

FACS FACTS



The Newsletter of the BCS Formal Aspects of Computing Science Special Interest Group.

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Editorial

In 1979, within the UK, the FACS community was a small, geographically dispersed group of people who felt they had a partial answer to not only developing our discipline but also to developing better computer based systems. BCS-FACS had started the year before holding meetings which continued on trains taking us home. The FACS group was indeed a community but in the McLuhan sense. The meetings were a great success but not everyone who wished to could attend them, also the community had a zeal to spread the good word. What was needed was a parish magazine to record and publicise the meetings and to provide a further channel to disseminate ideas. As McLuhan said 'an eye for an ear'.

With such thoughts in my mind I penned the editorial for FACS FACTS Vol. 1 No.1. I still feel such aims are pertinent as I write this great editorial for the last issue of FACS-FACTS. In the intervening years much has grown from the FACS acorn. We have become a much broader based church, we have a much larger congregation, we have had our non-conformist movements (FX Reid mailed me to add his best wishes to all readers) and a much larger audience are listening to the things we are saying. Despite all this the newsletter has retained its character of the parish magazine and has served a very important role in BCS-FACS.

When the next issue appears as "FACS-Europe" I hope it will continue to thrive and to undertake the role it has played for the past 15 years. Perhaps we shall even invent the Revue Paroissiale.

Dan Simpson

Correspondence Column

As we said in previous issues, we will start a column for correspondance . . . just as soon as we get some! We hope this will become a general forum for technical questions and queries, answers and replies, and of course just comments of a general nature. We look forward to hearing from you!

If you want to send a letter or email the FACS Europe newsletter, write to Ann Wrightson at:

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or preferably by e-mail to annw@uk.ac.uclan.sc.

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Announcing

FACS Europe

The Newsletter for BCS FACS & Formal Methods Europe

Coming September 1993

FACS FACTS is to be reborn as '**FACS Europe**' from the next issue. This means that your newsletter will have an extended distribution, embracing the mailing list for Formal Methods Europe as well as the UK based BCS FACS membership.

Formal Methods Europe (FME) is the successor to VDM Europe; FME was set up to widen the scope of VDM Europe to include other methods and more generally to provide a convenient and effective way for European industry to obtain information about formal methods. FME is an association sponsored by the European Commission (DG III). Its mission is to stimulate the use of formal methods in European industry and to provide a meeting place for the European formal methods community, with an emphasis on industrial providers and users, either current or potential.

We hope that this increased audience and readership will encourage *you* to consider contributing articles and material to your Newsletter. As you know, articles should have some relevance to the Formal Methods community at large, containing some technical content. But please bear in mind that this is a *Newsletter* — we do not have the resources to conduct formal reviews. In practice this means we cannot accommodate submissions of a length and completeness which is usual for strong technical papers: they really ought to be submitted elsewhere.

We hope that future issues will contain topics such as:

- Technical columns in specific areas: *Z, VDM-SL, Raise, Term Rewriting, Refinement, Process Algebra, ...*
- Regular features, such as *Forthcoming Events*
- Contributed articles on topics with relevance to Formal Methods
- General correspondence to the Newsletter
- Survey articles on technically relevant topics
- Site reports from fellow industrial/academic sites ...

BCS FACS MEMBERSHIP REMINDER

Many thanks to all our readers who have already renewed their FACS membership for 1993. To those of you who have not yet done so, please fill in the forms, write out the cheque and send to Loughborough ASAP. Details of fees can be found on the back cover of this newsletter.

Now that the newsletter has been revamped, it seems a pity to include 'tear out' forms within its pages so, if you have mislaid the forms, please email or phone for replacements.

Currently we are liaising with EATCS with the aim of being to update their records directly. When this is done we should be able to lessen the paperwork next year. Indeed we seem to be moving closer to performing the role of an EATCS chapter.

We are also collecting a large number of email addresses. When a critical mass has been achieved we shall supplement our usual direct mailings with broadcast email notices.

Please help us to maintain and improve the service we offer to the Formal Methods community and especially to yourself.

Best wishes,

John Cooke
FACS Membership Secretary

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The following short article has been submitted for inclusion in the new BCS/IEE Software Engineering Journal "personal view" column. Comments are welcome. In particular, we are looking for good examples of epideictic or apodeictic use of formal notations.

Formal Methods: Epideictic or Apodeictic?

If you are confused by the title above you are in the same boat as the vast majority of software producers when confronted with a display of formal methods. The easiest option when dealing with an activity whose benefits are doubtful and which looks impenetrable is to ignore it and do without. This is precisely what most software developers do and not necessarily to the detriment of their business (unless this business has safety implications); witness Microsoft, which makes millions of dollars selling MS-DOS and Windows without a single quantifier in sight¹. Even a successful mathematical product such as *Mathematica*, which supports the interactive computer-based use of mathematics, consists of the order of a million lines of C-based code produced with no formal development.

Despite the unfriendly face of some formal methods some people do use them for commercial development. We pose the question, "For what purpose are they used?" Are they epideictic (*ἐπίδειξις* = show off, exhibition) or are they apodeictic (*ἀπόδειξις* = clear demonstration, proof)? Let us examine the motivation, benefits and dangers with both scenarios.

Ἐπίδειξις may be motivated by the desire to demonstrate adherence to some process quality criteria such as, for instance, are

¹If we are wrong, then Microsoft Windows would be the most secret, biggest ever application of formal methods and you need read no further!

established by the 00-55 UK MoD Interim Defence Standard. The benefits of such an, apparently shallow, approach are substantial. The use of these methods enforces a strict discipline of design and implementation which encourages proper exploration of the problem space. It also supports disciplined design reasoning. The inherent danger is the assumption that the use of the methods *per se* or adherence to a standard will necessarily deliver dependable software. Another epideictic factor may be the desire to increase company prestige and establish competitive advantages. A software contractor with a reputation in the use of formal methods is likely to be perceived as a mature, expert provider in certain markets and well this might be so.

Ἀπόδειξις is what some people would claim and believe, discharges all the correctness issues associated with software. The benefits of proofs (which are in fact a detailed and disciplined analysis of a system) are clearly substantial in that they demonstrate that certain classes of errors have been eliminated or made very unlikely. On the other hand, proofs and their technology must not be interpreted as infallible manifestations of truth; errors may occur in axioms and models, during formal reasoning, or in the implementation due to incorrect assumptions about the environment. In other words, proofs deal in abstractions, not physical systems.

We can also pose the question, "Are formal methods clearly established in the field of software engineering?" The answer is "Unfortunately, no." We say "unfortunately" not because of formal methods religiosity but because detailed, logical analysis would benefit many software projects. The number of formally developed, or even formally specified, lines of code in the world is an extremely small percentage of the total in existence and still being produced. The largest companies involved with software have of the order of tens of millions of lines of code to maintain, even for real-time critical systems, and this can be increasing on the order of millions of lines of code per year. However formal methods do hold out some hope for improvement in the quality of both documentation and software. The following are examples taken from actual documentation and a licence agreement for software currently in use. The names and other clues have been removed to protect the guilty.

*The rules for how * combines your filename with the suffix (the thing passed to *) are rather complicated, but the basic idea is that the "obvious" name is chosen.*

*Limited Warranty. * warrants that for a period of ninety (90) days from the date you purchased a license to it, the Software, if operated as directed, will substantially achieve the functionality described in the Documentation. * does not warrant, however, that your use of the Software will be uninterrupted or that the operation of the Software will be error-free. ...*

Such cavalier attitudes would be unacceptable in other more mature engineering disciplines. Would you buy a washing machine without a year-long guarantee

which may or may not work if you fathom the "rather complicated" instructions? The use of formal methods has been shown to improve software quality by providing answers to questions which would not have been posed otherwise (e.g., on the IBM CICS project at Hursley Park in the UK). And therein lies the true value proposition of formal methods to the software industry. Whether these methods are branded as *ἐπίδειξις* or *ἀπόδειξις* their true worth lies in their ability to increase understanding of a system, particularly in the early stages of the design process, by performing *ἀνάλυσις*.

Jonathan Bowen and Victoria Stavridou

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MS-DOS is a registered trademark of Microsoft Corp. Windows is a trademark of Microsoft Corp. Mathematica is a registered trademark of Wolfram Research, Inc. CICS is a trademark of IBM.

Report on Z User Meeting, London 1992

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The last Z User Meeting ("ZUM'92") was held in London on 14–15 December 1992. As the 7th annual meeting in the series, it may be considered a fairly venerable institution in formal methods terms. The theme for the meeting was the industrial use of Z which made the location of the meeting at the offices of the UK Department of Trade and Industry particularly apt. With this in mind, all four of the invited speakers were from industry. In addition there was a good mix of attendees from both academia and industry. Of the just over a hundred participants, approximately half were from industry. About half the authors of the papers presented at the meeting were also from commercial organisations. This healthy melange of backgrounds makes for a good atmosphere in encouraging the technology transfer of formal methods. At this meeting, longer breaks between the sessions were provided, which helped significantly in allowing personal contacts to be cemented; this has always proved to be a very important role of the Z User Meetings.

Old hands at Z User Meetings will know that John Nicholls has been the main organiser and driving force of these meetings. Unfortunately John was unexpectedly hospitalised during the 1992 meeting. John Wordsworth of IBM stepped in at short notice and introduced the meeting and opening session. Happily, John Nicholls is now fully recovered and

plans to continue work on the proposed Z Base Standard (now accepted for ISO standardisation).

At the meeting, special sessions were held on language issues, reuse and tools, safety-critical systems, object-oriented systems, information systems, methods and quality, and timing related specifications. Of the invited speakers, Dan Craigen (ORA, Canada) presented a recent international survey on the industrial application of formal methods; Andrew Bradley of British Aerospace gave an interesting talk on management issues in the safety-critical systems session, with particular reference to the MoD 00-55 Interim Defence Standard; Elspeth Cusack described the use of Z in communications engineering at BT; and Glyn Normington presented his experiences of combining Cleanroom techniques from the US with the use of Z at IBM Hursley. A number of presentations from the DTI/SERC sponsored ZIP project were made during the meeting on the proposed Z standard and other Z-related activities such as tools and methods. Throughout the meeting, there were a number of Z tools on demonstration, including proof tools, as well as stalls displaying a range of books from several publishers.

During 1992, the Z User Group (ZUG), which has always previously had a rather unofficial status under the auspices of the Programming Research Group at Oxford, was form-

ally inaugurated. The first ZUG Annual General Meeting was held during the evening of the first day of the Z User Meeting. A constitution was adopted and the existing Z User Meeting programme committee, together with Jonathan Jacky of the University of Washington, the first North American representative, were elected as ZUG committee members. The following officers were elected: John Nicholls (Chairman), Jonathan Bowen (Secretary) and Mike Hinchey (Treasurer). In the absence of John, Mike chaired the meeting. Possible affiliations with the BCS FACS specialist group and Formal Methods Europe (FME) were discussed and it is hoped that all three organisations will co-ordinate with each other over future related activities to the benefit of the formal methods community at large.

Later on in the evening, Prof. Darrel Ince of the Open University provided a jocular and enlightening after dinner speech on his experiences of industrial methods, formal and otherwise, which seemed to be enjoyed by all present.

The general comments from participants during and after the meeting were favourable (apart from the perennial complaints about the food of course). It was particularly pleasing to welcome a sizable minority of foreign attendees from Australia, Canada, USA and continental Europe, several of whom commented on the real UK industrial interest in formal methods that was evident from the meeting.

As always, Joan Arnold at the Programming Research Group provided invaluable secretarial help in organising and being on hand during the event. Finally, thanks must go to Simon Attwood at the DTI for help before and particularly during the meeting.

The published proceedings will be available from around June 1993 and details of this and previous proceedings are included elsewhere in this newsletter.

Subsequently to the meeting it has been decided to hold the next Z User Meeting on 29–

30 June 1994 in Cambridge in association with BCS FACS for the first time. We welcome FACS members to contribute to and attend this meeting; a registration discount for members will be available. A Call for Papers is included in this issue of the newsletter. The change of time of year from the traditional December slot was made to allow the published proceedings to be distributed at the meeting and also to provide more clement weather!

Progress Report on the VDM-SL Standardization Process

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In the week following the FME conference in Odense, the ISO working group working on the VDM-SL Standard met to decide on the next step for the VDM-SL ProtoStandard. A draft of the Standard had been circulated by both ISO and the CEC in February, and versions had been available by anonymous ftp since January from sites in both Europe and the United States (thanks to NPL, Delft University and Digital).

Technical comments on this draft had been received from Japan, New Zealand, and later, from Canada. Those that pointed out problems are currently being incorporated in the draft. Other major decisions made at the meeting were mainly on technical matters, rather than the content of the ProtoStandard.

Conformance

The current conformance clauses described the requirements of tools rather than of specifications. Input from members of the committee not present at the meeting and from tool developers indicated that full conformance would be difficult to obtain. Because of this it was agreed that various levels of conformance would be allowed, and that these levels could be defined against the static semantics.

The working group therefore recommended that the following five levels of conformance be accepted:

A specification was conformant at level zero if it was syntactically correct, and could be translated from the outer abstract syntax to the core abstract syntax.

Level one conformance would be possibly conformant with an empty set of checks as defined by the static semantics.

Level two conformance would be at least one of the possible checks as defined by the static semantics. The checks to be done must be specified and there must not be an empty set.

Level three was that all static checks as defined by the static semantics were performed and the specification passed.

Level four means that the specification will conform to the dynamic semantics — this is a tricky one!

Informative Annex on Extensions and Subsetting

The Working Group recommended that information on how extensions and subsetting of the specification language should be handled would be by an informative annex and not by the conformance clauses. It was agreed that it was necessary to consider subsets of the language as it was possible to identify an executable subset of VDM-SL which would be suitable for both prototyping and software development. The informative annex would define how such extensions and subsets should be handled. (For those not familiar with "ISO-speak", an annex is advisory, and is not really part of the standard.)

Modules

The ISO standardisation activity has already been divided into two projects. One to standardise the VDM-SL flat language, the second to add a module structure. One of the main requirements of a structuring mechanism

is that it should allow separate reasoning about a module. Because of this requirement there may be a need to restrict VDM-SL when introducing a generalised module structure. It should be noted that when deriving proof rules for the flat VDM-SL languages certain constructs have been restricted in their application.

The main requirement for modules should be to respect the aim for separate reasoning. There are two approaches to modularisation:

1. Modules that are principally useful for the structuring of specifications, intended to solve the problem of packaging and hiding as the motivation for the facilities they provide.
2. Modules that are integrated with proof rules so as to support separate reasoning.

The drawback is that this may require changes to the VDM languages. It should be noted that the changes are more to *restrict* features of the language rather than to provide different meanings to known constructs. However, the implications of modules to support separate reasoning are not fully known at present and it is necessary to know what can be done with modules and what trade-offs may be necessary between language features and module features, e.g. the existing language with hiding but no separate reasoning versus a subset of the language and modules which do support separate reasoning. It should be noted that there may be a similar trade off to be made for deriving proof rules.

Committee Draft

Those present voted unanimously that the current ProtoStandard (N-246B) be submitted as an ISO CD (Committee Draft) with the following changes:

1. known typographical errors to be fixed;
2. the new conformance rules should be incorporated;
3. any changes required by resolving the Issues List to be incorporated;
4. an annex describing the requirements of modules should be added; and
5. an annex on extensions and subsetting to be added.

The technical content of the CD will be identical to the ftp version (N-246B) except for the items discussed as part of the Issues List. (In "ISO-speak" CD = Committee Draft = preliminary version of the Standard for public consumption.)

Timetable

May/June Various typographical and technical errors to be fixed. New version of the protostandard to be produced as a Committee Draft. Email votes to be sought from those members who did not attend this meeting.

September The Committee Draft be distributed for ISO comment.

March 1994 Tentative end of the CD comment period. Comments to be collated and responses drafted. This work to be done using Email.

It should be noted that the exact date of the ISO meeting is to be set early in the New Year to check how other deadlines have been proceeding. The next meeting of the ISO Working Group to be held in London in July or September under the auspices of the BSI.

Report on the 2nd BCS FACS meeting on Measurement

Julian Rose
University of Bristol

This is a short report on the 2nd BCS FACS meeting on Measurement, which was held at Bristol University on 29th March 1992. Software measurement is introduced and the state-of-the-art as perceived at the meeting is summarised.

1 Introduction

Software measurement consists of the activities and tools associated with measuring software products and processes. By a software product we refer to computer programs, software specifications, design models, and so forth, all of which may be thought of as artefacts of some kind. A software process is generally understood as an activity undertaken by people in the manufacturing of software products, including those associated with both project management and the life-cycle.

The purpose of measurement is to provide a basis for making engineering and management decisions. It would be hard to imagine how the traditional engineering disciplines could have evolved without measurement, and yet the matter has rarely been brought to bear in software engineering practice to good effect. Recent developments in software engineering are redressing this unfortunate state of affairs, and new areas for application and practice are emerging.

2 Software Engineering and Measurement Practice

'Software Engineering' is the term used to describe an engineering approach to the development of software systems. It includes the activities associated with managing, planning, modelling, analysing, designing, implementing, testing and maintaining, as applied to software systems. The term 'software system' refers not only to computer programs and architecture, but also to all documentation that is necessary for software construction, use, and maintenance.

Software engineering is arguably the dominating factor in applied computing today, where considerable effort is being expended to establish good engineering practices. Engineering might be defined as the application of science and mathematics in society, and engineering disciplines use methods that are underpinned by models and theories that have evolved out of the classic engineering domains in which measurement is the basis.

2.1 Modelling Techniques in Practice

Models are the foundation of engineering design and project management. They are mathematical artefacts used to describe the subject matter of interest. The mathematical basis of the different models provides us with various properties that might be analysed, which can be applied depending upon known project requirements. For example, if we wish to analyse the structural properties of some software product, then we may represent the product using a graph-based model which makes such analysis accessible. If, instead, we wish to analyse the state-based properties of the product, we could represent it using a set-theoretic model. Use of different kinds of model for the analysis of software products and processes provides us with a *formal* approach to software development.

'Formal Methods' is a general term often used to describe a mathematical approach to the development of software products. The techniques associated with formal methods are traditionally applied at the specification and design stages of the software life-cycle.

The main aim of applying formal methods is to help with the production of good quality software. A formal description technique is used to make a structured mathematical model of the subject matter, which may be analysed for certain properties. The results from analysing a model in turn provide engineering reasons to develop the software product it represents. Once the model has been satisfactorily analysed, the product can be transformed into an implementation.

Where formal models are often associated with the description of software products, there exist modelling techniques that describe software processes. A data flow diagram is one example, where the flow of information around an information processing system is described. When we model a software process, an attempt is made to provide key information for the control and management of software development. A classic example of such modelling is software engineering economics, where we wish to analyse risks, uncertainties, and so forth, throughout the project life-cycle.

2.2 Empirical Techniques in Practice

It is often not possible to model a software product or process. This will be the case when too little is known about the mathematical basis or relationships involved. In such instances we can turn to a scientific approach to analysis and measurement, or an *empirical* technique.

An empirical approach to software modelling essentially involves conducting an experiment with the aim of observing some specific relationship. In an experiment, there is a stated objective to determine which attributes strongly influence others, such that the relationships might be applied as observers or predictors. As the relationships between attributes become better understood, by continued practice and experience, they may become regarded as the basis for a model. Furthermore, continued empirical and observation studies of real applications serve to validate the models that have been developed.

2.3 Measurement Techniques in Practice

Software measurement is used in the analysis of domain models, to effect engineering or management decisions. We can apply software engineering measurement at all stages of the life-cycle, however, the earlier the better. Engineering measurement is best applied early in the project life-cycle so that it can be used as a prediction tool, rather than a post-development tool. A predictor measure is one that is used to predict the value of a property of a software product or process that will only become known during a later stage of development.

Software managers can apply measurement throughout the project life-cycle, to effect control and quality. Control is exerted by applying measurement to the software processes involved with the project development, while quality is established by applying software product measures. An understanding of the models of software products and processes, and the measures associated with them, helps us to deliver good quality software in good time.

Software product measures provide us not only with technical information, but also with management information about the quality of the developed software. Indeed, project managers may establish the required quality of software products using measures, set off against the cost overheads involved in achieving that standard of development. Such an approach may be used with certain national and international standards.

Software process measures are usually used to make observations to do with the activity of manufacturing software products, and can be used by engineers and managers alike. For example, certain project attributes may be measured, such as project schedule, security, resources, and so forth. In a similar way to product measures, certain values for measures may be chosen to establish the required level of attainment. In addition, achieved measures indicate the state of play.

3 The 2nd BCS FACS meeting on Measurement

The theme of the 2nd BCS FACS meeting on Measurement was "Practical Applications of Formal Software Measurement". It had as its aim the presentation and discussion of applying various modelling techniques, as outlined above, for the activities associated with software development.

3.1 About the meeting

The 2nd BCS FACS meeting on Measurement was jointly hosted by the BCS FACS (Formal Aspects of Computing Science) group and the Faculty of Engineering at Bristol University. It saw attendees from a wide variety of organisations, including both industry and academia, and from a wide variety of backgrounds, including technical and managerial. It provided an opportunity for people to find out about activities and developments in the measurement arena, and to come away with a clear picture of current application areas for formal software measurement.

The meeting was a one-day event divided into four sessions, two in the morning and two in the afternoon. The agenda is given below.

Registration	09.00 - 09.30	
Session 1	09.30 - 10.30	State of the Art <i>Martyn Thomas from Praxis plc</i> Measurement-based Software Quality Assurance <i>Norman Fenton from City University</i> Software Standards Evaluation
Refreshments	10.30 - 11.00	
Session 2	11.00 - 12.30	Applications in Industry <i>Mark Norris from British Telecom plc</i> Software Measurement in BT <i>Nicholas Ashley from Brameur Ltd.</i> Defect Analysis <i>Martin Neil from Lloyds Register plc</i> Software Process Improvements
Lunch	12.30 - 14.00	
Session 3	14.00 - 15.30	Applications in Academia <i>Martin Shepperd from Bournemouth University</i> Constructing Measurement Functions <i>Pat Hall and Hong Zhu from the Open University</i> Test Adequacy Assessment <i>Robin Whitty from South Bank University</i> Implementing a Company Measurement Scheme
Refreshments	15.30 - 16.00	
Session 4	16.00 - 17.00	Panel discussion of the theme
Close	17.00	

The first three sessions consisted of a series of focused presentations that addressed the theme from a variety of viewpoints, and the fourth session was a panel discussion on the theme where lively topics were debated by the participants and presenters from the first three sessions. Presentations were made by prominent speakers from both industry and academia, all of whom have up-to-date experience in software measurement.

3.2 Summary of the meeting

Rather than attempt to recount the presentations themselves, the author highlights the salient points and while accuracy is hoped for, this interpretation lies solely with him. In the state of the art session, the participants heard about the role measurement has to play in software development standards. According to the definition of British standards (BS-0), the software standards available today, for example 00-55, are not standards at all. There is no formal way to check that software adheres to a standard, a role for which measurement is under study.

It was made clear that the key issue of software measurement is to know what you want to measure. An issue of near equal importance is to know what action is to be taken following a measure. These issues lead to a review of current industrial practice.

In the industrial applications session, we heard about the current practice of British industry as represented by the speakers. A common theme here is the requirement for straightforward application, where the theory has little, if any, importance. This is the case in practice because measures are used mostly to indicate or highlight problem areas, and in general the actual measurement value does not matter. What does matter is common sense.

There are two main issues for industrial application of software measurement. The first is the presentation of information about the software development process, using, for example, line graphs, bar charts or diagrams that highlight problem areas. The purpose of such presentation is mainly to impact upon software managers, enabling them to make effective policy decisions. The second issue, which was not widely debated at the meeting, is the use of software product measures mainly of use to software developers. Such measures need not have impacting presentation, and are provided to supply developers with snap-shot information.

The academic session accorded practical needs with their underlying theories, in an attempt at discussing technology transfer. The common theme here is the need to produce meaningful measures that can be applied. A main issue is the use of a model and the validation of measures for it. One of the most studied applications in this area is the testing of software, where measures can be used to tailor the testing requirements. Getting this right depends largely upon the acceptability of certain axioms.

Perhaps the most important issue arising from the academic session is the need for technology transfer. There was a good debate by the participants about the selling of academic developments in software measurement to industry. This is very important since it addresses how the boundaries of academia and industry are bridged, as we put measurement theory into practice. An overriding concern is the simplicity and meaningfulness for applying software measures to real problems experienced by both software developers and software managers.

4 Conclusions

In the author's opinion, software measurement remains immature. Software measures will be mature when they provide salient and meaningful information to the people that use them. Although admittedly software measurement research lags behind research in formal methods of software engineering, they both suffer from poor usability. What practitioners want from software measurement is a development tool in their toolkit that works simply, meaningfully and without the need for specialist knowledge. This implies that software measurement specialists should integrate their work with desktop GUI tools.

Audited FACS accounts for the year ending 30th April 1993

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Receipts:	
Members subscriptions (all classes)	2050.00
Interest from savings accounts	666.53
Events income (gross)	7369.64
Subscriptions collected for FACJ/EATCS	2566.53
Total:	12652.70
Payments:	
Committee expenses	1100.70
Mail/services	799.87
Events expenditure	7186.27
Subscriptions passed on for FACJ/EATCS	2706.00
Total:	11792.84
Total at bank and building society	25799.39
(compared with previous year)	24939.53

All figures quoted above are in Pounds (£) sterling.

BUT

The BCS owes FACS £1726.61 in VAT claims.

AND

FACS owes Springer Verlag £1716.00 for FACJ subs not yet passed on.

FACS owes EATCS £718.00 for subs not yet passed on.

FACS owes Sheffield Hallam University £1000.00 for printing 3 editions of FACS-FACTS.

Notes:

Membership subscriptions down slightly this year

Refinement workshop (Jan 92) made profit of £643.25

Christmas workshop made a loss of £182.28

Once again thanks to Carys Bez for her careful work during the year in keeping the books and making the VAT returns to BCS H/Q. Thanks also to Steve Hughes for auditing the accounts in time to meet the BCS H/Q deadline.

FME'94 Symposium Preliminary Announcement and Call

The second Formal Methods Europe Symposium will be held in October 1994 in Barcelona, hosted jointly by Inisel Espacio, IN-novació and the Engineering School "La Salle" of Ramon Llull University, and organised by Formal Methods Europe (FME), who are supported by DG XIII of the European Commission. The objectives of FME are to stimulate the use of formal methods by European industry and to provide a forum for the formal methods community, especially industrial users and providers. FME holds industrial seminars throughout the European Community and holds a major conference every eighteen months. The FME symposia are the successors to the previous four VDM Europe symposia.

The theme of FME'94 will be the application and demonstrated industrial benefit of formal methods, their new horizons and strengthened foundations.

Barcelona, which is in Catalonia in the north-east of Spain, is Spain's second largest city. It is very well connected with Europe through daily flights and the town provides a very good hotel infrastructure resulting from tourism, international events and the former XXV Olympic Games. It offers a wide range of cultural life, international shows, gastronomy and shopping.

The conference will comprise Tutorials, a Symposium, a Tools Exhibition, Project Reports and posters. Those interested in submitting a paper, tutorial or project report, or who wish to demonstrate a tool should in the first place contact the programme chair:

Tim Denvir
c/o Lloyd's Register
Lloyd's Register House
29 Wellesley Road
Croydon CR0 2AJ
UK
Telephone: +44 (0)81-882 5853
Fax: +44 (0)81-882 3118
e-mail: timdenvir@cix.compulink.co.uk

Sponsors for the event will also be welcomed. Sponsors of FME'93 were:

*Computer Resources International (CRI), DDC International,
Deutsche System Technik, Fyns Telefon, ICL Data AIS (SUN Division)
Lloyd's Register, Odense Steel Shipyard Ltd., Praxis,
Scandinavian Airlines System (SAS), Space Software Italia,*

Organisations interested in sponsoring FME '94 should likewise contact the programme chair.

FORTHCOMING EVENTS

1993

June 14-16 PEPM'93

ACM Symposium on Partial Evaluation and Semantics-Based Program Manipulation,
Gothenberg, Sweden. *Sponsor:* SIGPLAN. *Contact:* John Launchbury, Comp. Sci. Dept., Glasgow Univ., Glasgow, G12 8QQ, UK; Tel +44 41 339 8855 x6053. Email: jl@dcs.glasgow.ac.uk

June 14-17

The Fifth Asian Logic Conference,

National University of Singapore, Republic of Singapore. *Contact:* The 5th ALC, Department of Mathematics, National University of Singapore, Singapore 0511, Republic of Singapore. Email: matlogic@nuscc.nus.sg Or matlogic@nusvm.bitnet

June 14-18 Parle'93

Munich, Germany. *Sponsor:* ESPRIT Programme and ECRC. *Contact:* Parle'93, ECRC, Arabellastr. 17, 8000 Munich 81, Germany, tel +49 89 92 69 90, fax +49 89 92 69 91 70. Email: parle@ecrc.de

June 15-18

7th International Symposium on Methodologies for Intelligent Systems,

Trondheim, Norway. *Contact:* Jan Kmorwski, Univ. of Trondheim, Norwegian Institute of Technology, Dept. EE and Comp. Sci, N-7034 Trondheim, Norway. Email: janko@idt.unit.no Or Zbigniew W. Ras, UNC-Charlotte, Dept. of Comp. Sci., Charlotte, NC 28223.

June 16-18 RTA-93

Fifth International Conference on Rewriting Techniques and Applications,

Montreal, Canada. *Contact:* Claude Kirchner, RTA-93, INRIA Lorraine & CRIN, Campus scientifique, 615 rue du Jardin Botanique, BP 101, 54602 83 27 83 19. Email: Claude.Kirchner@loria.fr Or Mitsuhiro Okada, RTA-93, Department of Computer Science, Concordia University, H3G1M8 Montreal, Quebec, Canada, tel. +1 (514) 848 30 48, fax. +1 (514) 848 28 30. Email: RTA93@concour.cs.concordia.ca

June 16-18 SEKE'93

5th International Conference on Software Engineering and Knowledge Engineering,

San Francisco, CA., USA. *Contact:* Bruce I. Blum, Applied Physics Laboratory, Johns Hopkins Univ., Laurel, MD 20723-6099; tel: (301) 953-6235; fax: (301) 953-6904. Email: bib@aplcomm.jhuapl.edu Or C.L. Chang, Lockheed S/W Tech Center, Org 96-10, Bldg. 254E, 3251 Janover St., Palo Alto, CA 94304; tel: +1 (415) 424-5379; fax: +1 (415) 424-2999. Email: chang@stc.lockheed.com

June 20-23 LICS

Eighth Annual IEEE Symposium on Logic in Computer Science,

Montreal, Canada. *Contact:* Prof. R. Constable, Department of Computer Science, Cornell University, Ithaca, NY 14853, USA. Email: rc@cs.cornell.edu

June 21-25

The 14th International Conference on Application and Theory of Petri Nets,

Bismarck Hotel, Chicago, USA. Petri Nets'93. *Contact:* Prof. T. Murata, Dept. of EECS (m/c 154), Univ. of Illinois at Chicago (UIC), P.O. Box 4348, Chicago, IL 60680, USA. Email: pn93@uicbert.eecs.uic.edu

June 21-25 ICLP'93

Tenth International Conference on Logic Programming,

Budapest, Hungary. *Contact:* L. Plumer, University of Bonn, Institute for Computer Science III, Romerstrasse 164, D-5300 Bonn1, Germany. Email lutz@uran.Informatik.uni-bonn.de

June 21-25 SIGPLAN'93

ACM SIGPLAN Conference on Programming Languages Design and Implementation,

Albuquerque, NM, USA. *Sponsor:* SIGPLAN. *Contact:* Robert Cartwright, Rice Univ., Dept. of Comp. Sci., Houston, TX 77521, tel +1 (713) 527-6042. Email: cork@rise.edu

June 21-3 July

Fifth International School for Computer Science Researchers "Specification and Validation Methods for Programming Languages and Systems",

Lipari Island, Italy. *Contact:* Prof. A. Ferro, Dipartimento di Matematica, Citta Universitaria, Viale A. Doria, 6, 95125

Catania, Italy. Email: school@mathct.cineca.it

June 22

Computer Supported Cooperative Work, Petri Nets and Related Formalisms,

Chicago, USA *Contact:* G. De Michellis, University of Milano, Via Comelico 39, 20135 Milano, Italy.

Email: gdemich@hermes.dsi.unimi.it. Or C. Ellis, University of Colorado at Boulder, Boulder 80309, USA. Email: skip@cs.colorado.edu

June 22

ACM SIGPLAN'93 Workshop on State in Programming Languages,

Albuquerque, NM, USA. *Contact:* Prof. P. Hudak, State Workshop'93, Department of Computer Science, Yale University, 51 Prospect Street, New Haven, CT 06520-2158, USA. Email: state-workshop@cs.yale.edu

June 22-24 FTCS 23

The Twenty Third Annual International Symposium on FaultTolerant Computing,

Toulouse, France. *Sponsors:* IEEE Computer Society and LAAS-CNRS in cooperation with AFCET and IFIP WG 10.4 *Contact:* Marie-Therese Ippolito, LAAS-CNRS, tel: +(33) 61 33 62 74, Fax: +33 61 55 35 77. Email: Marie-Therese.Ippolito@laas.fr

June 22-25 AMAST

Third International Conference on Algebraic Methodology and Software Technology,

University of Twente, Enschede, The Netherlands. Abstract to: AMAST Conference, University of Twente, Fac. Informatica, PO BO 217, NL-7500AE Enschede, The Netherlands. Or Canada: V.S. Alagar, Concordia University, Dept. of Computer Science, 1455 De Maisonneuve Blvd. West, Montreal, Quebec H3G 1M8, Canada, Tel. +1 514 8483022, Fax. +1 514 8483000. Email: alagar@concour.cs.concordia.ca Or Europe: Charles Rattray, University of Stirling, Dept. of Mathematics and Computing Science, Stirling, Scotland, FK9 4LA, UK, Tel. +44 786 73171, Fax. +44 786 64551. Email: cr@cs.stir.ac.uk Or USA: Teodor Rus, University of Iowa, Dept. of Computer Science, Iowa City, IA 52242, USA, Tel. +1 319 3350742, Fax. +1 319 3350627. Email: rus@cs.uiowa.edu

June 24-25 ICLP'93

Tenth International Conference on Logic Programming,

Budapest, Hungary. *Contact:* M. Carlsson, SICS, PO BOX 1263, S-16428 Kista, Sweden, fax +46-8-7517230. Email: matsc@sisc.se

June 28-30 LP&NMR-93

2nd International Workshop Logic Programming and Non-Monotonic Reasoning,

Lisbon, Portugal. *Contact:* Anil Nerode, Mathematical Sciences Institute, Cornell Univ., Ithaca, NY 14853.

June 28-30 ISSTA 1993

International Symposium on Software Testing and Analysis,

Cambridge, MA, USA *Sponsor:* ACM SIGSOFT *Contact:* John Gannon, Dept. of Computer Science, University of Maryland, College Park, MD 20742, USA. Tel.: +1 (301) 405-2671. Email: gannon@cs.umd.edu

June 28 - July 1

Fifth Conference on Computer-Aided Verification,

Heraklio, Crete, Greece. *Contact:* Costas Courcoubetia, University of Crete, Department of Computer Science and Institute of Computer Science, FORTH, PO BOX 1385, GR-7110, Heraklion, Crete, Greece. Email: courcou@csi.forth.gr

June 28 - July 3

International Conference on Formal Methods in Programming and Their Applications,

Novosibirsk, Russia. *Contact:* M. Bulyonkov, Institute of Informatics Systems, 6, Acad. Lavrentyeva Av., 630090 Novosibirsk, Russia. Email: mike@isi.itfs.nsk.su

June 28 - July 9

First International Summer School in Logic for Computer Science,

Le Bourget-du-Lac, France. *Contact:* M. Parigot, School LCS, Laboratoire de Logique, UFR de Mathematiques, Universite Paris 7, 2 place Jussieu, 75251 Paris Cedex 05, France. Email: school@logique.jussieu.fr

June 29 - July 2

International Conference on Number Theoretic and Algebraic Methods in Computer Science,

Moscow, Russia. *Contact:* I. Shparlinski, Dept. no. 4, ICSTI, Kuusinena str., 21 B, Moscow, 125252, Russia, Fax +95-9430089. Email: shparlb.icsti.su

July 5-9 ICALP'93

20th International Colloquium on

Automata, Languages, and Programming,

Lund, Sweden. *Contact:* Prof. Rolf Karlsson, Department of Computer Science, Lund University, S-221 00 Lund, Sweden. Email: icalp93@dna.lth.se

July 7-9 SEE'93

Conference on Software Engineering Environments,

Reading, United Kingdom. *Contact:* Ray Welland, Comp. Sci. Dept., Univ. of Glasgow, Glasgow, G12 8QQ, UK; Tel +44 41 330 4968; Fax +44 41 330 4913. Email: ray@dcs.glasgow.ac.uk

July 12-15

Developments in Language Theory,

Turku, Finland. *Contact:* A. Salomaa, Mathematics Department, University of Turku, SF-20700 Turku, Finland, fax +358-21-6336595

July 13-20 LPAR'93

Fourth International Conference on Logic Programming and Automated Reasoning,

St. Petersburg, Russia. *Contact:* LPAR'93 ECRC, Arabellestrasse 17, 8000 Munich 81, Germany.

July 17-22

5th International Conference on Genetic Algorithms,

Urbana-Champaign, IL. *Sponsor:* International Society for Genetic Algorithms. *Contact:* Stephanie Forrest, Dept. of Comp. Sci., Univ. of New Mexico, Albuquerque, NM 87131-1386. Email: icga@unmvax.edu

July 19-23 CASE 93

Sixth International Workshop Computer-Assisted Software Eng.,

Singapore. *Contact:* John Junkins, City Univ. London, School of Informatics, Northampton Sq., London, EC1 0HB, UK, phone +44 (71) 477-8410; Fax +44 (71) 477-8588. Email: sb308@city.ac.uk

July 20-August 1

Marktoberdorf Summer School "Proof and Computation",

Marktoberdorf, Germany. *Contact:* Faculty of Computer Science, Technical University of Munich, Summer School, PO BOX 202420, W-8000 Munich 2, Germany.

July 26-30 ECOOP'93

Seventh European Conference on Object-Oriented Programming,

Kaiserslautern, Germany. *Contact:* W. Olthoff, ECOOP'93, Organizing Chair, German Research Center for AI, PF 2080, 6750 Kaiserslautern, Germany; Fax +49-631-2053210. Email: ECOOP93@dfki.uni-kl.de

July 26-30

7th European Conference on Object Oriented Programming,

Kaiserslautern, Germany. *Sponsor:* DFKI in coop. w/SIGPLAN. *Contact:* Gerhard Barth, DFKI, PO BOX 2080 Kaiserslautern 6750 Germany; Tel +49 631 205 3213. Email: barth@dfki.uni-kl.de

August 13-24

Nato Advanced Study Institute, Constraint Programming,

Pamu, Estonia *Contact:* J. Penjam, Institute of Cybernetics, 21 Akadeemia tee, EE-0026 Tallinn, Estonia. Email: natoasi@ioc.ee

August 15-18

12th Annual ACM Symposium on Principles of Distributed Computing,

Ithaca, NY, USA. *Sponsor:* SIGOPS, SIGACT. *Contact:* James Anderson, Dept. of Comp. Sci., Univ. of Maryland-College Park, A.V. Williams Building, College Park, MD 20742-3255; Tel +1 (301) 405-2701. Email: 1ha@cs.umd.edu

August 23-26 CONCUR'93

Fourth International Conference on Concurrency Theory,

Hildesheim, Germany. *Contact:* CONCUR'93, attn. E. Best, Institut fur Informatik, Universitat Hildesheim, Marlenburger Platz 22, D-3200 Hildesheim, Germany. Email: E.Best@informatik.uni-hildesheim.de

August 23-27 FCT'93

Fundamentals of Computation Theory,

Szeged, Hungary. *Contact:* T. Gaizer or J. Viragh, FCT'93 Bolyai Institute, A. Jozsef University, 6721 Szeged, Aradi v. tere 1., Hungary; Fax +36-62-12292. Email: h754esi@ella.hu, h1299gai@ella.hu, J68A004@HUSZEG11

August 25-27 PLILP'93

Fifth International Symposium on Programming Language Implementation and Logic Programming,

Tallinn, Estonia. *Contact:* PLILP 93, Jaan Penjam, Software Department, Institute of Cybernetics of Estonian Academy of Sciences, Akadeemia tee 21, EE-0108 Tallinn, Estonia. Email: plilp@ioc.ee

August 30-September 3 MFCS'93

Eighteenth International Symposium on Mathematical Foundations of Computer Science,

Gdansk, Poland. *Contact:* MFCS'93, Institute of Computer Science of the Polish Academy of Sciences, ul. Jaskowa Dolina 31, PO BOX 562, 80-252 Gdansk, Poland; Fax +48-58-416912

September 1-3

The Mathematics of Dependable Systems,

London, UK. *Sponsor:* The Institute of Mathematics and its Applications *Contact:* Dr Victoria Stavridou, Department of Computer Science, Royal Holloway and Bedford New College, University of London, Egham, Egham Hill, Surrey

TW20 OEX, UK, tel (+44) 784 443429/21, fax (+44) 784 443420. Email: victoria@uk.ac.rhbc.cs

September 7–10 CTCS-5

Category Theory and Computer Science,

Amsterdam, The Netherlands. *Sponsor:* CWI. *Contact:* Dr. D. Pitt, Department of Mathematics, University of Surrey, Guildford, Surrey GU2 5XH, United Kingdom. Email: d.pitt@mcs.surrey.ac.uk. Or Conference Administrator, CTCS-5, c/o CWI, Ms. Anna Baanders, P.O. Box 4079, 1009 AB Amsterdam, The Netherlands; Tel +31-20-5924048; Fax +31-20-5924199. Email: anna@cw.nl

September 13–17 ESEC'93

4th European Software Engineering Conference,

Garmisch-Partkirchen, Germany. *Sponsor:* AFCET, AICA, ATI, BCS, GI, OGI and SI. *Contact:* ESEC'93, c/o Uta Weber, Technical Univ., Inst. fur Informatik, Orleansstr. 34, D-2000 Munchen 80 Germany, tel +49 48095 142, fax +49 89 48095 160. Email: esec@informatik.tu-muenchen.de

September 13–17 CSL'93

Conference of the European Association for Computer Science Logic,

Swansea, Wales. *Sponsor:* EACSL. *Contact:* K. Meinke, Dept. of Comp. Sci., Univ., College of Swansea, Swansea, Great Britain, fax +44 792 295708. Email: csl93@pyr.swan.ac.uk

September 20–23 KBSE'93

8th Knowledge-Based Software Engineering Conference,

Chicago, Ill., USA. *Sponsor:* Rome Lab., USAF. *Contact:* Barbara Radzisz, Data and Analysis Center for Software, PO BOX 120, Utica, NY 13505; Tel +1 (315) 734-3696. Email: kbse8-request@cs.rpi.edu

September 23–24 HOA'93

An International Workshop on Higher Order Algebra, Logic and Term Rewriting,

Amsterdam, The Netherlands. *Contact:* Prof. dr. B. Moller (HOA'93), Institut fur Mathematik, Universitat Augsburg, Universitätsstrasse 2, W-8900 Augsburg, Germany; Fax +49-821-5982200. Email: moeller@uni-augsburg.de

September 26–October 1 OOPSLA'93

Conference on Object Oriented Programming Systems Languages and Applications,

Washington, DC., USA. *Sponsor:* SIGPLAN. *Contact:* Timlynn Babitsky, JFS Consulting, 5 Wise Ferry Ct., Lexington, SC 29072; Tel +1 (803) 957-5779.

September 27–30

Conference on Software Maintenance '93,

Montreal, Quebec, Canada. *Contact:* Marc Kellner, Software Engineering Institute, Carnegie Mellon University, Pittsburgh, PA 15213-3890, USA, tel +1 412 268 7721, fax 412 268 5758. Email: mik@sei.cmu.edu

October 6–8

12th Symposium on Reliable Distributed Systems,

Princeton, NJ, USA. *Contact:* Prof. David Taylor, Department of Computer Science, University of Waterloo, Waterloo, Ontario, CANADA N2L 3G1, tel (519) 888-4432. Email: dtaylor@grand.uwaterloo.ca

October 19–22 PNPM'93

Fifth International Workshop on Petri Nets and Performance Models,

Toulouse, France. *Contact:* G. Juanolé, LAAS-CNRS, 7, Avenue du Colonel Roche, 31077 Toulouse Cedex, France; Fax: +33-61-336411. Email: juanolé@laas.fr

October 26–29 ILPS'93

International Logic Programming Symposium,

Vancouver, Canada. *Contact:* Dale Miller, Department of Computer Science, 200 South 33rd Street, University of Pennsylvania, Philadelphia, PA 19104-6389, USA; Fax: +1-215-8980587. Email: dale@sau.cis.upenn.edu

October 26–29

Forte'93

6th International Conference on Formal Description Techniques,

Boston, MA. *Sponsor:* IFIP WG6.1. *Contact:* Richard L. Tenney, Math & Comp. Sci., Univ. of Massachusetts, Boston, MA 02125-3393. Email: rlt@cs.umb.edu

November 3–6

ISSRE 93

Fourth International Symposium on Software Reliability Engineering,

Denver. *Cosponsor:* IEEE Computer Soc. Technical Committee on Software Eng., IEEE Reliability Soc. Denver Chapter. *Contact:* Anneliese von Mayrhauser, Computer Science Dept., Colorado State Univ., Ft. Collins, CO 80523; Tel +1 (303) 491-7016; Fax +1 (303) 491-6639. Email: avm@cs.colostate.edu. Or Yoshihiro Tohma, Computer Science Dept., Tokyo Inst. of Technology, 2-12-1 Oakayama Meguro-ku, Tokyo 152, Japan, tel +81 (3) 3726-1111, ext. 2566. Email: tohma@cs.titech.ac.jp

December 1–3

14th IEEE Real-Time Systems Symposium,

Durham, N.C. *Sponsor:* IEEE Computer Soc. TC on Real-Time Systems. *Contact:* Farnam Jahanian, IBM T.J. Watson Research Ctr., PO Box 704, Yorktown Heights, NY 10598; Tel: 784-7498. Email: farnam@watson.ibm.com

December 1-4**Fifth IEEE Symposium on Parallel and Distributed Processing,**

Dallas, TX, USA. *Contact:* Prasenjit Biswas, Cyrix, 2703 N. Central Expressway, Richardson, TX 75080; Tel: +(214) 234-8388; Fax: (214) 699-9857. Email: cyrix \ !biswas@central

December 6-7 IWSSD-7**Seventh International Workshop on Software Specification and Design,**

Los Angeles area, CA, USA. *Sponsor:* IEEE Computer Society. *Contact:* Jack Wileden, Computer Science Department, University of Massachusetts, Amherst MA 01003, USA. Email: jack@cs.umass.edu

December 7-10**Symposium on the Foundations of Software Engineering,**

Los Angeles, CA, USA. *Sponsor:* ACM SIGSOFT. *Contact:* Barry Boehm, Computer Science Department, University of Southern California, Los Angeles CA 90089, USA; Tel +1 (213) 740-8163 Email: boehm@cs.usc.edu

December 15-17 FSTTCS'93**Thirteenth Conference on the Foundations of Software Technology and Theoretical Computer Science,**

Bombay, India. *Contact:* Prof. R.K. Shyamasundar, FST&TCS'13, Tata Institute of Fundamental Research, Bombay 400 005, India; Fax: +91-22-215-2181. Email: fsttcs@tifrvax.bitnet

1994

January 5-7**The Sixth FACS Refinement Workshop on Theory and Practice of Formal Software Development,**

London, United Kingdom. *Contact:* R. Shaw, Lloyd's Register, Lloyd's Register House, 29 Wellesley Road, Croydon, CR0 2AJ, UK. Email: roger.shaw@ale.lreg.co.uk

January 16-19**POPL,****The 21st Annual Symposium on Principles Of Programming Languages,**

Portland, OR, USA. *Sponsor:* ACM SIGPLAN-SIGACT *Contact:* Hans-J. Boehm, Xerox Corporation, Palo Alto Research Ctr., 3333 Coyote Hill Rd., Palo Alto, CA 94304 USA. Email: boehm@parc.xerox.com

February 24-26**STACS'94,****11th Symposium on Theoretical Aspects of Computer Science,**

Caen, France. *Contact:* Prof. Patrice Enjalbert, L.A.I.A.C. STACS'94, Universite de Caen, F-14032 Caen Cedex, France; Tel: +33-31-45-56-16; Fax: +33-31-45-58-14. Email: stacs@univ-caen.fr

April 7-9**CC'94,****International Conference on Compiler Construction,**

Edinburgh, Scotland. *Contact:* Peter Fritzon, CC'94, Department of Computer and Information Science, Linköping University, S-581 83 Linköping, Sweden; Tel: +46-13-281484; Fax: +46-13-282666. Email: petfr@ida.liu.se

April 11-13**CAAP'94,****Colloquium on Trees in Algebra and Programming,**

Edinburgh, Scotland. *Contact:* Sophie Tison, CAAP'94, University of Lille 1, LIFL, Bat. M3, F-59655 Villeneuve d'Ascq Cedex, France; Tel: +33-20434309; Fax: +33-20436566. Email: tison@lifl.fr

April 11-13**ESOP'94,****European Symposium on Programming,**

Edinburgh, Scotland. *Contact:* Don Sannella, ESOP'94, Laboratory for Foundations of Computer Science, Department of Computer Science, The King's Buildings, University of Edinburgh, Edinburgh EH9 3JZ, Scotland; Tel: +44-031-6505184; Fax: +44-031-6677209. Email: dts@dcs.ed.ac.uk

July 10-15 ICALP'94**21st International Colloquium on Automata, Languages, and Programming,**

Jerusalem, Israel. *Contact:* E. Shamir, Department of Computer Science, Hebrew University of Jerusalem, Jerusalem 91904, Israel; Fax: +972 2630702. Email: shamir@cs.huji.ac.il

Guidelines for Newsletter Contributions

Contributions may be in the form of **single-sided** camera-ready copy, suitable for layout and sub-editing. They can also be sent to us using electronic media (i.e. by floppy disk (MS DOS or Mac)/e-mail/etc.), to be formatted in the house style. As a rule, we generally accept pure ASCII text or T_EX/L_AT_EX in order to avoid complications involving interchange between wordprocessing formats. We regret that we are unable to offer typesetting facilities for handwritten material.

If contributions are sent using proprietary wordprocessor/markup language formats (i.e. MicroSoft Word 5, FrameMaker), then these will be treated as though they were camera-ready copy. If we are unable to print them adequately or to otherwise convert to another more suitable form then the authors may be asked to provide paper copies of appropriate reproduction quality.

Artwork can be provided for appropriate inclusion, either using general formats (such as DVI files or Encapsulated PostScript) by sending camera-ready paper copy. Generally, line drawings and other high-contrast graphical diagrams will be acceptable.

Material must be of adequate quality for reproduction. Output from high quality printers with at least 300 DPI resolution is generally acceptable. Output from printers with lesser resolution (i.e. dot-matrix printers) tends not to reproduce very well and will not be of sufficiently good print quality. The Editorial Panel reserves the right to refuse publication for contributions which cannot be reproduced adequately.

Page definition information

If possible, contributions should be designed to fit standard A4 paper size, leaving a margin of at least one inch (1") on all sides. Camera ready copy should be sent in **single-sided** format, with page numbers written lightly **on the back**. Ideally, all font sizes used should be no smaller than 10pt for clarity. Contributions should attempt to make adequate use of the space, filling at least 60% of each page, including the last one. Authors should note that all contributions may be sub-edited appropriately to make efficient use of space.

Deadlines

The production deadlines for the coming year are:

Summer	end of May, 1993	Winter	end of November, 1993
Autumn	end of August, 1993	Spring	end of February, 1994

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The views and opinions expressed within articles included in the BCS FACS FACTS newsletter are the responsibility of the authors concerned and do not necessarily represent the opinions or views of the editorial panel.

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BCS FACS Committee 1992/93

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Discount subscription rates 1993

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 FACS Journal : £33 (6 issues, Vol. 5)

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