

QUIZ - A GENERALIZED REPORT WRITER FOR THE HP 3000

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ABSTRACT

QUIZ is a generalized reporting and inquiry program for the HP 3000. Simple ad-hoc reports can be produced by an end-user through entry of minimal specifications. Complex reports may be produced by entry of detailed format specifications. QUIZ operates on any combination of IMAGE/3000 databases, KSAM/3000 files and conventional MPE files.

This paper reviews our experience in the design and implementation of QUIZ. Particular emphasis is placed upon the difficulties of designing a facility which is simple enough to be used by non-EDP personnel to produce simple reports, but which is also capable of the sophisticated formatting and control required of production reports. User experience in a number of installations is also described.

INTRODUCTION

QUIZ is a generalized report writer for the HP 3000. QUIZ was originally developed as an internal tool for use by Quasar Systems Ltd. staff in the implementation of turnkey business systems based on the HP 3000. However, the enthusiastic response of our customers has encouraged us to further develop QUIZ into a generalized reporting package.

Quasar was led to develop QUIZ because of a need to provide an inquiry facility for MPE and KSAM files and because of the unsuitability of QUERY as a production report writer for IMAGE databases. Our primary design objective was to develop a tool which could be used both for simple inquiries and ad-hoc reports by clerical level staff and which could also be used by programmers to generate complex production reports.

This paper reviews our experience in the design and implementation of QUIZ. Particular emphasis is placed on the difficulty in meeting the primary design objective.

DESIGN OBJECTIVES

As indicated in the Introduction, the primary objective of the design of QUIZ was to develop a tool which could act both as a database inquiry facility and as a production report writer. This objective can never be completely realized, since the needs of the groups which perform each function are radically different. Therefore, the primary objective was translated into a set of more realistic sub-objectives, which are listed below:

- the report writer must support any combination of MPE, KSAM and IMAGE files, including multiple IMAGE databases in a single report.
- the report writer must allow unlimited logical linkages between keyed files, independent of the physical representation of the data.
- the report writer must be able to produce properly formatted reports from minimal specifications, but it must also be possible to override the automatic formatting and specify the format of the report in detail.
- the report writer must provide the formatting capabilities required by commercial applications, including leading and/or trailing signs, credit/debit indication, currency symbol, punctuation of numeric fields, blank when zero, "n-up" reporting (e.g. 4-up mailing labels) etc..

- the report writer must provide an extensive run-time calculation capability. This capability must include numeric, string and date expressions and the ability to produce counts and subtotals in control breaks.

These objectives are, of course, additional to the basic objectives which should apply to all software development (packaged or otherwise), i.e. that the programs should be easy to use, reasonably efficient, well documented, modular, easily modifiable, etc..

MEETING THE OBJECTIVES

The report specification and a sample page of output from a simple ad-hoc QUIZ report are reproduced in figure 1 below.

QUIZ				
* ACCESS PERSONAL				
* REPORT CACID FIRSTNAME LASTNAME CITY CBASD				
* GO				
11/07/79	NATIONAL COACHING CERTIFICATION PROGRAM			PAGE 1
PASSPORT NUMBER	FIRST NAME	SURNAME	CITY	DATE ADDED
CC000101	ARTHUR E	CORRIER	BUCTOUCHE	25/04/79
CC000102	LEONARD W	MACDONALD	SOURIS	25/04/79
CC000103	KAREN E	MACDERMOTT	BATHURST	25/04/79
CC000104	EDGAR	FERRON	CAP BETERU	25/04/79
CC000105	BOB	DRISDELLE	OTTAWA	25/04/79
CC000106	RAYMOND J H	MELANSON	DIEPPE	25/04/79
CC000107	KENNETH	DURLING	BRIDGETOWN	25/04/79
CC000108	HARRY E	ROBBINS	REGINA	25/04/79
CC000109	FRANCES E	HENDERSON	MONCTON	25/04/79
CC000110	DOUGLAS L	CHAPMAN	NEWCASTLE	25/04/79
CC000111	DAVID H	DOUCETTE	CAMPBELLTON	25/04/79
CC000112	JAMES	HORNBSY	HALIFAX	25/04/79
CC000113	LUDDER	BARBINEAU	ST LOUIS DE L'ENT	25/04/79
CC000114	LESLIE C	MASON	LUNENBURG	25/04/79
CC000115	CARLOS J	FERRERIA	FREDERICTON	25/04/79
CC000116	HENRY G	MACWILLIAM	CHARLOTTETOWN	25/04/79
CC000117	JANET M	MASON	LUNENBURG	25/04/79

FIGURE 1: SIMPLE AD-HOC REPORT

Three commands were required to produce the report. The ACCESS command identifies the file to be read. The REPORT command identifies the data items to be reported. The GO command initiates report production. This sequence, possibly augmented by a SELECT command, is typical of what is required to process online inquiries or simple ad-hoc reports.

The simplicity of this report specification is accomplished in two ways. First, QUIZ provides default formatting specifications which supply a standardized page heading including the current date, the application name, the current page number and field headings. A simple algorithm is used to space the data items across the page and to justify or centre field headings.

Second, the detailed format instructions for each data item have already been provided by the database administrator or system designer. In this sample report, the application name, the field headings and the special formatting applied to the items CACID and DBADD were obtained from a file schema prepared by the database administrator and accessed by QUIZ at run time. The file schema is a description of an application "database" (which may include several (or zero) IMAGE databases, as well as KSAM or MPE files). The description identifies the qualified users of the database, the files which make up the database, the data elements contained in the files and the structure and contents of each record. The description may contain file and element security specifications, data element headings, data element scaling and output format options. The database description need be prepared only once - it is then available to all users of the database.

The previous example illustrates how we have attempted to meet the needs of the unsophisticated user of QUIZ. The next example illustrates how the more sophisticated user can exercise considerable control over the output of QUIZ. The example is also intended to illustrate the facilities provided to meet the design objectives listed in a previous section.

Figure 2 contains the report specifications and sample output of a QUIZ run to produce mailing labels. The example illustrates multi-file access, run-time definition of temporary variables, selection of data, user specified formatting, sorting and control breaks and parameter setting.

The ACCESS command in this example directs QUIZ to read each record of the COACHINTEREST file (an IMAGE detail file containing a list of sports coached), to read the corresponding PERSONAL record (another IMAGE detail file containing name and address information) and to read sport name and province name from the appropriate master files. In this example, the linkages between the files are established automatically by QUIZ which searches for an occurrence of the primary key item of newly accessed files in one of the preceding files. For secondary key access, or for linkages between items with different names, the linkage may be explicitly specified.

The DEFINE commands illustrate the definition of run-time character string variables. NAME is defined to be a 30 character string made up of a concatenation of the first name, a space and the last name, packed together so that leading and all but one intervening spaces are suppressed. Numeric and date expressions may be defined in a similar manner.

The SELECT command defines a selection criterion applied to each (compound) record read. Note that parentheses may be used to alter the precedence of the AND and OR connectors.

The REPORT command specifies the contents and format of the detail report lines. TAB and SKIP parameters are used to specify the format of the detail report group. TAB specifies the column in which the printing of a field should begin. SKIP indicates the number of lines to be skipped before the next field is printed. The default format of any data item may also be overridden. In the example, the POSTCODE field is to be printed with an additional space between the initial three and final three characters.

QUIZ

SPECIFICATION

```

USE QUIZTEST LIST
ACCESS COACHINTEREST%
  LINK TO PERSONAL%
  LINK TO SPORTMAST%
  LINK TO PROVMAST

DEFINE NAME STRING*30 = PACK(FIRSTNAME+" "+LASTNAME)
DEFINE LOCATION STRING*24 = PACK(CITY+" ", "+PROVINCE")

SELECT IF SPORT > 0 AND RESULTS = "Y" AND%
  (DBADD OF COACHINTEREST >= 790401 OR DBMOD OF PERSONAL >= 790401)

REPORT TAB 2 NAME%
  SKIP TAB 2 STREET%
  SKIP TAB 2 LOCATION%
  SKIP TAB 2 POSTCODE PICTURE "###-####"
  SKIP TAB 2 CACID "-" SPORTNAME%
  SKIP 9

SORT%
  ON PROVINCE FOOTING PROVINCENAME SKIP "LABELS PRINTED:" COUNT%
  SKIP "*****" SKIP 9%
  ON CITY ON LASTNAME ON FIRSTNAME ON CACID ON SPORT

SET NOHEAD
SET REPORT DEVICE PRINTER
SET REPORT FORMS "2-UP MAILING LABELS"
SET PAGE LENGTH 9 WIDTH 35 IMAGES 2

GO

```

G ROBERT CAPEN
BOX 118
STANLEY, NB
E0H 1T0

CC000384 - VOLLEYBALL

DAVID O DAYE
127 BROADWAY
WOODSTOCK, NB
E0J 2B0

CC000315 - BASEBALL

DAVID O DAYE
127 BROADWAY
WOODSTOCK, NB
E0J 2B0

CC000315 - BASKETBALL

NEW BRUNSWICK
LABELS PRINTED: 39

CHARLES M ENNIS
72 HIGH ST
BAIE VERTE, NF
A0K 1B0

CC000175 - SOFTBALL

TONY BOWERING
BOX 538
BAY ROBERTS, NF
R0A 1G0

CC000399 - VOLLEYBALL

PATRICIA CLARKE
BOX 408
BAY ROBERTS, NF
A0A 1G0

CC000292 - VOLLEYBALL

JOHN G HENLEY
BOX 659
CLARENVILLE, NF
A0E 1J0

CC000351 - SOFTBALL

FIGURE 2: A MORE COMPLEX REPORT

The SORT command specifies the order in which the selected data is to be reported and identifies any control breaks required. Six sort keys are used in this example, specified in sequence from the major key (PROVINCE) to the most minor key (SPORT). A control break will occur on PROVINCE, and a control footing (summary) will be printed including the name of the province, a count of the number of labels printed for the province and a line of asterisks. The syntax of the specification of control headings or footings is identical to the syntax of the REPORT statement. The same syntax may also be used to specify an initial heading, a final footing, page headings and page footings.

The mailing label report also uses several parameter settings. The standard page heading is eliminated (NOHEAD). Output is routed to the system printer and a forms message is entered for display to the operator. The output page is set to a standard mailing size (9 lines x 35 characters, "2-up").

PRACTICAL EXPERIENCE

The reaction of our clients to QUIZ has been very enthusiastic. However, we have learned the truth of the maxim "you can't please everybody". In particular, one cannot expect to provide all the features required by programmers involved in the production of complex reports or processing complex file structures. "One more" feature is always required. As these additional features are added, the complexity of the program and, especially, its documentation and help facilities increases and it becomes less attractive as a vehicle for simple database inquiry. It has proved to be relatively straightforward to add additional formatting options to QUIZ, without obscuring the simplicity of the design. We have been much less successful in accommodating more complex file structures, such as header and detail records within the same file, multiple record types from the same file reported simultaneously, and complex variable length structures.

QUIZ has now been installed on five HP 3000 computers across Canada. A variety of application systems have been implemented using QUIZ both as an inquiry tool and for generation of production reports. Applications have included a licensing system, a sports result system, a payroll system and a number of standard business applications. QUIZ has been used to print paycheques, membership cards, invoices, mailing labels and other forms, in addition to standard tabular reports. We are confident that the use of QUIZ in these applications has resulted in substantial reductions in cost of development of production reports and inquiry facilities.