SIMULETTER is a quarterly publication of
the ACM Special Interest Group on Simulation

SIMULETTER Editorial Staff

SIMULETTER is an informal quarterly publication of the ACM Special Interest Group on Simulation. This special publication serves as a medium for the dissemination of information about modeling and simulation and related topics of interest to the membership and as a means of circulating official announcements.

All contributions to **SIMULETTER** are unrefereed working papers unless otherwise indicated. Except for editorial items, all sources of material appearing in **SIMULETTER** will be clearly identified. Articles and items attributed to individuals are ordinarily to be interpreted as personal rather than organization opinions, and in no way does this non-editorial material represent the opinion of the editor regarding its accuracy or quality. Unless specifically stated, the contents of SIMULETTER do not represent the official position of SIGSIM or ACM.

All contributions should be sent to the editor in 'camera ready' form, typed single-spaced and clearly with margins ready for publication. Authors of longer articles are requested to write to the editor for copy paper. All correspondence must be signed; however, letter to the editor will be published anonymously if requested.

Simuletter
Volume 8
Number 4
Summer 1977

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HELP !

Although this issue is for reading, it also requires ACTION on your part. Please read the new Chairperson's Column starting on page 2 and complete the questionnaire contained on page 5. Mail that questionnaire directly to Sue Solomon. Do it today; don't delay (or you may become editor of Simuletter).

The other action is really a REACTION to the article, "A List of Simulation Terms." As editor I have a vested interest in that article and would like your reaction. Since I know that I will not be able to reply to all your responses (now don't let me down), I will say 'thanks' now. – hjh

THE { CHAIRMAN / CHAIRWOMAN / CHAIRPERSON / CHAIR / ALL OF THESE / NONE OF THESE } 'S COLUMN

You asked for it, you got it (I think)! It was very gratifying, but a great shock, to discover that I had been elected your presiding officer, (whatever title you may prefer, I have been called worse) since I never received a ballot (due to a problem with my membership file) and had no idea the election had taken place yet. In any event, I promise to do my utmost for SIGSIM during the forthcoming two-year term, and I thank the membership for its confidence!

On another note, as I reflect on the five years in which I have been part of the SIGSIM administrative structure in one or another capacity, I find that I have learned a great deal from and have been privileged to work with a most intelligent, informed, dedicated and thoroughly delightful group of people! The slates of outgoing and incoming officers are excellent examples. Paul Roth has spent days, weeks, and perhaps months over the past five years on SIGSIM activities. It was he who conceived and brought to fruition the several Symposia on the Simulation of Computer Systems which attracted such widespread favor in the simulation community. Don Deutsch was a meticulous Treasurer, and I know Larry Hull will draw on his depth of experience in Conference accounting to continue the tradition. Herb Schwetman and Joe Clema I know principally through their professional work rather than through SIGSIM directly, but both are certainly well respected in their fields. The tireless Harold Highland assures me he will persevere as Editor of Simuletter. These and numerous others are remarkable individuals, some of whom have become my dearest friends, whom I would never have met except for the vehicle of SIGSIM. I convey my thanks and best wishes to all and hope they will continue to channel their energies on behalf of the organization in the future.

Like Jimmy Carter (and here is where the resemblance ends) I ran for the SIGSIM Chairmanship on a populist platform. That is, I would like to see many more people become involved more routinely and more heavily in the activities of SIGSIM. Many of us who have worked in the organization for some time now began by a chance meeting with someone already working for SIGSIM or by proximity to the New York/Washington area where most decisions are made and most work takes place. There is an awesome number of tasks to be done for conferences, an overabundance of administrative trivia perpetrated by ACM Headquarters (a subject to be discussed at length in a later column), and of course, the principal objective of the organization, the preparation and presentation of current, high quality work in the simulation area. It is not necessary to have the statistical expertise of George Fishman or the programming ability of Ira Kay to contribute significantly to these ends. My two-year-old son can already spell GPSS in (what else?) blocks, and very shortly I expect I will delegate the writing of the SIGSIM annual report to him. Since I have tackled a number of these tasks along the way, I can verify that the psychic rewards of having done one's part for a conference which attracts several hundred attendees or, more generally, for a respected international professional organization, are indeed great, and I urge you to let me know if you would like to participate in any way at all. Some jobs take several hours a week, others just a few hours period, but all need doing. You may volunteer for a particular task or simply offer your time and a sketch of your background and interests, and I'll let you know what is available.

I do have some thoughts on new avenues for participation. There are some positions which need to be filled periodically by appointment by the SIGSIM officers. These include a person to undertake membership recruitment and servicing, conference planning, nominations for the next slate of officers, general chairmen and program chairmen for conferences and symposia (to the extent that these are co-sponsored by other organizations, the other organizations must approve the administrative personnel); publicity, arrangements, registration and business chairmen for conferences, and certain ad hoc positions of a temporary nature. Every conference needs a supply of people who are willing and able to serve as session chairmen, referees and discussants, and I believe there is a large pool of you out there, so motivated, with whom we are not in touch at the present time.

Most of my ideas for new SIGSIM ventures might be implemented through Simuletter. All of them require the assistance of at least one interested person to act as the receiver of materials for a column or

section and to interface between Harold Highland and the contributors of material. These may be occasional specials or regular features depending on supply and demand. I hope, as well, that these ideas will stimulate still more ideas and will encourage those of you who have not contributed to Simuletter in the past to do so in the near future.

1. A "CLASSIFIED" section.
   In this section, a person in the midst of doing simulation work might "advertise" for assistance with some aspect of the project, the object being co-authorship of a better paper. Many simulation practitioners and theoreticians have one definite strong suit, such as the philosophy of model building, simulation programming or statistical methodology but could benefit from association with another individual interested in the topic who complements his talents. Likewise, a person with good overall ability in simulation might seek a person knowledgeable in the particular functional area in which the model is to be built, such as transportation or manufacturing. Since SIGSIM would not be permitted to charge a fee for such listings, it would be necessary to place a word count and frequency of appearance limit on each entry.

2. A "TUTORIAL" section of a self-study type prepared by people with in-depth knowledge of some advanced topic in the simulation area, but presented at the level of, say, a Freshman or Sophomore college course. This would require considerable discipline on the part of the preparer--to use simple but lengthy descriptions in place of compact but abstruse mathematical notation, to provide ample illustrations and worked-out examples, as well as self-test problems and questions with some portion of the solution given as a guide to correctness. One such topic which particularly interests me is spectral analysis and its application to simulation. I have a basic understanding of statistics and have sufficient acquaintance with the statistical alternatives to realize their shortcomings, but I don't have the mathematical sophistication to fathom the pioneering works in this area. I am most willing to have my intelligence insulted by a tutorial presentation beneath my level rather than to waste my time trying to follow one which is beyond me. The tutorial sessions at the several simulation conferences do meet some part of this need, but I personally learn a lot more by leisurely examination of printed material than by trying to keep pace with a lecturer over a period of just a few hours, no matter how patient and well versed that lecturer may be.

3. A "REFEREED PAPERS" section. Since a large proportion of our audience is from academia, I believe that the paucity of papers received for publication in Simuletter in the past may be at least partially ascribed to the fact that academicians get few, if any, brownie buttons toward promotion and tenure for contributions to an unrefereed publication. Therefore, I would like to see a group of people volunteer for refereeing duties with specification of the areas in which they feel competent to evaluate the work of others. If there seems to be interest in contributing to such a section among the membership but few people volunteer as referees, I will try to jawbone some of the Old Guard into helping, but as I said before, my principal objective is to get new people involved to assist the old ones.

   Another, subsidiary function of these referees would be to serve as scouts in their major areas of interest, to find out who is doing what, and to solicit their papers for publication. The volume of simulation materials submitted for presentation at WSC, SSCS, CPEUG, SIGMETRICS, general ACM/AFIPS/IFIPS conferences, and meetings of TIMS/ORSA and related societies indicates that a lot is going on, but little of it appears in national print because the refereed journals are of such broad scope that a simulation paper at random has little chance of acceptance. I also know a few management scientists who regard simulation as a second-class discipline because its logical structure is inductive rather than deductive; unfortunately, some of these people are rather prominent figures and wield veto power over the most prestigious publications. Indeed, how many simulation-related articles can you recall in recent issues of the Journal and the Communications of the ACM itself? An academician who presents a paper at a conference which does not publish Proceedings may legitimately submit the paper for publication elsewhere, if there were a viable elsewhere. Why not let Simuletter become that viable elsewhere?

4. "THE ONE THAT GOT AWAY". Let's face it, many a simulation project bombs in one way or another, causing grief, needless expenditure of time and effort, but yielding considerable learning by hindsight on the part of the hapless modeler. It happens to the best of us, and we could all profit (if not smile) from reading about such experiences. If the contributor is embarrassed by the situation, the article could be published anonymously.

5. "DEAR ABBY,(TOM),(DICK),(HARRY),ETC:" Do you have a problem of fairly limited scope but of such a persistent and/or technical nature that it has been impeding your progress for some time? This might be a real, live supplement to "The Problem Corner", with the intent that solutions might be suggested by other readers and published in subsequent issues.

6. "AFTER-USE REVIEWS OF CURRENT SIMULATION TEXTS AND RELATED MATERIALS". Most instructors will agree that one cannot evaluate a textbook properly until after it is used, when it is often too late. Those of us who teach simulation could benefit from the experiences of our colleagues as a supplement to what we hear from the friendly local textbook sales representative.

7. An annual student paper competition. If each of us who teaches simulation were to submit the best paper in each of our classes, there would be a reserve of articles for Simuletter, enhanced interest on the part of student members, and an opportunity for the new members of our profession to gain exposure.

8. An innovative teaching techniques section.

9. Contributions of an artistic, poetic or humorous nature, similar to the "What Hath Got Roth" regular feature.

Many of these ideas are the result of my academic orientation. What about those of you in the government and in industry? Have these given you any inspirations? Before you reposition this issue on top of the Reader's Digests under the family toothbrush rack, please take a moment and let me know your thoughts and (I hope and pray) what you would be willing to do to help. The page after this one will contain some leading questions and blank spaces; on its reverse side my name and address will be pre-printed. All you need to do is to detach it, fill out as much as you desire, fold it in thirds, staple it, stamp it and mail it. If you prefer, you may send your views to Harold in the form of a Letter to the Editor. Finally, I would be delighted to chat with any of you by long-distance telephone (the surest way to reach me is at home, about 9 P.M.). Or I'll be glad to exchange correspondence on any subject which interests you.

Several issues back, Tom Schriber let his better judgment be overwhelmed by publishing my set of GPSS problems called "Xaviera's Establishment". Soon after, Harold forwarded to me an irate letter from a reader who averred that this sort of disgraceful behavior (mine, not Xaviera's) was the result of allowing women to take up careers outside the home. I'm now well on my way into middle age and have some fairly fixed attitudes, habits and ways of thinking. Since I will be representing you as well as myself for the next two years, I am more than willing to present your positions when they differ from mine in various forums, but you will have to take the responsibility to let me know. If I hear enough outrage, perhaps I'll resign and try, for the umpteenth time, futilely, to learn to cook.

NOTES FROM THE VICE CHAIRMAN .....

I want to congratulate Sue Solomon, our new Chairperson, who has long been active in SIGSIM. Sue called me shortly after the election results were announced and she is already working (and now I am too) on her plans for furthering SIGSIM activities benefiting the members of our organization. I am certain I express all of the officers views when I say that I hope we continue to move and expand SIGSIM in a positive manner as Michael Morris, Dick Brandon, Harold Highland, Paul Roth and others have done over the past few years. Truly our growth has been phenomenal and yet we have only scratched the surface. If each one of our current SIGISM members (nearly 2000) could get one friend in the field to join, our growth would be explosive. Certainly we all know many professionals working in the simulation field who would profit by joining SIGSIM. Let's urge each of them to join and expose them to a copy of SIMULETTER to get them interested.

This year at the Annual Simulation Symposium in Tampa, Florida, March 15 through 17, Sue Solomon and I, in conjunction with Dr. Carl Evert, Chairman of the IEEE Technical Committee on Simulation, are planning something new. Dr. Evert has proposed a one day Simulation Methodology Workshop to be held on Tuesday, 14 March 1978. The idea behind this is to sponsor educational tutorials and present examples of and promote discussions on general tools, methodologies, and techniques which foster good simulation practices. The morning of March 14 will be used to present an overview of where simulation is today. Some of the major simulation languages will be briefly overviewed and a comparison of how they are used will be made. The morning session will include a brief look at the many diverse areas of simulation (from non-real-time discrete event simulations to real-time man-in-the-loop digital continuous simulations). The afternoon session will center on GASP. We hope to emphasize and present a detailed look at a different simulation language at each major simulation conference. In addition to the brief overview, a look at the implementation of standards for the development of software will be examined. There is little doubt that certain disciplined methodologies contribute positively to the development of simulation software, while other enforced techniques may in fact serve as impediments. The morning session will cover programming standards that foster good practices in the coding of a conceptual model. These have been applied to GPSS and FORTRAN simulations, with examples of the techniques used available to the Workshop Attendees. Please send

(continued on page 6)

Professor Susan L. Solomon
Department of Accounting and Decision Science
Eastern Washington University
Cheney, WA 99004

MEMBERSHIP QUESTIONNAIRE

Name_____

Affiliation_____

Address_____

City, State, ZIP _____

Years in simulation _____

Highest college degree _____

I can devote (a small amount) (a moderate amount) (a lot, e.g., consistently more than an hour or two per week) of time to SIGSIM.

Please indicate all in which you would like to participate, and add comments as appropriate.

1. General SIGSIM administrative positions, such as Nominations, Membership or Conferences Co-Ordinator, liaison with other professional organizations (specify which), SIGSIM representative on ACM committees.

2. Conference positions--General Chairman, Program Chairman, Arrangements Chairman, Registration Chairman, Publicity Chairman, Business Chairman, Session Chairman, Referee, Discussant. (Please specify choice of conference (e.g., WSC, NCC, etc.), if any, and areas of special interest.)

3. Simuletter Associate Editorships or referee positions (please indicate areas).

4. I hereby swear to make a written contribution to Simuletter this year!

5. Your ideas...,

THANK YOU VERY MUCH!

in your comments and views, i.e., which techniques, methodologies and language(s) do you think should be covered? Anyone desiring to participate in the March 14 Workshop should contact either myself, the Annual Simulation Symposium, or

Dr. Carl Evert
Dept. of Electrical Engineering
University of Cincinnati
Cincinnati, Ohio 45221

The first tutorial is planned to discuss and present the use of the FORTRAN oriented language GASP. GASP is undoubtedly the most universally available simulation tool and is written in ANSI Standard FORTRAN easily available on virtually every medium and large scale computer today and many mini's. This planned session will cover the applicability and use of GASP; experienced users of GASP will present their applications of the language and be available for questions and answers during the day. The nice thing about GASP is that anyone who knows FORTRAN and understands the concepts of simulation can use this highly portable language. GASP has both digital continuous and discrete capabilitites and the use of both methodologies will be presented on March 14. Several books are available on the language and if it isn't now on your computer, it only costs $300 to put it on your system. Sue and I urge your support of Dr. Evert's Workshop and I welcome all correspondence on suggestions and ideas on this and future Workshops

Incidentally, if anyone would like to subscribe to the IEEE Technical Committee Newsletter on Simulation (its title is "Modeling"), please write to me:

Dr. Joe Clema
SIMULATION TECHNOLOGY, INC.
4124 Linden Avenue Suite 200
Dayton, Ohio 45432

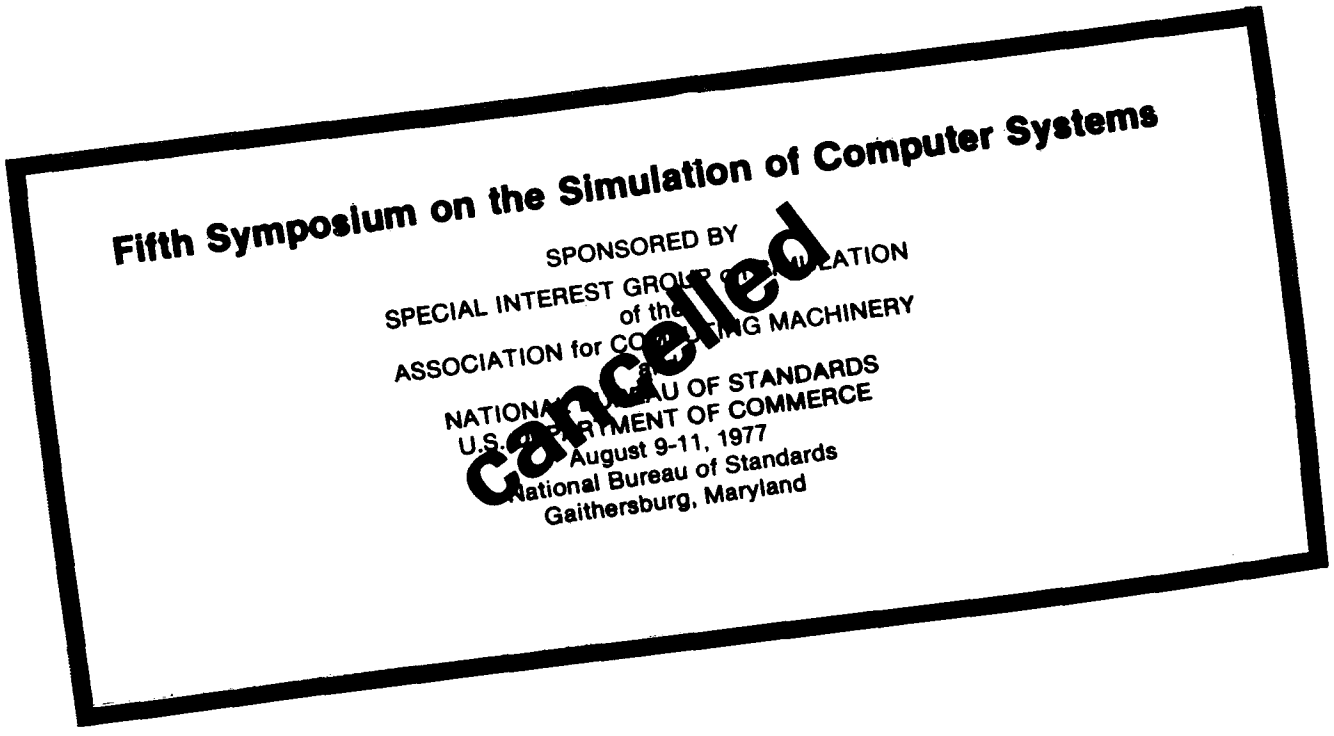
You do not need to belong to the IEEE and there is no cost to receive "Modeling" at the present time. SIGSIM and the IEEE Simulation TC hope to work closely together on many joint efforts in the future.

Anyone interested in more information on the 11th Annual Simulation Symposium to be held March 15-17, 1978 should write to the:

Annual Simulation Symposium
P.O. Box 22621
Tampa, Florida 33622

This year's selection of papers appears to be the best ever. Sue and I will be there and we hope to see you there too.

Joe



From the Editor's Desk

• **Catching Up Time Again**

This is the second Editor's Column that I am writing for this issue. The first went the way of a strayed messenger. It all started months ago when I used a new special service to get the issue's copy from my office to ACM headquarters. Since I was busy wearing a cervical collar (and not fit to talk to), I waited until I received the 'old copy' from ACM (they send it back after printing) before getting the next issue off my desk. Finally I discovered that ACM had not received the copy and upon checking with the messenger service found that they had been 'reorganized.' It appears that my copy just wasn't delivered.

Upon receipt of the copy from the messenger service I discovered that first they must have used the United States Mail Service since a number of pages were spindled, folded and mutilated. Others appeared to have spent their time 'sitting in the rain,' or resting under a dripping wtaer faucet. Therefore, quick surgery was undertaken.

For these and future mistakes I offer my sincere apology to the reader of Simuletter and especially to Sue Solomon. Therefore, an addendum to my New Year's resolutions (which I did not make until mid-January when I finally got out of the cervical collar): this issue is going out at once and will be followed by all missing issues within 45 days. Sorry to give you such concentrated reading within so short a time, but.... after all there is that field of data compression.

• More Copy Wanted

To those authors who have contributed copy in the past, my thanks. For those authors who want to see the copy in print, I ask only to wait since by April I hope to have Simuletter back on its normal timetable of the past six or seven years - no more delays!

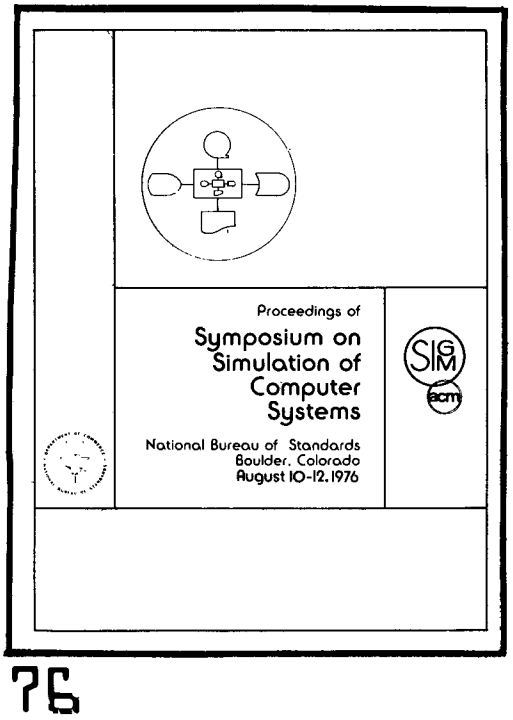
In the meantime, I find that we have copy to fill those missing issues, but what comes after that? I do have a number of book reviews I have written and can write more. These will appear in the near future. But I should like to hear from our readers to get more for Simuletter, so please write. It makes it easier if you request the special copy paper rather than our getting an article retyped.

• Our Thanks

Two special articles appear in this issue which have appeared in other ACM publications. First, our thanks to Norman R. Lyons and SIGBDP for permission to reprint, "An Automatic Data Generating System for Data Base Simulation and Testing." Secondly, thanks to Michael Adamowicz and Jamshed Mirza and SIGMICRO for their permission to reprint, "A Microcomputer Design and Simulation Languages."

Finally, I'd like to call attention to a special article on "Simulation Terms," for we'd like your reactions. Dr. Tuncer Oren and I are both interested and you can communicate with either or both of us. The addresses face the Table of Contents on page 1. - hjh

PROCEEDINGS OF SYMPOSIUM ON THE SIMULATION OF COMPUTER SYSTEMS AVAILABLE!



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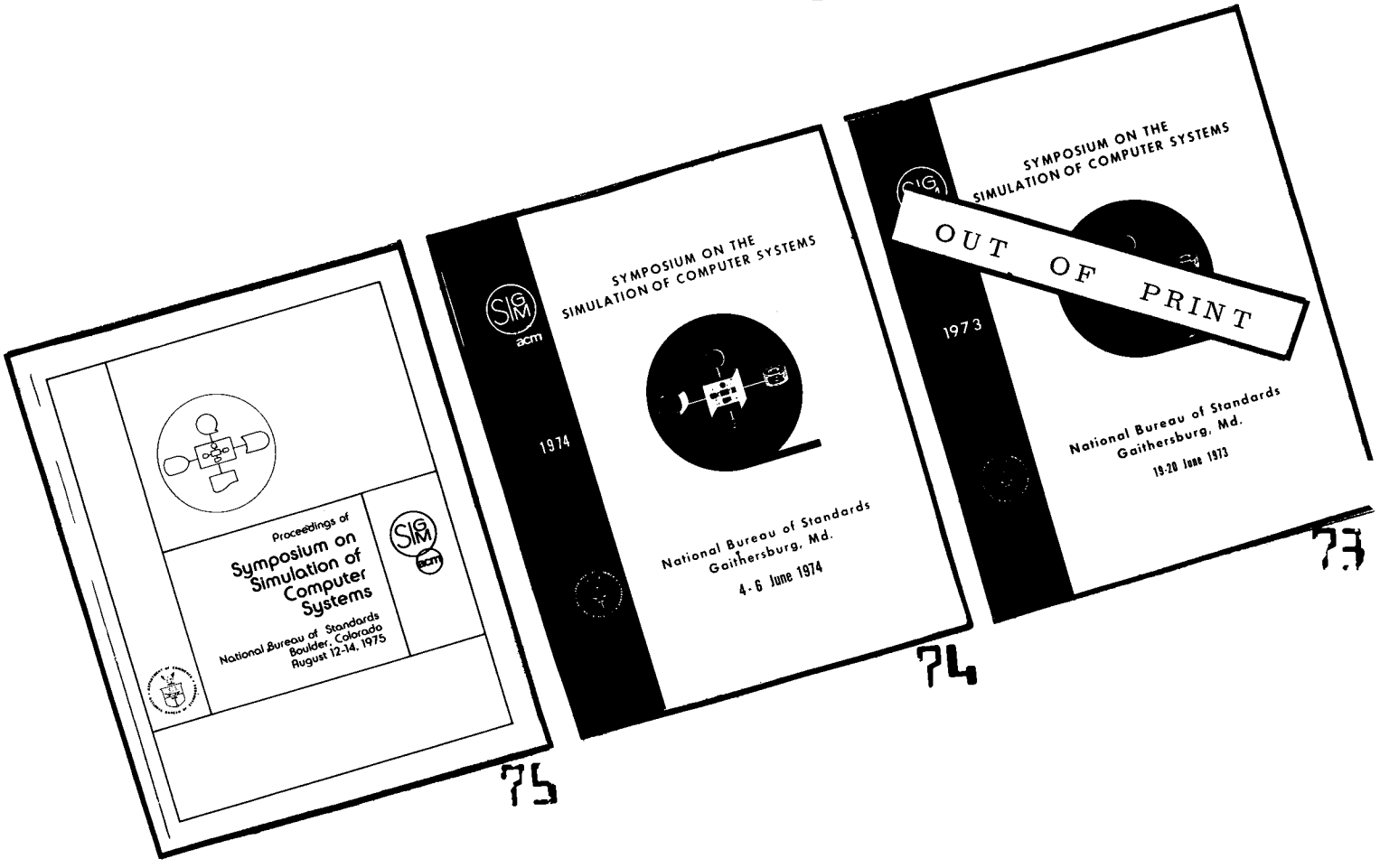

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New SYMPOSIUM PROCEEDINGS NOW AVAILABLE

The Proceedings of the **1976 Symposium on the Simulation of Computer Systems** are now available to the readers of Simuletter. This is Volume 4 of the series started back in 1973.

The 4th Annual SSCS sponsored by both the Institute for Computer Sciences and Technology of the National Bureau of Standards and SIGSIM was held August 10-12, 1976 at Boulder.

This annual event started in 1973 with the meeting held at the National Bureau of Standards at Gaithersburg, Maryland has resulted in a series of annual publications containing papers full of practical applications, state-of-the-art reports and introductory analysis of complex topics.

The four-volume series should prove an invaluable asset to any library containing publications in the field of simulation, and particularly in the area of computer systems simulation.

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• VOLUME ONE – '73 ▽ There are 26 original papers in this vi + 288 page volume, and cover such topics as: Languages for Computer Systems Modeling, Simulation of Computer Systems, Critical Issues in Computer Systems Simulation, ...

• VOLUME TWO – '74 ▽ There are some 16 specialized original papers in this vi + 210 page volume, covering: Simulation and Measurement of Computer Systems, Use of Statistical Analysis in Systems Simulation, Simulation and Resource Scheduling, ...

• VOLUME THREE – '75 ▽ This volume consists of 25 original papers in viii + 264 pages, and includes: Simulators for Minicomputers, Simulation of Real-time Micro-Processor Networks, Tuning and Verifying Package Simulation Models, Use of Simulation in Systems Design, ...

• VOLUME FOUR – '76 ▽ Some 23 special papers are contained within viii + 224 pages, and cover: Simulation Method for Multi-level Data Security Analysis, Testing Microprograms Using Microinstruction Simulator, Run-time Characteristics of a Simulation Model, ...

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PRICE: Each of these volumes is available at only $15.00 to members of SIGSIM and ACM; the price to all others is $25.00 per volume.

All volumes are shipped 4th class; please allow about 8 weeks for delivery. Copies will be sent airmail for an extra charge as noted below.

All orders should be prepaid. Because of collection difficulties in the past, we prefer a check made payable to SIGSIM to accompany each order.

Purchase orders will be filled for institutions only. There will be a surcharge for this service as noted below.

Please send: ☐ 1976 Proceedings of SSCS ☐ 1975 Proceedings of SSCS
☐ 1974 Proceedings of SSCS ☐ 1973 Proceedings (Out of Print) CS

My check for $_____, payable to SIGSIM, is enclosed with this form.

Name (please print) _____ ☐ Member of SIGSIM

Affiliation _____ ☐ ACM membership _____

Address _____

City _____ State _____ Zip _____ ☐ Please bill me; $6.00 surcharge

■ Mail this form together with your check to:

Dr. Harold Joseph Highland / SIGSIM
State University Technical College
Whitman Hall 126
Farmingdale NY 11735 USA

☐ Airmail copy; $2.50 per volume domestic & Canada; $4.50 per volume overseas.

CALL FOR PAPERS
1978 WINTER SIMULATION CONFERENCE
To be held at The Deauville Hotel
Miami Beach, Florida on December 4 - 6, 1978

Deadline for all Paper Summaries and Proposals is April 4, 1978.

The conference will feature papers and panel discussions on discrete and combined (discrete/continuous) simulation, organized into three types of sessions.

Tutorials: state-of-the-art summaries of simulation methodology (languages, techniques, data analysis) as well as fields of application

Methodology: research papers on simulation methodology and techniques

Applications: papers describing applications of simulation, including the uses made of and the benefits gained from the models as well as the lessons learned from the modeling experience

Unpublished papers are solicited in all aspects of discrete and combined simulation. Summaries of approximately 1000 words are requested for each paper and are to include a list of key words and references. All papers must include full disclosure of any models presented. Individuals interested in presenting tutorials or organizing panels and application sessions are requested to contact the program chairman promptly.

Four copies of all summaries and proposals should be sent to the Program Chairman by April 14, 1978. Receipt of submissions will be acknowledged in writing. Notification of acceptance will be sent by July 1, 1978, with the final version of papers in production-ready form for publication in the proceedings due September 1, 1978.

PAPERS ARE SOUGHT OVER A BROAD RANGE OF TOPIC AREAS, INCLUDING:

SIMULATION METHODOLOGY

Experimental Design
Language Developments
Statistical Analysis
Debugging Aids
Validation Techniques
Human Interfaces
Education and Training
Random Number Generation

SIMULATION APPLICATIONS

Information Systems
Data Base Systems
Computer Systems
Planning Models
Scheduling
Logistics and Networks
Reliability Control
Financial Models
Communications

Agriculture and Forestry
Energy
Health
Industry
Government
Transportation
Education
Military

GENERAL CHAIRMAN:
Mr. Larry G. Hull
Code 533.1
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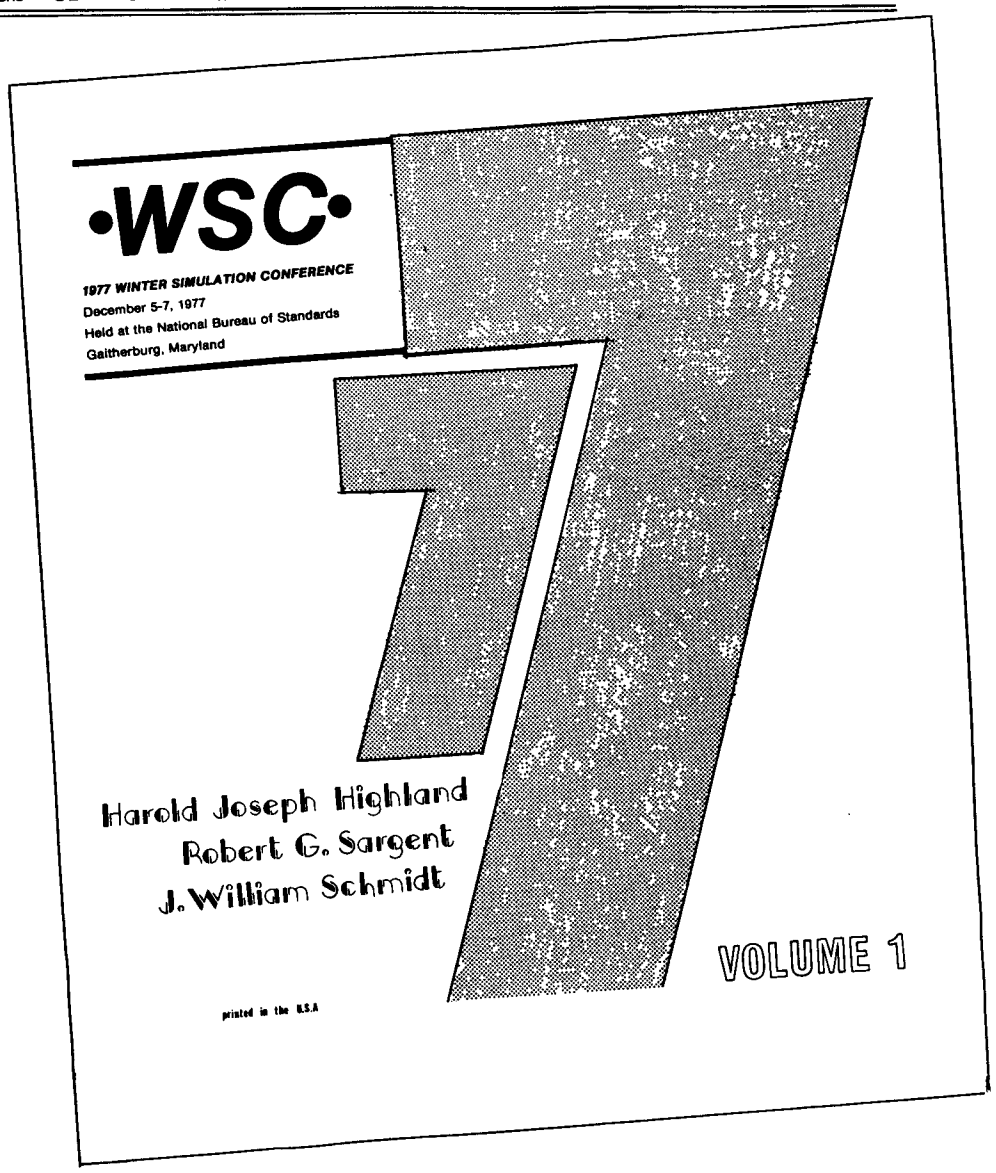
(301) 982-5308

PROGRAM CHAIRMAN:
Dr. Norman R. Nielsen
Information Science Laboratory (J-1041)
SRI International
333 Ravenswood Avenue
Menlo Park, California 94025
(415) 326-6200 ext. 2859

PROCEEDINGS OF 1977 WINTER SIMULATION CONFERENCE AVAILABLE



The two-volume set of the Proceedings of the 1977 Winter Simulation Conference, 880 + xxx pages, is available to members of SIGSIM. There are 103 individual articles covering all aspects of simulation. The price of this two-volume set is $40.00, but is available to members of ACM and SIGSIM at the special membership price of $32.00. All orders should be sent prepaid.

TO: Association for Computing Machinery
1133 Avenue of the Americas
New York NY 10036

My check for $ _____ is enclosed for the two-volume set of the Proccedings of the 1977 Winter Simulation Conference. Please send this set to:

Name (pplease print) _____

Affiliation _____

Address _____

City _____ State _____ Zip _____

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RAL     rotate register left one bit position
RAR     rotate register right one bit position
SET     set to 1's
SHL     shift register left one bit position
SHR     shift register right one bit position
XOR     logically Exclusively OR two registers and place result in
        target
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CALL FOR PAPERS

Papers are invited for presentation at the Twelfth Annual Simulation Symposium to be held in Tampa, Florida, March 14-16, 1979. The organization consists of those most interested in digital discrete simulation, but papers describing other techniques, such as continuous or analog, will be considered. Those selected will present their papers in person, and be expected to discuss points of interest with the attendees.

PURPOSE

The Annual Simulation Symposium is a non-profit corporation organized to provide a forum for the interchange of ideas, techniques and applications among practitioners, and to offer grants for the advance of the art. Sponsored by the three major professional organizations concerned with simulation using computers, the Symposium concentrates on developing dialogue among the attendees. In accordance with the rules established and maintained from the First Symposium, those submitting papers are advised that all attendees, including speakers, are expected to have the costs of all expenses and their registration fees borne by their respective agencies, companies, universities or by themselves.

$500. AWARD FOR THE BEST PAPER

An award of $500.00 is being made for the best paper presented at the Twelfth Annual Simulation Symposium. The prize will be awarded on the basis of subject matter, applicability, presentation and other selected judgments.

REQUIREMENTS

Any papers submitted for presentation must not have been previously presented or published. As in the past, the complete paper will be published in the Proceedings of the Symposium.

Initially the following will be required no later than April 7, 1978.

-A working title for the paper.
-An abstract of no less than 750 words.
Full name of author(s).
-Official title(s) or position(s) and company or university affiliation.
-Complete mailing address and telephone number of each author.
-Statement that the author will personally present the paper at the Twelfth Annual Simulation Symposium.

The above mentioned material should be mailed to:

Mr. W. Vincent Neisius
Simulation Development Department
Defense and Space Systems Group of TRW, Inc.
One Space Park
Redondo Beach, CA 90278
Telephone: 213-535-1953

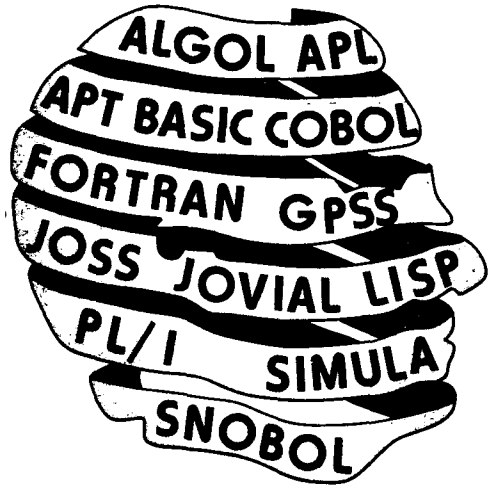
Notification of the acceptance of the papers will be made to the authors not later than May 26, 1978, together with the complete instructions for submission of final papers. The final papers will be required by November 26, 1978.

acm SIGPLAN

HISTORY OF PROGRAMMING LANGUAGES CONFERENCE

LOS ANGELES, CALIFORNIA

JUNE 1-3, 1978



THEY CHANGED THE FACE OF COMPUTING

The conference is intended: (1) to initiate the preservation of a historical record for some major current languages and to give impetus to others to continue adding to this record, and (2) to provide information from one or two key contributors to the early technical development of the selected languages.

An opportunity to hear and to participate in discussions with a key technical contributor to the initial development of 13 of the most significant programming languages which: (1) were created and in use by 1967, (2) are in use in 1977, and (3) have had considerable influence on the field of computing.

The planned list of languages, speakers, and language coordinators is

LANGUAGE	SPEAKER(S)	LANGUAGE COORDINATORS
ALGOL(58, 60)	Alan Perlis, Peter Naur	David Gries, Tom Cheatham
APL	Ken Iverson	Phil Abrams, Jan Lee
APT	Douglas Ross	John Goodenough, Shizuo Hori
BASIC	Tom Kurtz	Henry Ledgard, Ted Lewis
COBOL	Jean Sammet	Michael Marcotty, Henry Ledgard
FORTRAN	John Backus	Bernard Galler, Jan Lee
GPSS	Geoff Gordon	Julian Reitman, John Goodenough
JOSS	Cliff Shaw	Charles Baker, Tom Cheatham
JOVIAL	Jules Schwartz	Tom Cheatham, Christopher Shaw
LISP	John McCarthy	Carl Hewitt, Barbara Liskov
PL/I	George Radin	Bob Rosin, Michael Marcotty
SIMULA	Ole Johan Dahl, Kristen Nygaard	Barbara Liskov, Richard Nance
SNOBOL	Ralph Griswold	Michael Shapiro, Bob Rosin

The language coordinators will work with each speaker by suggesting questions to be answered and by assisting the speaker in preparing the paper and then the talk.

The keynote speaker will be Captain Grace Murray Hopper.

Jean E. Sammet (IBM) is General Chairman and Program Chairman of the conference. Program Committee members are Tom Cheatham (Harvard U.), John Goodenough (SofTech), Henry Ledgard (U. Mass.), Jan Lee (VPI&SU), Barbara Liskov (MIT), Bob Rosin (Bell Labs), and Henry Tropp (Humboldt State U.).

Papers written by the invited authors will be distributed as preprints at the conference as an issue of SIGPLAN Notices. A final edited proceedings will be published after the conference.

Everyone interested in programming languages is invited to attend this meeting. Attendance will be open up to the capacity of the facilities on a first-come first-served basis. Advanced registration is strongly recommended. General information, including hotel and registration information, can be received by mailing the cutoff at the bottom of this announcement to the Publicity Chairman Billy G. Claybrook, Department of Computer Science, VPI&SU, Blacksburg, VA 24061. Advanced registration and hotel forms will be sent automatically to SIGPLAN members.

Please forward information, including Hotel and Registration information, for the History of Programming Languages Conference, June 1-3, 1978 to

Name _____

Affiliation _____

Street _____

City/State _____ Zip _____

A LIST OF SIMULATION TERMS

by Dr. Tuncer Ören

• Editor's Note: For many years, Dr. Ören has been an Associate Editor of Simuletter and for many more years he has built an extensive data file of simulation literature references, bibliographies and simulation terms. Both he and I have exchanged considerable correspondence and met periodically.

Dr. Oren and I are both members of IFIPS WG 7.1 [International Federation of Information Processing Socieities Working Group 7.1] which is involved in the development of an international dictionary of modelling and simulation.

Furthermore, I am a member of the advisory group of AFIPS CS&E [American Federation of Information Processing Societies' Computer Science and Education] Taxonomy Committee, chaired for former ACM President Anthony Ralston.

In both ventures, it has been necessary to cull information from numerous articles and books. Now both Dr. Ören and I would like to enlist the aid of the members of SIGSIM. The following is a list of simulation terms which he has developed over the years from the various indexes he has created plus a great deal of effort to boot. Following the dictates of E. X. Murphy's law [III, part 7, section 13]:

> "In any given situation and within any time frame, a group of experts or specialists, that is those who know a vast amount about a very little, would prefer to criticize than to create,"

I have included the list of simulation terms which Dr. Ören has developed as of May 1977. Neither he nor I make any calims that this is a definitive list, but it is one which is a start in the development of any dictionary and/or taxonomy of modelling and simulation terminology.

The statisticians among our readers are likely to reaction in the same way I did the first time I was sent this list from Canada. It is sparse in statistical terminology, where is Erlang? Actually, I should like to obtain the views from our readers... should we get involved with a set of statistical terms that would enlarge this 'vocabulary,' or should we hope and pray that a worthwhile source of statistical terminology exists for the average user? Possessing a comprehensive library of statistical volumes (after all I do teach that subject regularly), I find little difficulty in adding to this basic list of terms.

Also requested from our readers is their reaction to possible replication of terms. For example, look at the list under 'event.'

Event
Event, critical
Event, current
Event, endogenous
Event, exogenous
Event, next
Event, state
Event, time

Would this detail be helpful? If yes, how much detail should one include?

It should remembered that such a dictionary of terms should be useful not only to the advanced practioner, but also to those who know little or nothing about the field. This dictionary would serve many purposes, particularly in the area of communications: does he know what you mean?

Would you please address all comments and/or complaints directly to your editor. I will make certain that the information gets to Dr. Ören, who is now on leaving in The Netherlands. Both of us would be grateful for all and any help you offer. – hjh

A LIST OF SIMULATION TERMS

.....developed by Dr. Tuncer Ören.....

ACCURACY, MODEL
ACTIVITY
ADVANCE, TIME
AGGREGATION
ALGORITHM
ALGORITHM, SIMULATION
ALGORITHMIC
ALLOCATION, COMPONENT
ALLOCATION, COMPUTER
ALTITUDE, SIMULATED
AMPLIFICATION, DEVIATION
ANALOG
ANALOGY
ANALOGY, FORMAL
ANALOGY, PERFECT
ANALOGY, SUBSTANTIAL
ANALYSIS
ANALYSIS, POST GAME
ANALYSIS, SIDE
ANALYSIS, SYSTEMS
ANALYST
ANALYZER, DIGITAL DIFFERENTIAL
ANALYZER, NETWORK
APPROACH, ACTIVITY SCANNING
APPROACH, EVENT SCHEDULING
APPROACH, PROCESS INTERACTION
APPROACH, SYSTEMS
ASSESSMENT
ASSESSOR
ATTRIBUTE
BACKCASTING
BLOCK, FUNCTIONAL
BOARD, GAME
BOUNDARY, SYSTEM
CALENDAR
CALIBRATION, MODEL
CAPABILITY, INTERACTIVE
CAPABILITY, MACRO
CHANCE, GAME OF
CHECK, STATIC
CLOCK, MODEL
CLOCK, SIMULATION
CLOCKWORKS
COMPILER
COMPILER, SIMULATION LANGUAGE
COMPONENT
COMPUTER, ANALOG
COMPUTER, DEDICATED
COMPUTER, DIGITAL
COMPUTER, HOST
COMPUTER, HYBRID
COMPUTER, OBJECT
COMPUTER, SIMULATED
COMPUTER, SOURCE
COMPUTER, STOCHASTIC
COMPUTER, TARGET
CONDITION, BOUNDARY
CONDITION, INITIAL
CONDITION, OPTIMAL
CONDITION, STARTING
CONFERENCING
CONTEST
CONTEST, SIMULATION
CONTEST, SIMULATION GAME
CORRECTNESS, PROGRAM
COUNTER-INTUITIVE

COUPLING
COUPLING, CASCADE
COUPLING, CONJUNCTIVE
COUPLING, DISJUNCTIVE
COUPLING, FEEDBACK
COUPLING, NESTED
COUPLING, SYSTEM
COUPLING, TIME-VARYING
CREDIBILITY, MODEL
CYBERNETICS
CYCLE, GAME
DEBRIEFING
DETERMINISM
DETERMINIST
DIAGNOSIS
DIAGNOSTIC
DIAGNOSTIC, COMPILE-TIME
DIAGNOSTIC, EXECUTION-TIME
DIAGNOSTIC, PROCESS-TIME
DIAGRAM, BLOCK
DIAGRAM, INFORMATION FLOW
DIAGRAM, PROCESS FLOW
DIFFERENTIAL EQUATION, STIFF
DIMENSION, MODEL
DIRECTIVE, GAME
DISCRETE
DISTRIBUTION, NEGATIVE EXPONENTIAL
DISTRIBUTION, NORMAL
DISTRIBUTION, POISSON
DISTRIBUTION, UNIFORM
DOCUMENTATION
DOCUMENTATION, PROBLEM
DOCUMENTATION, PROGRAM
DOCUMENTATION, SOLUTION
DYNAMICS, INDUSTRIAL
DYNAMICS, MODELLING SYSTEM
DYNAMICS, SYSTEM
DYNAMICS, URBAN
DYNAMICS, WORLD
ELEMENT, LINEAR
ELEMENT, NONLINEAR
ELEMENT, MEMORY
EMULATE
EMULATION
EMULATION, SOFTWARE-CONTROLLED
EMULATIVE
EMULATOR
ENCOUNTER
ENCOUNTER, INDEPENDENTLY SEEDED
ENCOUNTER, SIMULAR
ENDGAME
ENTITY
ENVIRONMENT
EQUIFINALITY
ERROR
ERROR, EXPERIMENTAL
ESTIMATION
EVENT
EVENT, CRITICAL
EVENT, CURRENT
EVENT, ENDOGENOUS
EVENT, EXOGENOUS
EVENT, NEXT
EVENT, STATE
EVENT, TIME
EVENT FILE, ACCESS TO
EVENT SCHEDULING, TIME-MAPPING
EXCURSION
EXPERIMENT
EXPERIMENT, DETERMINISTIC
EXPERIMENT, NONDETERMINISTIC
EXPERIMENTATION
EXPERIMENTATION, DIRECT
FEEDBACK
FEEDBACK, NEGATIVE
FEEDBACK, POSITIVE
FEEDBACK LOOP, NEGATIVE
FEEDBACK LOOP, POSITIVE
FEEDFORWARD
FIRMWARE
FITTING, MODEL
FLOW, PLUG
FORMALISM, MODEL
FRAME, EXPERIMENTAL
FUNCTION, DENSITY
FUNCTION, DISTRIBUTION
FUNCTION, FORCING
FUNCTION, HISTORY
FUNCTION, INPUT
FUNCTION, MEMORY
FUNCTION, OBJECTIVE

FUNCTION, OUTPUT
FUNCTION, SIMULAR RESPONSE
FUNCTION, STATE TRANSITION
GAMBLE
GAME
GAME, BARGAINING
GAME, BUSINESS
GAME, CLOSED
GAME, COMPETITIVE
GAME, COMPLETELY MIXED
GAME, COMPONENT OF A
GAME, COMPOUND
GAME, COMPUTER
GAME, COMPUTER ASSISTED
GAME, CONFERENCE
GAME, CONSTANT SUM
GAME, CONTEST
GAME, CONTINUOUS
GAME, CONTROLLED-PLAY
GAME, COOPERATIVE
GAME, CRITICAL EVENT
GAME, DECOMPOSABLE
GAME, DEVELOPMENT
GAME, DIFFERENTIAL
GAME, DISCONTINUOUS
GAME, DISCRIMINATORY SOLUTIONS OF A
GAME, ESSENTIAL
GAME, EXTENSIVE FORM OF A
GAME, FAIR
GAME, FINITE
GAME, FREE
GAME, FREE-FORM
GAME, FREE-PLAY
GAME, FUNCTIONAL
GAME, GORE
GAME, HAND-PLAYED
GAME, INCREMENTAL
GAME, INESSENTIAL
GAME, INFINITE
GAME, LEVEL OF
GAME, MAJORITY
GAME, MANAGEMENT
GAME, MANUAL
GAME, MATHEMATICAL
GAME, META
GAME, MILITARY
GAME, N-PERSON
GAME, NON COOPERATIVE
GAME, NON STRICTLY COMPETITIVE
GAME, NON-ZERO-SUM
GAME, ONE-SIDED
GAME, OPEN
GAME, OPERATIONAL
GAME, PERFECT INFORMATION
GAME, PRACTICE
GAME, QUICK
GAME, RESEARCH
GAME, RIGID
GAME, RIGID-FORM
GAME, ROBINSON CRUSOE
GAME, ROLE-PLAYING
GAME, SEQUENTIAL
GAME, SIGNIFICANT EVENT
GAME, SIGNIFICANT TIME
GAME, SIMPLE
GAME, SIMULATION
GAME, SIMULATION OF STRATEGIC
GAME, STOCHASTIC
GAME, STRATEGIC
GAME, SURVIVAL
GAME, SYMMETRIC
GAME, SYSTEMIC
GAME, TRAINING
GAME, TRUNCATED
GAME, TWO PERSON
GAME, TWO PERSON ZERO-SUM
GAME, TWO SIDED
GAME, UNIVALENT
GAME, UPDATING A
GAME, VARIATION
GAME, WAR
GAME, WORD
GAME, ZERO-SUM
GAME ANALYSIS, POST
GAMING
GAMING, COMPUTER
GAMING, MILITARY
GAMING, OPERATIONAL
GAMING, ROBINSON CRUSOE
GAMING, SIMULATION
GAMING, WAR
GAMIST
GESTALT
GRAPH, EVENT
GRAPH, SIMULATION
HEURISTIC

MODEL, EXPLICITYLY NORMATIVE
MODEL, EXPLORATION
MODEL, FORMAL
MODEL, HOLISTIC
MODEL, ICONIC
MODEL, IMPLICITYLY NORMATIVE
MODEL, ISOMORPHIC
MODEL, LUMPED
MODEL, MACRO
MODEL, MACROSCOPIC
MODEL, MATERIAL
MODEL, MATHEMATICAL
MODEL, MICRO
MODEL, MICROSCOPIC
MODEL, MIXED STATE
MODEL, MONTE CARLO
MODEL, NONAUTONOMOUS
MODEL, NONDETERMINISTIC
MODEL, NORMATIVE
MODEL, PARTIAL
MODEL, PASSIVE ENTITY OF A
MODEL, PREDICTIVE
MODEL, PROCEDURAL
MODEL, QUASI-REPLICATIVE
MODEL, REPLICATIVE
MODEL, ROBUST
MODEL, SIMULAR
MODEL, SIMULATION
MODEL, STATIC
MODEL, STOCHASTIC
MODEL, SYMBOLIC
MODEL, TERRAIN
MODEL, TIME INVARIANT
MODEL, TIME VARYING
MODELLER
MODELLING
MODELLING, DEDUCTIVE
MODELLING, INDUCTIVE
MODELLING, SIMULATION
MODELLING, UNCERTAINTY PRINCIPLE OF
MODELLING, WORLD
MONITORING, SIMULATION
MOVE
NATURE, GAME AGAINST
NOISE, WHITE
NOTATION, DOT
NOTICE, EVENT
NUMBER, PSEUDORANDOM
NUMBER, RANDOM
OCCURENCE, EVENT
OPTIMIZATION, PARAMETER
OUTPUT, RUN-TIME
PACKAGE, SIMULATION
PARADIGM
PARALLELISM, PSEUDO
PARAMETER
PARAMETER, GAME
PERFORMANCE, MEASURE OF
PERFORMANCE, SYSTEM
PERSONNEL, CONTROL
PHASE, INITIALIZATION
PHASE, POST SIMULATION
PHASE, PRE-SIMULATION
PHASE, REAL-TIME SIMULATION
PHASE, SIMULATION
PHENOMENA, ISOMORPHIC
PLAY
PLAYER
POINT, BREAK
POINT, INTERACTION
POINT, REACTIVATION
PORT, INPUT
PORT, OUTPUT
POSTULATES, MODEL
PRECISION
PREDICTION
PRINCIPLE, SEEDING
PRINT-PLOT
PRIORITY
PROBLEM
PROBLEM, ANALYSIS
PROBLEM, CONTROL
PROBLEM, DIRECT
PROBLEM, FIELD
PROBLEM, INVERSE
PROBLEM, SIMULATED
PROBLEM, SYNTHESIS
PROBLEMATIQUE
PROCESS
PROCESS, AUGMENTED
PROCESS, MARKOV
PROCESS, MODELLING
PROCESS, RANDOM
PROCESS, REMOTE BATCH
PROCESS, STOCHASTIC
PROCESSOR, SIMULATION

PROCESSOR, SIMULATION LANGUAGE
PROGRAM
PROGRAM, DIGITAL SIMULATION
PROGRAM, HYBRID SIMULATION
PROGRAM, OBJECT
PROGRAM, OBJECT SIMULATION
PROGRAM, PROCEDURAL
PROGRAM, SIMULATING
PROGRAM, SIMULATION
PROGRAM, SIMULATION CONTROL
PROGRAM, SIMULATOR
PROGRAM, SOURCE
PROGRAM, SOURCE SIMULATION
PROGRAM, TARGET
PROGRAM, TARGET SIMULATION
PROGRAMS, SIMULATION BETWEEN
PROGRAMMING, SIMULATION
PROGRAMMING BY QUESTIONNAIRE, SIMULATION
QUEUE
REAL-TIME, SIMULATED
REAL-TIME ON-LINE OPERATION, SIMULATED
REDUCTION, DEGREE
REGION
REGION, DYNAMIC
REGION FOR DIGITAL SIMULATION, DYNAMIC
REGION FOR HYBRID SIMULATION, DYNAMIC
REGION IN HYBRID SIMULATION, SETUP
REGION, INITIAL
REGION, SETUP
REGION, TERMINAL
REPLICATION
REPRESENTATION, STATE
RESOLUTION
RESOLUTION, LEVEL OF
RESOURCE
RESPONSE
RESPONSE, SIMULAR
RESPONSE, SYSTEM
RETRODICTION
ROBUSTNESS, MODEL
ROOM, CONTROL
ROOM, PLAYER
ROOM, SIDE
ROOM, WAR
ROUTINE, EXECUTIVE
RULE
RULE, DECISION
RULE, DETERMINISTIC
RULE, PRIORITY
RULE, STOCHASTIC
RUN ACTIVITY, POST
RUN, ANTITHETIC
RUN, ANTITHETIC SIMULATION
RUN OUTPUT, POST
RUN MONITORING, SIMULATION
RUN, SIMILAR SIMULATION
RUN, SIMULATION
RUN STATEMENT, POST
SAMPLE, RANDOM
SCALE, TIME
SCALING
SCALING, MAGNITUDE
SCALING, TIME
SCAN, ACTIVITY
SCHEDULING
SCHEDULING, CONDITIONAL
SCHEDULING, EVENT
SCHEDULING, UNCONDITIONAL
SECTION, DERIVATIVE
SECURITY, GAME
SEED
SEEDING
SELECTION, EVENT
SEMAPHORE
SENSITIVITY
SENSITIVITY, PARAMETER
SEQUENCE, SIMULATION
SERENDIPITY
SET, DISCRETE
SIMULACRE
SIMULACRUM
SIMULAND
SIMULAR
SIMULATE
SIMULATED
SIMULATION
SIMULATION, ACOUSTIC
SIMULATION, ACTIVE
SIMULATION, ADAPTIVE
SIMULATION, ALL DIGITAL
SIMULATION, ALL DIGITAL ANALOG
SIMULATION, ALL DIGITAL HYBRID

SIMULATION, ALTITUDE
SIMULATION, ANALOG
SIMULATION, APPROXIMATE
SIMULATION, ATMOSPHERIC ENTRY
SIMULATION, ATTENTIVE
SIMULATION, BACK-UP
SIMULATION, BACK-UP FOR ANALOG
SIMULATION, BACK-UP FOR HYBRID
SIMULATION, BASE CASE
SIMULATION, BUSINESS
SIMULATION, COMBAT
SIMULATION, COMBINED
SIMULATION, COMPOUND
SIMULATION, COMPRESSED TIME
SIMULATION, COMPUTER
SIMULATION, COMPUTER AIDED
SIMULATION, COMPUTER RELATED
SIMULATION, COMPUTERIZED
SIMULATION, CONDENSED TIME
SIMULATION, CONFERENCING
SIMULATION, CONTINUOUS
SIMULATION, CONTINUOUS TIME
SIMULATION, CONTROL
SIMULATION, CONTROL SYSTEM
SIMULATION, CONVERSATIONAL
SIMULATION, DETERMINISTIC
SIMULATION, DIGITAL
SIMULATION, DIGITAL ANALOG
SIMULATION, DIGITAL COMBINED SYSTEM
SIMULATION, DIGITAL CONTINUOUS SYSTEM
SIMULATION, DIGITAL DISCRETE SYSTEM
SIMULATION, DIGITAL DISTRIBUTED PARAMETER SYSTEM
SIMULATION, DIGITAL ON-LINE
SIMULATION, DISCRETE
SIMULATION, DISCRETE EVENT
SIMULATION, DISCRETE-TIME
SIMULATION, DISTRIBUTED
SIMULATION, DYNAMIC SYSTEM
SIMULATION, ENVIRONMENT
SIMULATION, EVENT FOLLOWING
SIMULATION, EVENT-SCHEDULING
SIMULATION, FIDELITY OF PSYCHOLOGICAL
SIMULATION, FLIGHT
SIMULATION, FUNCTIONAL
SIMULATION, GAMING
SIMULATION, GENERALIZED MODEL
SIMULATION, HARDWARE
SIMULATION, HYBRID
SIMULATION, HYBRID COMBINED SYSTEM
SIMULATION, HYBRID CONTINUOUS SYSTEM
SIMULATION, HYBRID DISTRIBUTED PARAMETER SYSTEM
SIMULATION, INCREMENTAL
SIMULATION, INITIALIZING OPERATIONS IN HYBRID
SIMULATION, INSTRUCTIONAL
SIMULATION, INTERACTIVE
SIMULATION, INTERPRETIVE
SIMULATION, LANDING
SIMULATION, LINEAR SYSTEM
SIMULATION, LOGICAL
SIMULATION, MACHINE
SIMULATION, MAN
SIMULATION, MAN-MACHINE
SIMULATION, MANUAL
SIMULATION, MARKOV
SIMULATION, MATHEMATICAL
SIMULATION, MODULAR
SIMULATION, MONTE CARLO
SIMULATION, NESTED
SIMULATION, NONLINEAR SYSTEM
SIMULATION, NON-NUMERICAL
SIMULATION, NUMERICAL
SIMULATION, ON-LINE
SIMULATION, ON-LINE CONTINUOUS SYSTEM
SIMULATION, ON-LINE DIGITAL
SIMULATION, OPERATIONAL
SIMULATION, OPTICAL
SIMULATION, PARALLEL
SIMULATION, PART-TASK
SIMULATION, PHYSICAL
SIMULATION, QUALITATIVE
SIMULATION, QUANTITATIVE
SIMULATION, REAL-TIME
SIMULATION, REAL-TIME DIGITAL
SIMULATION, REMOTE
SIMULATION, REMOTE DIGITAL
SIMULATION, REMOTE REAL-TIME
SIMULATION, RETROSPECTIVE
SIMULATION, SHOP OPERATIONS
SIMULATION, SOFTWARE
SIMULATION, SOLAR
SIMULATION, SPACE ENVIRONMENT
SIMULATION, STOCHASTIC
SIMULATION, SYMBOLIC
SIMULATION, THEORY OF
SIMULATION, THERMAL
SIMULATION, TIME-SLICING

STUDY, SIMULATION
SUBPROGRAM, DERIVATIVE
SURFACE, RESPONSE
SURFACE, SIMULAR RESPONSE
SYNCHRONIZATION, PROCESS
SYNCHRONIZATION, TRANSACTION
SYNERGY
SYNTHESIS, SYSTEM
SYSTEM
SYSTEM, CLOSED
SYSTEM, COMPONENET
SYSTEM, CONCEPTUAL
SYSTEM, CONTINUOUS
SYSTEM, CONTINUOUS-TIME
SYSTEM, DISCRETE
SYSTEM, DISCRETE-TIME
SYSTEM, DISTRIBUTED
SYSTEM, DYNAMIC
SYSTEM, GLOBAL
SYSTEM, HIERARCHICAL
SYSTEM, LINEAR
SYSTEM, LUMPED
SYSTEM, MAN-MACHINE
SYSTEM, MEMORYLESS
SYSTEM, OBSERVE THE BEHAVIOUR OF A
SYSTEM, OPEN
SYSTEM, REAL
SYSTEM, REFERENT
SYSTEM, SAMPLED DATA
SYSTEM, STATE DETERMINED
SYSTEM, STIFF
SYSTEM, STOCHASTIC
SYSTEM, TIME-VARYING
SYSTEM, TIME-VARYING COMPONENT
SYSTEM, ULTRASTABLE
SYSTEMIC
TEST, RETRODICTIVE
TESTING, SENSITIVITY
THEORY, GAME
THEORY OF, SIMULATION
TIME
TIME, COMBAT
TIME, COMPRESSED
TIME, CONDENSED
TIME, GAME
TIME, PLAYING
TIME, REAL
TIME, SIMULAR
TIME, SIMULATED
TIME, SIMULATION
TIME ADVANCE, EVENT
TIME ADVANCE, INCREMENTAL
TIME-RATIO, PLAYING
TIME-STEP TECHNIQUE, FRACTIONAL
TRAINER
TRAJECTORY
TRAJECTORY, INPUT
TRAJECTORY, OUTPUT
TRAJECTORY, STATE
TRAJECTORY, TIME
TRANSACTION
TRANSLATOR, SIMULATION LANGUAGE
UNIT, STATE OF A
UTILITY, MODEL
VALIDATION, MODEL
VALIDATION, SIMULATION
VALIDITY
VALIDITY, EVENT
VALIDITY, FACE
VALIDITY, HYPOTHESIS
VALIDITY, INTERNAL
VALIDITY, MODEL
VALIDITY, VARIABLE PARAMETER
VALIDITY OF A MODEL, PREDICTIVE
VALIDITY OF A MODEL, REPLICATIVE
VALIDITY OF A MODEL, STRUCTURAL
VALUE, INPUT
VALUE, OUTPUT
VALUE, STATE
VARIABLE
VARIABLE, ACROSS
VARIABLE, ANTITHETIC
VARIABLE, CONTINUOUS
VARIABLE, CONTROL
VARIABLE, CONTROLLABLE
VARIABLE, DECISION
VARIABLE, DESCRIPTIVE
VARIABLE, DETERMINISTIC
VARIABLE, DISCRETE
VARIABLE, EXOGENOUS
VARIABLE, FLOW
VARIABLE, INPUT
VARIABLE, INTERNAL
VARIABLE, NONOBSERVABLE
VARIABLE, OBSERVABLE
VARIABLE, OUTPUT