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Using Crystal: an Expert System Shell to Create CONFER, a Guide for Cataloguers in Determining the Correct Form of Main Entry Headings for Conference Documents

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Abstrak: *Kertas persidangan merupakan bahan yang sukar dikendalikan terutama jika seseorang pengkatalog itu tidak berpengalaman dalam peraturan-peraturan standard AACR2. CRYSTAL merupakan sebuah cengkerang sistem pakar yang telah digunakan secara eksperimen untuk membina sebuah panduan bernama CONFER. CONFER tidak akan menghasilkan sebuah entri katalog tetapi akan memandu seorang pengkatalog muda kepada peraturan dan format yang bersesuaian untuk unsur-unsur entri utama bagi prosiding-prosiding persidangan. Maklumat daripada AACR2 (edisi kedua) dengan nasihat seorang pensyarah yang mengajar pengkatalogan di Loughborough University of Technology (seorang pakar yang sedia ada) telah digunakan untuk merangka kerangka-kerangka peraturan bagi panduan ini. Prosedur-prosedur yang digunakan untuk mengatasi batasan-batasan yang dikenakan oleh CRYSTAL juga dihuraikan. Semua menu pengguna dan enam belas lazar kesimpulan yang direka bagi CONFER bersama-sama dengan struktur lengkap bagi peraturan-peraturan utama dan peraturan-peraturan kecil yang digunakan juga dimuatkan.*

Abtract: *Conference documents are difficult materials to organize, especially if the cataloguer is a novice to standardized rules, such as AACR2. CRYSTAL is an expert system shell which has been used to experimentally build up a guide called CONFER. CONFER does not produce a catalogue entry but guides the novice cataloguer to the appropriate rule and format of main entry headings for conference proceedings. Information provided by the second edition of the AACR2 manual together with advice given by a lecturer who teaches cataloguing at the Loughborough University of Technology (the expert at hand) have been used to structure the rule frames for the guide. The procedures used to surmount restrictions imposed by CRYSTAL are also described. All user menus and sixteen conclusion screens designed for CONFER together with the full structure of the main rules and sub-rules used are included.*

INTRODUCTION

Publications emanating from corporate authorship has significantly increased in recent years with the current trend on joint effort amongst researchers and writers. The most prominent are conference proceedings.

The variety and forms, in which conference documents take, pose problems to the experienced cataloguer, and even more so to the novice. The findings of Mills[1] on publication patterns of conference proceedings held at the British Library, Document Supply Centre are summarized as follows: 41% are issued as serials, 32% as monographs and 28% are published as special issues within serials.

In the case of Malaysian conference documents, the situation is somewhat different. A study of the proceedings of Malaysian conferences held in 1989 and received by the University of Malaya Library indicated that 86.5% are unpublished; 12% are published as collected works mostly under editorship; 1.5% are published abroad; and none are published as serials.[2] The unpublished nature of the collection poses pro-blems, as a set of papers presented at a conference would have to be collated, the title page composed and the papers bound as a set. In this case the conference title which predominantly appears on all papers in the set is often adopted as the conference heading. Complications may arise when a different title is adopted by the publisher for the published version. The unpublished version of the conference

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title or information may or may not appear on the title page but may be embedded within the text of the introduction, preface or even the back cover of the published document. The novice cataloguer must be trained to look out for such conference information when handling the published type of conference document so that the necessary cross-references for collocation of the catalogue entry may be made.

The main problem which confronts the cataloguer is the choice of main entry heading and the format which needs to be adopted with consistency. This decision is in turn dependent on several factors:

(a) Where to locate the conference statement in a published or unpublished document.
(b) The format and name of the conference to be chosen as heading.
(c) The necessary information to be presented in a conference heading such as its number, year and location of the conference.
(d) The type of cross-references needed to be given from the variant names of the conference to the heading adopted for the main entry.

Anglo-American Cataloguing Rules (2nd ed.) attempt to devote greater attention to the cataloguing of conference documents. This code firmly rejects main entry under a conference name when the name does not appear predominantly on the item being catalogued. Hence, if the conference has a prominent name, it is entered under its name or else it is treated as being unnamed, and is then entered under the title of the document. The problem arises as to what constitute a prominent name. AACR2 help to focus on the form of main entry headings which should be adopted, but leave the cataloguer free to use his own judgement in providing for the various added entries necessary to guide the user to the form of entry adopted.

As to whether AACR2 alleviate all cataloguing problems when handling conference documents is beyond the scope of this article. This code has been chosen since it is widely used in libraries and new cataloguers often need to digest and be familiar with it before embarking upon actual cataloguing exercises. The rules of AACR2, which have been accepted as a basic cataloguing standard, have been used to experimentally structure CONFER, an expert system for novice cataloguers.

The Aim of CONFER

CRYSTAL (Intelligence Environment, United Kingdom, copyright 1986) is an expert system shell, a software which can be used to build expert systems. As a shell it is empty except that it provides guidance on the logical procedures on how to build up sets of rules. The compiler is required to structure a set of rules into CRYSTAL's knowledge base option which it consults to make decisions. CRYSTAL can be installed on a hard disk, a local area network or on to floppy disks (normal 360k or high-density diskettes).

CRYSTAL has been used to create an expert system called CONFER. CONFER guides the novice cataloguer in libraries to the correct form of main entry headings for conference proceedings. CONFER does not produce a catalogue entry but indicates to the user the appropriate rule and format of main entry headings for conference proceedings as determined by AACR2. This is an experimental exercise in finding out how CRYSTAL can be used to successfully create such a guide. It is hoped that similar guides can be developed to incorporate other rules concerning the determination of main entry heading for other types of documents. The guide has been created on a normal 360 disk on drive B with CRYSTAL on drive A.

A document which has a straightforward conference statement on its cover, verso or title page can be easily identified as needing a conference main entry heading. The form of headings adopted however may vary. CONFER attempts to guide cataloguers to the correct form of main entry headings to be used with examples on how such headings should be laid out.

Occasionally conference statements may appear on the preface of a document and this can sometimes be overlooked. The failure to recognize a conference document may result in the exclusion of a conference code to a cataloguing record. This in turn creates problems for members of an indexing team when identifying conference documents for retrieval purposes. A guide therefore also trains the novice cataloguer who is alerted to the various sections in a document which may contain conference information.

Cataloguing Rules for Conference Documents

Two sources are used to collect information about cataloguing rules governing conference documents. The information collected are then used to prepare the rule sets needed to build up the framework for the guide. Rule sets can be regarded as statements in the form, if a certain condition applies, then carry out a particular action or draw upon a particular conclusion.

The first source is the *Anglo American Cataloguing Rules 2* (London: The Library Association, 1980). The second edition of this source discusses the rules for conference documents between pages 416 and 421, broadly under the main sub-rule of 24.7. Various examples are provided with each rule. AACR2 ascertain that conference documents should contain the following four main elements which govern the format of main entry headings used.

(a) The most common category is when the conference heading is prominently displayed on the title page, cover or verso and includes information such as place and date of the event. The title in this case usually takes the form of 'Conference on ... (subject) held on ... (date and place) ..., an example is, *Conference on Microbiology held on 20-21 August 1991 in Kuala Lumpur, Malaysia*' or '(Subject) ... Conference held on ... (date and place) ..., an example is, *Fresh Water Fishes Conference; 11-15 September 1991, Jakarta*'. The main entry headings used in these cases are exemplified by the conclusion statements, C3, C4, C5 and C6 in figure 1a.

(b) When a conference is an outcome of a meeting convened by a society or organization the form of statement which appears on the title page may differ. An example is 'National Conference of the Mathematical Society, held in Paris, 1-3 June 1991' or 'Mathematical Society Conference ... held on ... (date and place)...'. The form of main entry heading used in this case would be different from those in category (a) and are provided by conclusion screens C7, C8, C9, C10 in figure 1b.

(c) The conference document would sometimes consist of a title and an added statement such as 'Small businesses in Malaysia. Proceedings/papers of a conference held in Penang, Malaysia on 3 - 6 January 1991'. The main entry heading used in this case is again different. Examples are provided by conclusion screens C11 and C12 in figure 1c.

(d) Place names of conferences can sometimes be an integral part of the conference statement (usually appearing in front of the conference statement). An example is 'Penang Consumers Conference held on 20-23 February, 1990'. The form of main entry heading used in this case is exemplified by conclusion statements C13, C14, C15 and C16 in figure 1d.

In all the categories above, the frequency statement of the conference, such as whether it is the first, second and so forth is being considered as an additional element which may or may not appear on the conference document. This has been considered as a variable in CONFER.

The second source used to collect information is from a lecturer who teaches cataloguing and information handling (Mrs Inese Smith) at the Department of Library and Information Science, Loughborough University of Technology. In this case she is considered to be the human expert (whom the compiler could consult) on the subject. As a result of this contact it has been possible to structure the rule frames for the guide with greater clarity and consistency as laid out by AACR2.

Basically CONFER is a menu driven guide where users are prompted to make a choice from a number of options displayed at each stage of consultation. Different choices on a menu is equivalent to 'if' part of the production rules. Menus are linked so that the rules are applied in a logical series of steps. The input required from the user is restricted to pressing the <RETURN> key on the chosen option which is highlighted.

The opening screen displays the purpose of CONFER and on pressing <RETURN> the first menu is displayed. The menu screen is centralized with the options displayed via a window predefined by the software in size. At each stage the user is prompted to make a choice which would at the final stage display the conclusion screen. There are 16 conclusion screens, in CONFER each displaying the format of main entry headings as determined by AACR2. The rule numbers which cover each format are also included. The menu and conclusion screens displayed to users are provided between figure 1 and figure 1d. The rule structure frames which consists of the main rules and sub-rules built for CONFER are given in figure 2.

Advantages in Using CRYSTAL

The following are the advantages considered when using CRYSTAL to structure CONFER.

(a) CRYSTAL is a rule based system using operators AND, NOT, IF, OR to string a set of conditions to arrive at the desired conclusion. The operators can be evoked by pressing the <RETURN> key or a combination of function keys predefined by the software. The design of the option menus are also created via the systems' menus provided by the software. This combination of using the <RETURN>, function keys and systems' menus makes CRYSTAL fairly easy to handle and very compiler friendly.

(b) The response time from the user end is almost instantaneous. The software can be run on personal computers with or without hard disk.

(c) The screen displaying user menus has an attractive layout, with options displayed at the centre of the screen. The bordered effect menus are pleasing to the eye.

Disadvantages of CRYSTAL

(a) The width of the screen windows can be rather restrictive especially when options provided are many and 'wordy'. Spaces often cannot be provided between each option because of the predefined window size. This aspect reduces the visual impact of the various options displayed. This similarly apply to screens displaying conclusions, which tend to be narrow and does not allow for detailed explanations.

(b) Problems are often divided by types and categories. Each type may contain variables some of which are common to the other categories. The conclusion reached for each category may hence be varied. CRYSTAL call for a premise of one master conclusion and this is found to be an inhibitive factor when several conclusion screens are needed.

(c) The objects of the main rules and sub-rules are kept together by CRYSTAL. If a main rule has been accidentally altered, it would result in the deletion of all other objects and options expanded under it. This is found to be a cumbersome feature. There is also no facility for undoing an error created in the main rule or sub-rule which has been saved. CRYSTAL is quite unforgiving in this respect.

(d) The cluttered means in which the frames of main rule and sub-rules are kept together make it difficult to keep track of instructions made. There is no facility to globally check or amend all the rule frames already structured.

(e) All rules governing each option displayed by the user menu must be structured individually even though in some instances it evokes a common user sub-menu. This is because each option at the various stages is tagged to a particular conclusion statement. Hence common menus has to be repeatedly structured under each option making the building up process a tedious task.

FIGURE 1

USER MENUS AND CONCLUSION SCREENS DESIGNED FOR CONFER

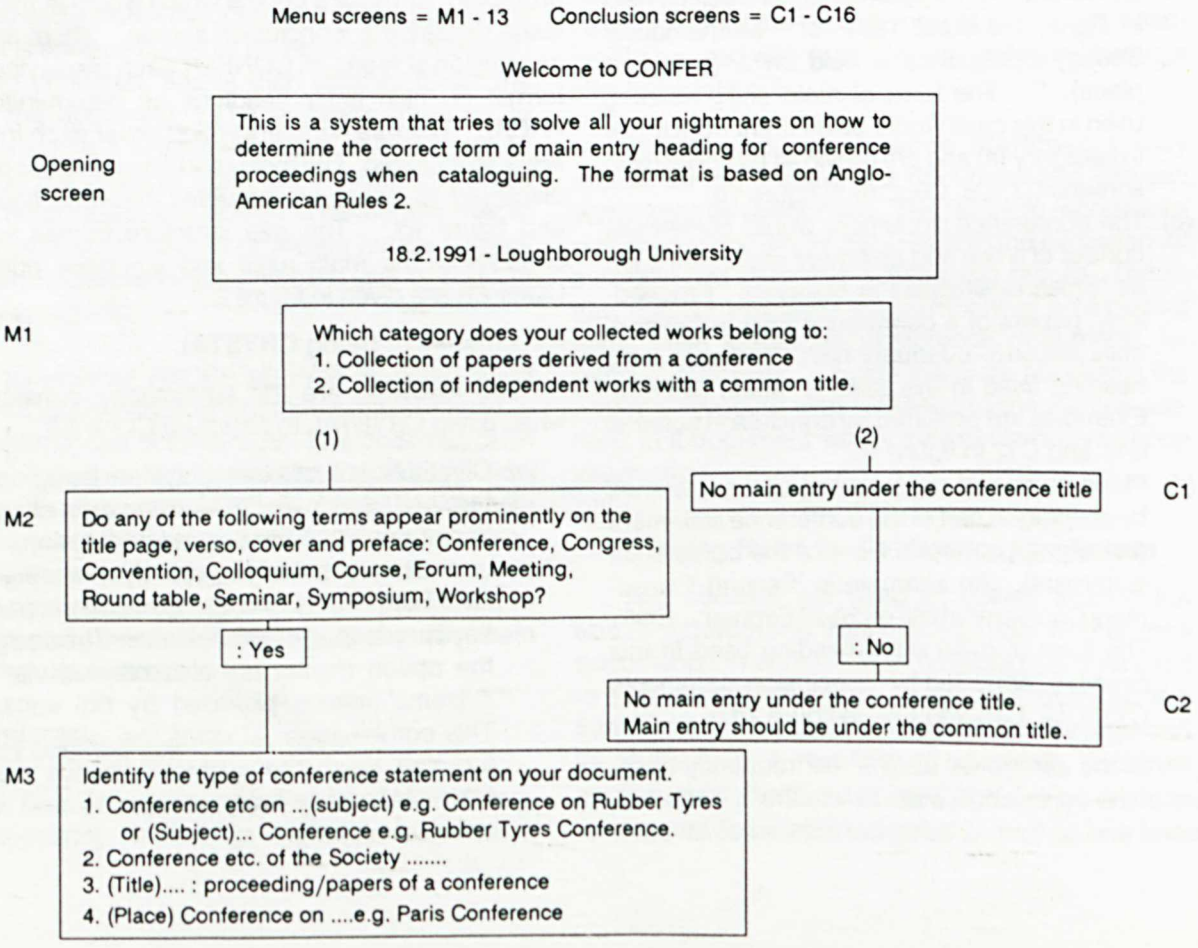

FIGURE 1a

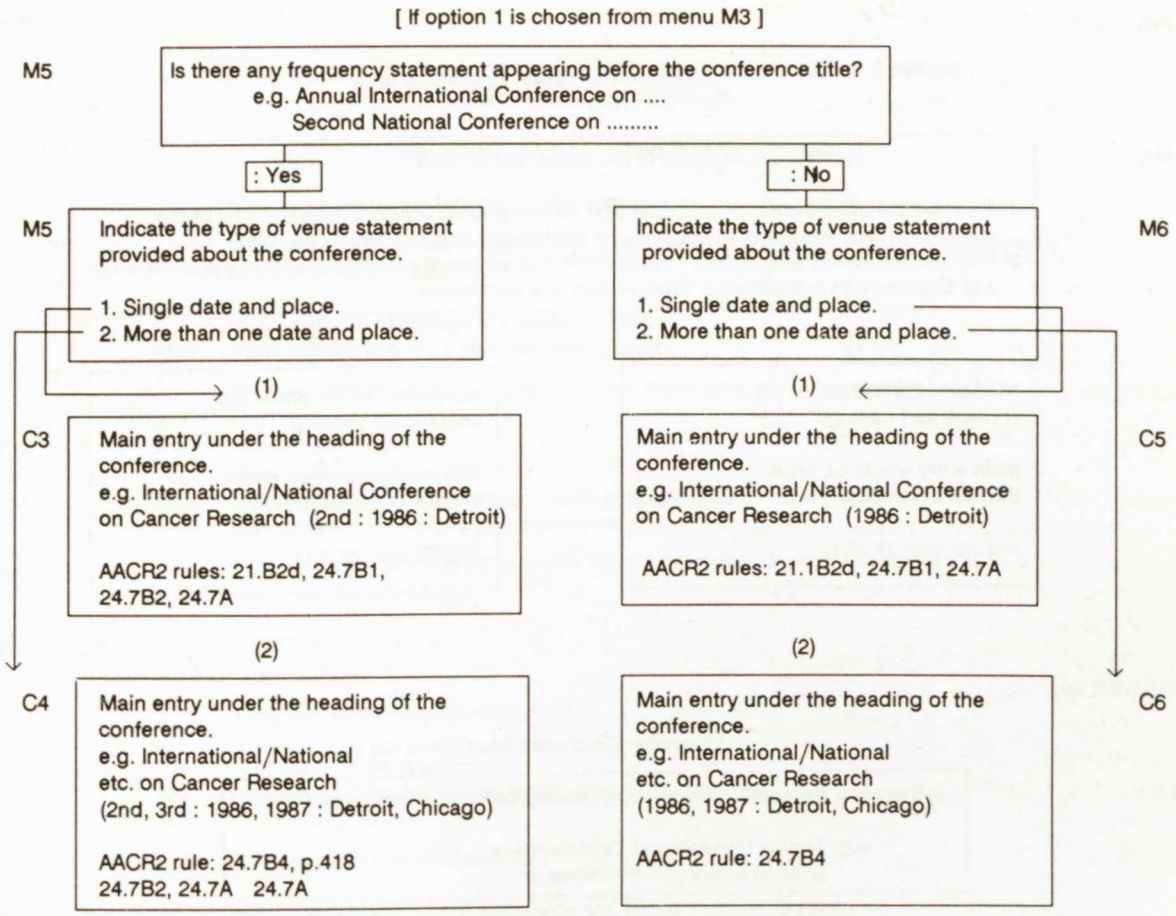

FIGURE 1b

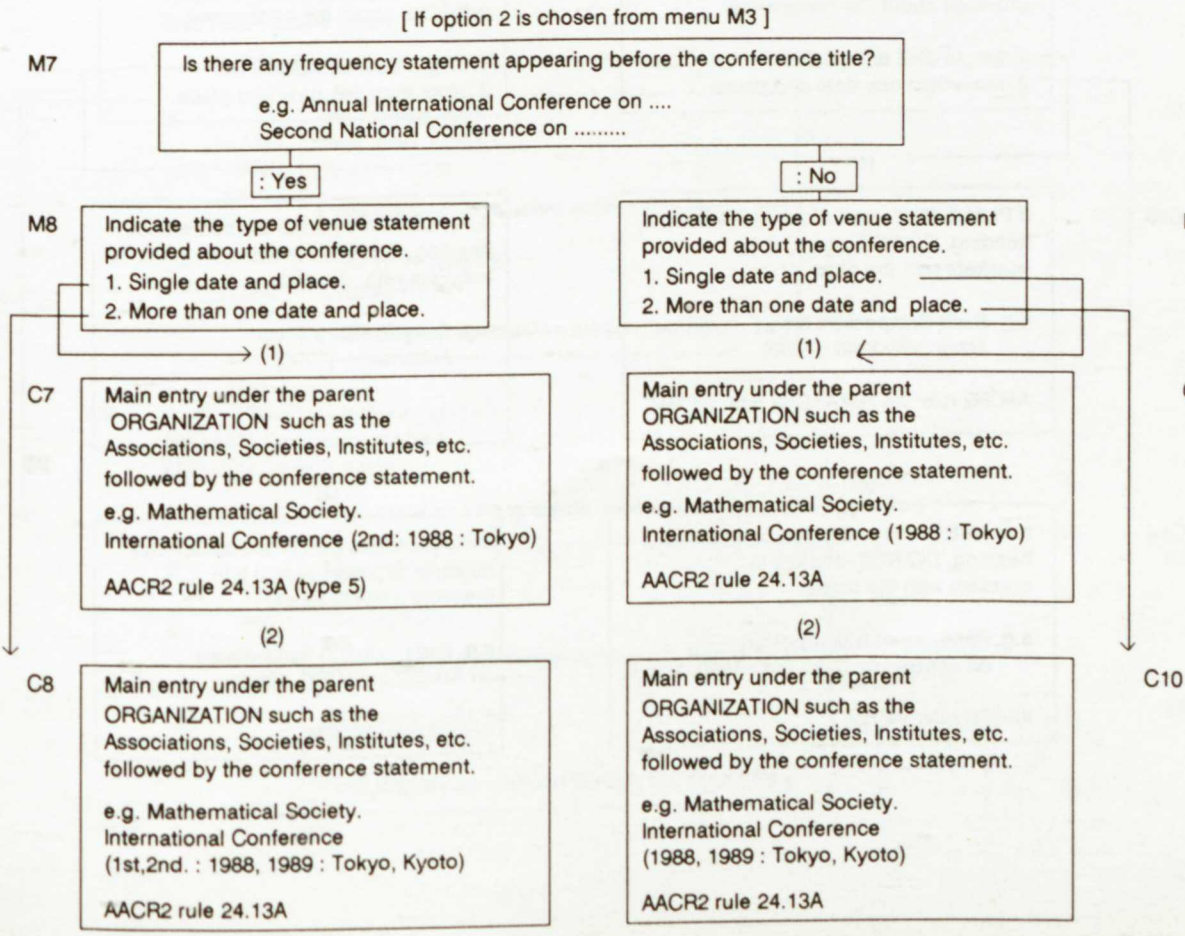

FIGURE 1c

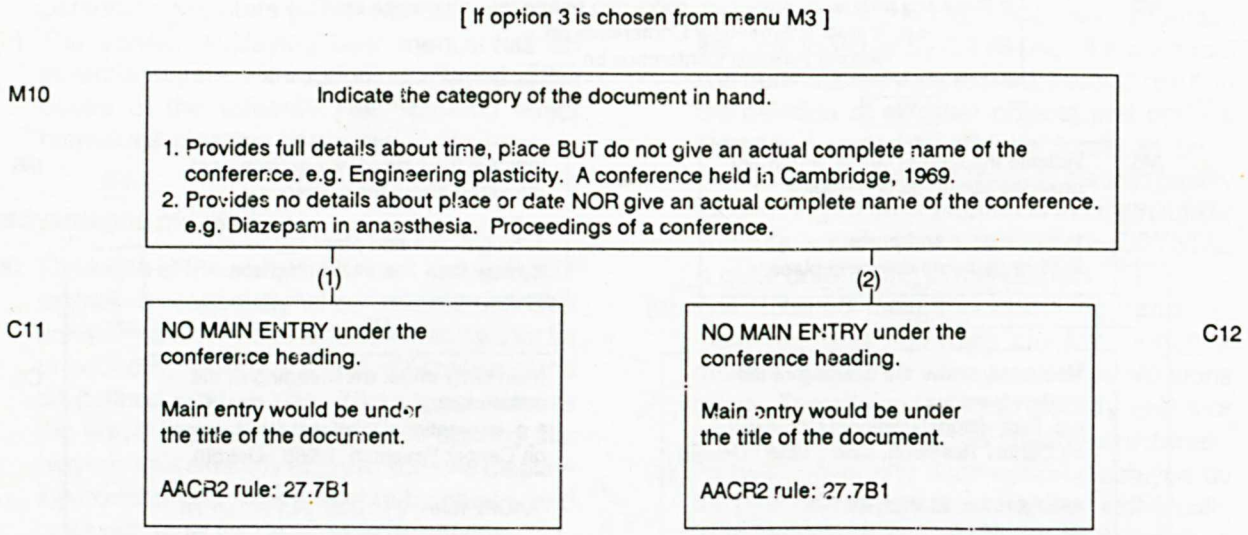

FIGURE 1d

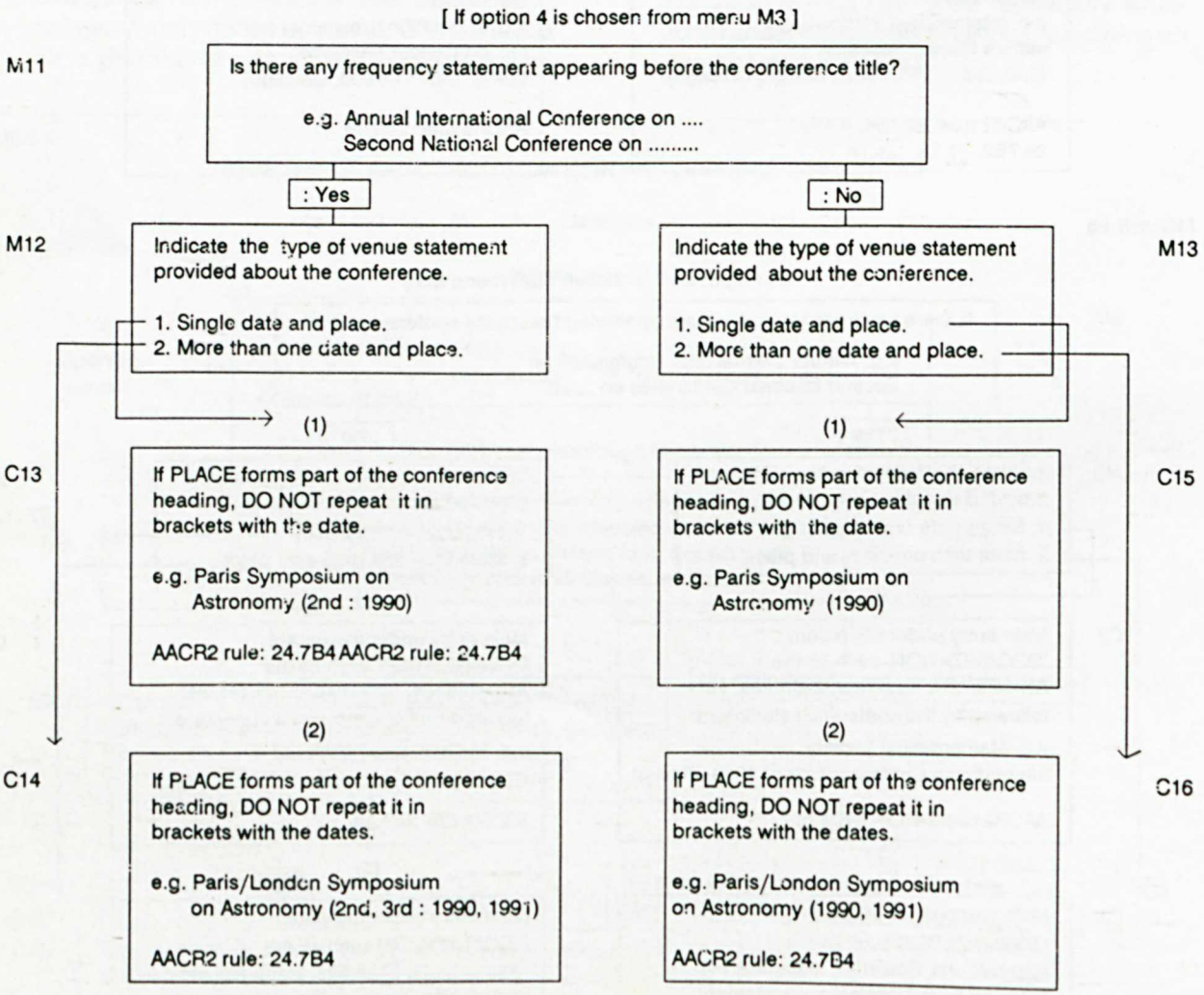

FIGURE 2

RULE STRUCTURES : MAIN RULES AND SUB-RULES USED IN CONFER CRYSTAL MASTER RULE

Main Rules = MR1 - MR12 Sub-Rules = SR1 - SR14

MR 1 IF Main entry under the heading of the conference

[The above master rule is not used to display conclusion statements. It is used merely to activate the program]

MR2 IF :Display Form [Displays the opening screen]
AND Book is collection of papers from conferences

[F10 for expansion and F6 to create menu book-type, M1 in figure 1]

MR3 IF :Menu book_type
AND :Test book_type = 1
AND Term appears on the title page, verso, cover,preface
AND Conference statement is 'Conference on ...'

[F10 for expansion and F6 to create menu conference_type, M3 in figure 1. Continues by rule MR6]

MR4 OR :Test book_type = 2
AND :Display Form

[Displays conclusion screen C1]

MR5 OR :Test book_type = 1
AND NOT Term appears on the title page,verso,cover,preface
AND :Display Form

[Displays conclusion screen C2]

MR6 IF Menu conference_type [See menu M3, figure 1 with 4 options]

AND :Test conference_Type = 1
AND Frequency is given
AND held place is given

[F10 for expansion and F6 to create menu held_type, M5, figure 1a]

IF :Menu held_type — SR1
AND :Test held_type = 1
AND :Display Form
[Will display conclusion screen C3, figure 1a]

OR :Test held_type = 2 — SR2
AND :Display Form
[Will display conclusion screen C4, figure 1a]

MR7 OR :Test conference_type = 1
AND NOT Frequency is given
AND date place is given

[F10 for expansion and F6 to create menu place_type, M6, figure 1a]

IF :Menu place_type — SR3
AND :Test place_type = 1
AND :Display Form
[Will display conclusion screen C5, figure 1a]

OR :Test place_type = 2 — SR4
AND :Display Form
[Will display conclusion screen C6, figure 1a]

MR8 OR :Test conference_type = 2
AND Frequency is given
AND location date is given
[F10 for expansion and F6 to create menu location_type, M8, figure 1b]

IF :Menu location_type SR5
AND :Test location_type = 1
AND :Display Form
[Will display conclusion screen C7, figure 1b]

OR :Test location_type = 2 SR6
AND :Display Form
[Will display conclusion screen C8, figure 1b]

MR9 OR :Test conference_type = 2
AND NOT frequency is given
AND date_place is given
[F10 for expansion and F6 to create menu date_type, M9, figure 1b]

IF :Menu date_type SR7
AND :Test date_type = 1
AND :Display Form
[Will display conclusion screen C9, figure 1b]

OR :Test date_type = 2 SR8
AND : Display Form
[Will display conclusion screen C10, figure 1b]

MR10 OR :Test conference_type = 3
AND site is given
[F10 for expansion and F6 to create menu site_type, M10, figure 1c]

IF :Menu site_type SR9
AND :Test site_type = 1
AND :Display Form
[Will display conclusion screen C11, figure 1c]

OR :Test site_type = 2 SR10
AND :Display Form
[Will display conclusion screen C12, figure 1c]

MR11 OR Test conference_type = 4
AND Frequency is given
AND show place is given
[F10 for expansion and F6 to create menu show_type, M12, figure 1d]

IF :Menu show_type SR11
AND :Test show_type = 1
AND :Display Form
[Will display conclusion screen C13, figure 1d]

OR :Test show_type = 2 SR12
AND :Display Form
[Will display conclusion screen C14, figure 1d]

MR12 OR :Test conference_type = 4
AND NOT Frequency is given
AND city is given
[F10 for expansion and F6 to create menu city_type, M13, figure 1d]

IF :Menu city_type SR13
AND :Test city_type = 1
AND :Display Form
[Will display conclusion screen C15, figure 1d]

OR :Test city_type = 2 SR14
AND :Display Form
[Will display conclusion screen C16, figure 1d]

Evaluation

Despite the disadvantages and problems of handling complex structures, CRYSTAL was chosen to create CONFER for the following reasons.

(a) Its user screen format is attractive. This is an important feature to ensure that end users would find it easy and pleasing to use.

(b) The response time is fast.

(c) The continuous running of the program on a stand-alone personal computer is ensured. At the end of each transaction, a hit on the <RETURN> key will always evoke the program to run again. This facilitates continuous usage by end users.

(d) It can run on a double sided diskette. It is hence feasible to compile the rules on any IBM compatible computer which is currently widely available in most libraries. The hardware problem of running such a system is reduced.

(e) The limitations of one master conclusion screen is surmountable. CONFER needs 16 conclusion screens. In such a case the compiler 'cheats' her way around by merely using the initial master rule as a dud to activate the program. It is not used to display any conclusion statements. The 16 conclusion screens are designed through the 'display form' facility provided by CRYSTAL. When the compiler chooses to opt for 'display form' screens for the various conclusion statements, the nature of what is being displayed is left entirely to the compiler. CRYSTAL does not place any limitations on the number of 'display form' screens used. The size of the window screens provided by the 'display form' facility are also larger then the one provided by the master conclusion screen.

(f) Different names were given to common user sub-menus generated to tag different sets of conclusion screens to the various user options displayed at various points of consultation. The 16 conclusion statements in CONFER are closely related to choices made at options 'conference type', 'frequency type' and 'date - place type'. Options relating to type of venue menus under each 'conference type' options were hence given different names. As an example, different venue names such as, 'held_place', 'place_type', 'location_type', 'date_type', 'site_type', 'show_type' and 'city_type' (see figure 2 between sub-rules SR1 and SR14) are used to generate common sub-menus M5, M6 (figure 1a); M8, M9 (figure 1b) and M12, M13 (figure 1d). This technique is crucial in order to achieve the 16 different conclusion screens using the 'display form' facility.

CRYSTAL has been found to be quite useful in creating this simple guide to novice cataloguers in ascertaining main entry headings for conference documents as laid down by AACR2. The potential of using CRYSTAL to set up cataloguing guides for other types of document is evidently plausible from this experimental exercise as it has been possible to achieve the desired end results in the case of CONFER.

CONCLUSION

It is conceivable that an expert system shell such as CRYSTAL may be used to build up a guide for all the 2,000 or so rules which comprise the AACR2. Libraries are labour-intensive and staffing constitute a sizeable proportion of the total budget. It is therefore crucial to ensure maximum staff productivity. The expert system would help alleviate some of the burden faced by professionals when providing on-the-job training for novices in cataloguing. As such, full productive potential of senior cataloguers can be realized. Based on the experimental use of CRYSTAL, it is reasonable to claim that an expert system shell is capable of handling rules encompassing AACR2 provided the rules are structured in the correct format. It is hoped that this experiment will encourage librarians to consider seriously some of the possibilities offered by an expert system as an aid in efficiently handling certain aspects of their professional tasks.

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