UNIVERSITY OF WARWICK
COVENTRY CV4 7AL

DEPARTMENT OF COMPUTER SCIENCE

TELEPHONE COVENTRY (0203) 523523

9 February 1987

Dear

We are writing to invite you to participate in a One Day Seminar on *Mathematics for Computer Science* to be held at the University of Warwick on Wednesday 4th March 1987.

Both at first degree level, and in current research work, computer science is now heavily dependent on mathematics, and on logic and abstract algebra in particular. At the same time, the teaching of mathematics at all levels is being affected by computing ideas (e.g. should some programming be a normal part of a mathematics curriculum?) and by computing technology (e.g. the recent appearance of graphical calculators). The continuing rapid development of computer science and its applications has posed problems of unparalleled complexity. We believe that the mastery of these problems will require some of the best mathematical minds of the coming generation. The universities therefore have a responsibility to attract into computer related subjects mathematically able students who will probably wish to proceed to academic research.

Computer Science is a young discipline. Its public image has been strongly influenced by commercial success in limited popular applications, and there are widespread misconceptions about the nature of the subject as studied at university. The recruitment of students with an appropriate mathematical background depends to a large extent on the image and portrayal of computer science in schools. We are therefore holding a few one day seminars in which we want to explain, among other things, why we believe that computer science degree courses (and equally, computer systems engineering) are amongst the most challenging and interesting for mathematically gifted students. In return, we should welcome the reaction and comment of experienced teachers on the content of these degrees, on current university selection procedures and on some new ideas we have for assessing gifted potential computer scientists. We are pleased that Dr David Tall (of the Science Education Department) will also be with us to demonstrate and discuss some of the latest applications of computer power to the teaching of mathematics. The programme of the day seems altogether more appropriate for those responsible for mathematics in schools rather than computer science .

We are therefore approaching a number of schools with a high academic reputation and inviting to these seminars senior mathematics teachers who we believe already have some interest in computing. To make the occasions more effective we are only inviting a small number (8 or 10) at a time. We have in mind that this will not merely be a 'one off' exchange of ideas but that possibly some sort of advisory group will emerge from the exercise consisting of some senior teachers together with representatives of higher education, the computer industry and the DES or DTI etc. The brief of such a group would include recommendations for the enhancement of computer related education and research.

We enclose a programme for the day and a summary of the issues we hope to present and discuss. Naturally we hope that you will be able to attend but if this is impossible let us know if you would like to come on another occasion. If there is someone else in your school who you know would be interested in contributing and attending in your place (or in addition to you) on 4th March then please suggest their name to us.

If you would like to arrive on the previous afternoon or evening we should be pleased to offer overnight accommodation on the campus at a nominal charge. If you are travelling by train and let us know what time you expect to arrive at Coventry station we can arrange for you to be met. Perhaps you would be kind enough, in any case, to let us know by the 25th February whether you are able to attend the seminar (write or telephone to Steve Russ - direct no. 0203 523361). Do not hesitate to get in touch if you have any queries about the day or travel directions.

We look forward to your being with us on 4th March.

Yours sincerely

Prof Graham Nudd (Chairman)

Dr Steve Russ

MATHEMATICS FOR COMPUTER SCIENCE

A One Day Seminar to be held at the Department of Computer Science, University of Warwick.

Wednesday 4th March 1987

10.30	Arrival and coffee
11.00	Welcome and Introduction *Prof Graham Nudd (Chairman)* *Dr Steve Russ*
11.15	Mathematics in Computing: Theory and Applications *Prof Mike Paterson*
12.00	Computer Science and Computer Systems Engineering at University *Prof Mathai Joseph*
12.45	Lunch (Radcliffe House)
2.15	Examples illustrating the role of mathematics in computing: *Dr Meurig Beynon:* Formal languages and automatic programming tools *Dr Tony Cohn:* Logic and automatic theorem proving *Dr Roland Wilson:* Mathematical modelling and image processing
3.45	Tea (Staff Common Room)
4.15	Computer Power and Mathematics in the Sixth Form *Dr David Tall*
5.00	Final Discussion .....ending about 5.30

Further details overleaf.

UNIVERSITY OF WARWICK Department of Computer Science

A One Day Seminar on

MATHEMATICS FOR COMPUTER SCIENCE

The Computer Revolution is a cliché of our time. There can be no question that the impact of computers upon society, industry, business and education has been enormous. Computers have made possible calculations, transactions and investigations which would have been inconceivable a generation ago.

Those most closely involved with the early development of computers identified Computer Science as a body of characteristic ideas related both to algebra and logic, and concerned with the representation and manipulation of data at many different levels of abstraction. In the 20 years since the first university Computer Science departments were established, the scope and the image of Computer Science has been influenced by a whole range of developments associated with large scale commercial computing, with ambitious new applications, and with personal computers. In the process, the direct relevance of mathematics for computer science has sometimes been obscured, and many political and psychological factors have affected current views of the subject in the educational arena.

The purpose of this seminar is to examine the relationship between mathematics and computer science more closely, and to explore the mutual benefits of closer cooperation between mathematics and computer related subjects in education. One of our principal concerns will be to explain the central importance of mathematics as a basis for computer related degree courses, and for future research in these areas. Other issues to be considered include: the mathematically able applicant's perception of computing at school and of computer related subjects at university: the potential role of computing in sixth-form mathematics teaching: the nature of undergraduate degree courses in computer science and computer systems, and current trends in undergraduate applications for these subjects.

The seminar will consist of three talks, a short series of demonstrations, and several opportunities for discussion. Dr Steve Russ, a former Head of Mathematics with considerable experience of sixth form mathematics teaching, will chair the sessions, which will include contributions from Prof Mathai Joseph, Prof Mike Paterson, Dr Tony Cohn and Dr Roland Wilson of the Department of Computer Science, and Dr David Tall of the Science Education Department. In the first of these talks: *Mathematics in Computing: Theory and Applications*, Prof Mike Paterson will outline the scope and nature of Computer Science as a mathematical discipline, and indicate some of the exciting mathematical issues at the centre of contemporary computer science related research. This will be complemented in the afternoon by three short tutorial sessions, in which the use of specific mathematical principles will be described and demonstrated. In the second talk: *Computer Science and Computer Systems Engineering at University*, Prof Mathai Joseph will review the content of the principal undergraduate computer related degrees offered at Warwick, and consider the academic requirements and prospects for students following these courses. In the final talk: *Computer Power and Mathematics in the Sixth Form*, Dr David Tall will discuss radical new teaching methods - and new insights into the mathematical education process - based upon the use of computers in the sixth form.

The day's proceedings will end with a brief discussion, at which there will be a further opportunity to consider future directions for collaboration, perhaps with a view to eventually establishing an advisory group comprising senior teachers and representatives from higher education, the DES or DTI, and the computer industry. A detailed timetable is overleaf.

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