorsement.

EJS

cc Dr. Hammerle

UNIVERSITY OF RHODE ISLAND

OFFICE MEMORANDUM

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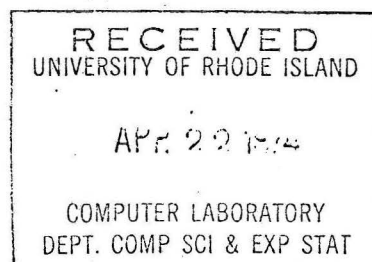
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R. M.

cc Department of Management Science
Department of Mathematics
✓ Department of Computer Science and Experimental Statistics



UNIVERSITY OF RHODE ISLAND, DEPARTMENT OF COMPUTER SCIENCE AND EXPERIMENTAL STATISTICS - INCREMENTAL COST OF NEW PROGRAM LEADING TO BACHELOR OF SCIENCE (B.S.) DEGREE WITH CONCENTRATION IN COMPUTER SCIENCE

PRIOR COST SHEET

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4	Other Fees and Services							
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MODIFIED COST SHEET

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3	Graduate Assistants							
4	Other Fees and Services							
5	Consultants, Lecturers, Other							
6	Student Help							
7	Fringe Benefits (1+2x14.5%)	377	395	772	1,958	2,730	2,101	4,831
	Total Personal Services	<u>\$2,977</u>	<u>\$3,120</u>	<u>\$6,097</u>	<u>\$15,463</u>	<u>\$21,560</u>	<u>\$16,593</u>	<u>\$38,153</u>