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EDUCATIONAL POLICY AND PLANNING PROJECT

INDONESIA

Microcomputer Applications for Education Planning and Management: A Modular Training Program

MODULE II Development of the Educational Management Information System

Office of Educational and Cultural Research and Development
Ministry of Education and Culture

December 1986

IEES

Improving the Efficiency of Educational Systems

Florida State University
Howard University
Institute for International Research
State University of New York at Albany

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PREFACE

The Educational Policy and Planning (EPP) Project is a six-year project conducted jointly by the Indonesian Ministry of Education and Culture (MOEC) and the Education and Human Resource Division of the United States Agency for International Development (USAID). The overall project objective is to improve the quality of education in indonesia by assisting the MOEC through the Office of Educational and Cultural Research and Development (Balitbang Dikbud) to formulate better policies and long-term plans. Specifically, the project aims to improve policy formulation and long-term planning by improving the timeliness, relevance, and accuracy of data collected, the subsequent analyses of such data, and the ultimate use for policy and decisionmaking.

There are three major components under the EPP Project: (1) to help the MOEC develop an integrated management information system (MIS), (2) to help the MOEC enhance its policy research and analysis capacity; and (3) to support the MOEC institutional development at the national and provincial level through training. Each of the above components is being implemented at the national level and in three pilot provinces. EPP technical advisory staff work closely with counterpart Indonesian staff as part of a collaborative process of developing institutional capacity.

As a part of the third major component (to support institutional development through training) the EPP Project has developed a set of four training modules in computer applications for educational planning and management. These prototype training modules are especially designed to demonstrate the application of computers for performing educational functions of management, control, monitoring, planning, and budgeting at the provincial level. The modules are laid out in a performance-based instructional design in order for the trainee to master computer skills and package program use in performing their educational tasks. The data utilized in the exercises is on four diskettes which can be obtained on request from Balitbang Dikbud. The program diskettes, i.e., DBASE III plus, Lotus 123 release 2, QuickCode II, and Quick Report, can be purchased in the commercial market. A task analysis of the three EPP pilot provincial education offices was conducted prior to and as a basis for the development of the instructional modules. The focus was on the Provincial Planning Unit which includes the subunits of Program Planning, Data Collection, and Monitoring.

The modules were developed by Mr. Yip Hak Kwong, consultant in Educational Statistics and Computer Applications and Dr. Nat J. Colletta, Education Planner and Chief of Party EPP in collaboration with the Center of Information, Office of Educational and Cultural Research and Development (Balitbang Dikbud). The materials were field tested in the process of training teachers at the Graduate Education Facility, Yogyakarta Institute of Teacher Training and Education (IKIP Yogyakarta). Balitbang has recently translated the materials into Indonesian for further field testing in the three pilot provinces. It is expected that after further field testing and revision the prototype modules would be disseminated through the appropriate MOEC unit.

Harsja W. Bachtiar, Head
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(December 1986)

INTRODUCTION TO EPP TRAINING MODULES ON THE DEVELOPMENT & USE OF MIS ON MICROCOMPUTERS

1.0 Purposes

1.1 These training modules on the development and use of the education management information system are primarily designed for planners and administrators at the provincial level, who are responsible for collecting, processing and analyzing statistics for educational planning and management. The main feature of the modules is the use of microcomputers to enhance the speed, flexibility, and versatility in the use of information.

1.2 The purposes of the modules are as follows:

- To introduce to the participants the basic framework of an integrated education management information system which could be used to serve the varied needs of different users;
- To demonstrate how such a system could be set up, making use of microcomputers, and how data could be retrieved for analytical purposes;
- To show how an interactive model(s) for diagnostic, forecasting, planning and budgeting purposes could be developed on microcomputers; and
- To show, as well, how the computer system and the models could easily be modified to cope with unforeseen changes in requirements, with the help of user-friendly software packages abundantly available on the market.

2.0 The Hierarchies of Information

2.1 When viewed in terms of the point at which information is collated and used, there are three main levels of information:

- The school level, at which detailed information about individual pupils, teachers and staff (including their name, age, sex, grade, home address, academic performance, qualification, salaries, etc.), as well as information about the schools (e.g., area, number of rooms, equipment, etc.) have to be kept for the smooth running of the schools concerned;
- The district level, where not all the data kept by schools are required. Only summary statistics such as the number of pupils by age, sex and grade, and the amount of recurrent expenditures are required for individual schools; and
- The national level, where, depending on the extent of decentralization, detailed information on individual schools may not be required. Only summary information is collected at the subdistrict or district level.

2.2 Alternatively, depending on the usage, information could be distinguished between that for:

- planning,
- management control, and
- operation.

2.3 Ideally, information at the school, district, and national level should be integrated and shared in one, or one network, of data base(s). For instance, information stored in schools could be computerized, and only the relevant data would be extracted and passed to the computer system kept at the district level;

and the similar procedure could apply to the flow of information between the district and national level. This could help avoid a lot of duplication of work, and solve the problems of quality of data and the time lag in producing the information. With the use of individualized data bases, more accurate information could be made available about pupil and teacher flow, which is extremely useful in planning school location, and teacher demand and supply. The individualized data base could also reduce considerably the data problems confronting educational researchers, especially those engaged in longitudinal studies.

2.4 Similarly, the same can be said of information for planning, management control and operation. For instance, a simple ledger accounting system, if carefully designed and computerized, could provide a wealth of information useful in monitoring spending, analyzing cost structure and efficiency, as well as for forecasting and planning educational expenditures.

2.5 For the purpose of the present training modules, it is not proposed to cover the entire spectrum of the information system as discussed above, which would be clearly beyond the scope of this training program. Attention will mainly be focused on the following:

- The flow of information from schools to the provincial and central offices via the usual channel of school surveys conducted by the Balitbang; and
- The use of such information for planning and administrative purposes at the central as well as provincial level.

Once the participants have mastered the basic principles and techniques discussed in this training program, they should have relatively little difficulties to applying them to different information environments in their daily work.

3.0 Organization of the Modules

3.1 There will be four modules in this training program, which are as follows:

- Module I: Overview of basic concepts and computer applications in educational planning, management, and research;
- Module II: The development of the Education Management Information System;
- Module III: The use of the Education Management Information System for management control; and
- Module IV: The use of the Education Management Information System for planning.

4.0 The Structure of Instructional/Learning Process

4.1 Much of the emphasis placed in this training program is the use of microcomputers and software packages. Although data base and spreadsheet programs for data files creation and manipulation and modeling have already been designed for the participants, they inevitably have to understand and practice the techniques in the use of microcomputers and software packages. With the availability of many user-friendly software packages and utility programs, computer programming could be kept to a minimum. It is also the aim of this training module to show to the participants that understanding the basic principles and operating system of the various software packages would be sufficient to enable them make full use of the information available to them for planning, management and research. For those participants who have a keen interest in computer programming and in mastering the software package, this training module will prepare them for further improving their computer skills by practicing the techniques demonstrated in this program.

4.2 It is recognized that the design of a management information system should be largely user oriented. It should start by looking at the potential uses of information rather than for the collection of information per se. However, it would be deceptive to assume that all potential uses of information could be foreseen at the time a management information system is constructed. Furthermore, the requirements and practices in educational planning and management in Indonesia vary considerably from province to province. Thus, it is almost impracticable to include the specific requirements of each and every province in designing the training modules.

4.3 Naturally, participants to the training program would come from different divisions of the provincial education offices. Some of them may mainly be concerned with say planning and budgeting, while others in the supervision of schools or other management functions. Some may be involved only in data collection. Consequently, not all parts of the training program would be of equal interest to the participants.

4.4 Taking into account the above considerations, the approach adopted in the design of the training materials is as follows:

- APPLICABILITY is emphasized in the training program. Wherever possible, practical sessions on microcomputer applications are included in the modules so that the participants can have "hands-on" experience in the course. They will also be invited to try to include some of their daily planning, management and research tasks into the practical sessions, making use of some of the techniques and methods discussed in the training program;

- FLEXIBILITY will be introduced in the design of the training materials so that alternate designs and applications of the management information system will be tested during the practical sessions, making full use of the versatility and flexibility of a computerized data base and the computer software packages; and

- a MODULAR approach will be adopted in the course so that each module is as self-contained as possible.

4.5 The structure of the instructional and learning activities for each of the four modules will thus be arranged as follows:

- Overall Objectives of each of the modules will first be stated so that instructors are aware of the while purpose of the module as well as the knowledge which is expected to be imparted during the instructional and learning processes;

- Module Performance Objectives will also be stated to enable the instructors to assess the extent to which the behavior of learners would be changed upon completion of the module. More specific performance objectives will also be given for different instructional units within a module;

- The actual instructional and learning processes are divided into four phases as follows:

  - Instructional activities where the instructors will present to the learners the teaching materials for the module and unit concerned. The teaching materials will cover the basic conceptual issues related to the topic in question, and fundamentals of computer applications that will be demonstrated, highlighting strengths and weaknesses of such applications;

  - User manual where the instructors will carry on with the presentation, but using microcomputers to demonstrate the various applications in planning, management, and research. The detailed step-by-step procedures required to be followed in developing and using the different computer applications will be described in this user manual section. Therefore, this section is designed for both the instructors and the learners;

- Learning activities where the interaction between the instructors and learners will take place. The learners will be asked to:

  - practice the techniques in developing and using the data bases or models demonstrated by the instructors;

  - then the participants will be divided into groups to discuss the concepts, approaches and methods used in the training materials. During the group discussion, they will be asked to suggest alternative approaches to the development and use of the management information system;

  - based on the alternative designs suggested, the learners will, under the guidance of the instructors, actually develop a new management information system and different models of computer applications;

- Post-assessment where the instructors will attempt to evaluate the extent to which the learners have been able to have a firm grasp of the contents of the training materials. A number of questions and assessments have been proposed in the unit, and individual learners will be asked to do the assignments themselves.

5.0 Choice of Computer Software Packages

5.1 With the rapid development in computer technology, it is difficult to choose software packages which are both the most up- to-date and are familiar to both instructors and learners. Therefore, the factors used in choosing a computer software are the power of the software, the ease of use and its popularity.

5.2 Two types of computing functions are required for these training modules:

- data base management; and
- spreadsheet applications.

A number of software packages have been very successful in integrating data base management with spreadsheet applications, and some statistical functions. However, these packages have limitations which dictate against using them in the training program. Nearly all of these packages are memory (or RAM) based, thus severely limiting the size of the data base that could be handled by the package. The availability of RAM banks or boards can increase the memory capacity of a 16-bit computer like an IBM PC/XT or its compatible to something like 8 mega-bytes. However, these are not yet very popularly used. Furthermore, most of these integrated softwares are not designed to handle relational data bases, a feature which is required in developing the management information system proposed in this training program. As a result, two separate software packages have been used in this training program, with each performing one of the two functions mentioned above.

5.3 A large number of data base and spreadsheet packages are available. The choice of one set of packages does not imply that the others available in the market are not suitable. The following packages are chosen for reasons given below:

- DBASE III (version 1.1 or 2) has been chosen for data base management. There are other data base packages which are as powerful as DBASE III, like RBASE 5000 and KNOWLEDGE 2. DBASE III is chosen mainly because it is more user-friendly with its assistant facilities. Other equally if not more powerful softwares like REVELATION and INFORMIX could be adopted in the training program. But it appears DBASE III is more popularly used in IBM PCs or the compatibles. In any case, the adoption of DBASE III in this training program does not preclude the participants from adapting the methodology and approach used in the training program to other data base management software, including newcomers like PARADOX (version 1.1); and

- LOTUS 123 (version 2) has been chosen as the spreadsheet software package largely because of its popularity and its extremely user-friendly approach. Other softwares like VP- PLANNER which is claimed to have almost the same capabilities as Lotus 123, to other software like MULTIPLAN (version 2) which has the additional facility of liking different spreadsheets, could well be adopted, following the approach and methods used in the training program.

5.4 Summing up from the above, the structure of this training program could be visualized as follows:

Module	Contents	Software
I	Basic concepts and computer applications	
	Unit 1: Issues & problems in educational planning,management and research	
	Unit 2: Microcomputer applications	
	Unit 3: Data requirements identification and assessment	
		WORDSTAR
II	Development of the Education Management Information System	
	Unit 1: Data base construction	
	Unit 2: Information retrieval	
		DBASE III QUICKCODE III
III	The Use of the Education Management Information System for Management Control	
	Unit 1: Routine administration of schools and projects	
	Unit 2: Monitoring performance of education system	
		DBASE III QUICKREPORT
IV	The Use of the Education Management Information System for Planning	
	Unit 1: Diagnostic analysis of pupil flow	
	Unit 2: Forecasting enrollment in school	
	Unit 3: Forecasting teacher and other resource requirements	
		LOTUS 123

It may be noted above that the use of WORDSTAR (version 3.3 or 2000) will be demonstrated when Module 1 is presented to the participants so that they may after the training program be able to use wordprocessing software for report writing.

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Module II

The Construction of the Education Management Information System

I. Introduction

1. Overall Module Objectives

1.1 The purpose of this module is to present to the participants the basic considerations in:

(a) The design and the construction of an integrated and computerized Education Management Information System (making use of microcomputers), which could serve simultaneously the needs of provincial planners/administrators, as well as their counterparts in the central ministry of education. The activities involved include the design of the questionnaires, and the setting up of the data base system for inputting, processing, and storing information;

(b) The use of the Education Management Information System in preparing reports for the central government, and other summary reports required to be compiled from time to time for administrative and planning functions.

1.2 Module Performance Objectives. On completion of this module, the participants are expected to be able to:

(a) Create the computerized information system, making use of microcomputer software packages;

(b) Produce simple reports from the data base so one can construct and retrieve information from it.

2. The Organization of the Module

2.1 The module is organized into two units, namely:

(a) Data Base Construction, where the essential considerations and related technical aspects involved in creating a computerized data base will be examined;

(b) Information Retrieval and Reporting, where the use of the data base so constructed for retrieving information and producing simple reports will be demonstrated.

2.2 It is hoped to underline in this module the flexibility and versatility that one could have in constructing a computerized data base, making use of software packages like DBASE III. Therefore, the active involvement of trainees is emphasized. After going through the course contents and the demonstration:

(a) The instructor would invite the trainees to comment on the relevance and practicability of the models and computer systems used in the course content. This would be a free and open discussion;

(b) The trainees are expected to give alternative suggestions to the model and computer system designs, based on their own knowledge and practical experience in school management, educational administration and planning. It would be useful if the trainees could bring along some of their data sheets, questionnaires, and reports used in their work to facilitate discussion and the subsequent practical exercises;

(c) On the basis of the suggested alternative designs, the trainees would be guided to construct different data files and retrieve information from the data files constructed. Although the software package DBASE III chosen for the course requires a fair amount of programming for more sophisticated data base design and information retrieval, the trainees would be shown that their tasks would be greatly simplified by using software packages like QUICKCODE III.

II. Unit 1: Data Base Development

3. Performance Objectives

3.1 The objective of this section is to spell out the step-by-step procedure that could be taken in the construction of a computerized data base. On completion of this unit, the participants are expected to be able to:

(a) Understand the basic considerations in the design of a computerized education management information system;

(b) Draw up the data base structures and the various programmes for data input, storage, and retrieval;

(c) Create the data base files and input data into the data base.

4. Instructional Activities

4.1 Sources and Flow of Data

4.1.1 There are two main sources of information, namely:

(a) Administrative records which could provide a lot of statistical information useful for planning and administration;

(b) Questionnaire surveys of schools which represent the more common means of collecting statistics for educational planning and other information required by the central education authorities.

4.1.2 There are definite advantages in trying to make as much use of the administrative records as the source of information, as they are usually more accurate and timely, especially if finances are involved. The problems are that the manner in which these data are classified and analyzed in such a way that they are only useful to those agency/office undertaking the data collection. Thus, they may not be useful to other users, in particular the planners. Furthermore, there may be great difficulty in retrieving such administrative information.

4.1.3 For information derived from questionnaire surveys of schools, it is usually more comprehensive and geared to the requirements of different users. However, there are problems of relevance, especially if the classification, coverage and counting rules are not consistent with the one adopted for finance, budgeting, and other management functions. Moreover, the data may not be available on time, because of the large number of schools involved. As schools may not have any incentive in completing the questionnaires, the data collected may not be reliable due to poor response and inaccurate reporting.

4.1.4 For the purpose of the present discussion, it is assumed that the main, if not only, source of information is from the survey of schools. Efforts will be made, in the design of the management information system, to overcome the problems discussed in paragraph 9.3 above, by trying to:

(a) streamline the procedure of data collection and processing through the use of microcomputers in setting up an integrated data base system;

(b) make the data base more useful to the provincial planners and administrators, by incorporating some of their data needs into the system.

Notwithstanding the above, it is still hoped that in the course of presenting this module to the participants, useful information items which could be obtained from administrative records could be identified and incorporated into the data base.

4.2 The Structure of the Data Base

4.2.1 The data base is to be set up at the provincial education office, with each individual record being a school. The data base may be organized into five data files as follows:

(a) the pupil stock file,
(b) the pupil flow file,
(c) the teacher file,
(d) the school file, and
(e) the school master file.

It is of course possible to put all information into a big file for the school as a whole, including information on pupil, teacher and school. This is the case with the present questionnaire format used by the provincial offices which combines the three types of information into one questionnaire. The former approach is adopted in this module, because it is considered more efficient to handle data files with fewer number of fields, especially if the number of records is big. With the use of such software packages as DBASE III, it is always possible to link different data files together for cross tabulations and analyses. Furthermore, the limited number of fields (being 128) permitted in a DBASE III data file almost dictates the adoption of the former approach.

4.3 The Creation of the Data Base Files

4.3.1 The essential steps involved in the creation of the three data base files outlined above compromise the following:

(a) The design of data collection forms (i.e., the questionnaires) to be sent to schools);

(b) The design of the structure for different data base files, defining field names, types and lengths. The software package DBASE III will be used in the exercise and the compilation of programs for data entry, validation and editing for the setting up of the data base.

4.3.2 Questionnaire Design. It is highly desirable that the same form could be used for subsequent data preparations (i.e., the input of data collected into the computer system). In designing the form, the need for simplicity and ease of completion on the part of the school staff is stressed. Four different questionnaires are required to be prepared, which are as follows:

(a) questionnaire on the stock of pupils,
(b) questionnaire on pupil flow,
(c) teacher questionnaire, and
(d) school questionnaire.

To facilitate future linkages between different data files, suitable references for identification (e.g., school codes) have to be incorporated into the questionnaires. Suggested specimens for the above four questionnaires are given in Figures I-IV below. It may be noted that efforts have been made to follow the format of the questionnaire now being used by the Ministry to collect statistics from schools. Because of the limited number of fields permitted in a DBASE III data file, that part of the questionnaire covering the age distribution of pupils by grade and by whether public or nonpublic (see Figure I) has been simplified.

4.3.3 In this unit, the questionnaires shown in Figures I-IV will only be used for illustrative purposes. For the practical exercises, and alternative, simplified set of questionnaires will be used, as the statistics available for designing the training materials are not detailed enough for the questionnaire design suggested in Figures I-IV.

Figure I

Questionnaire on the Number of Pupils Enrolled

Name of school _____ School Code [_____]

School Year [_____]

Session: Morning/Afternoon/Combined* Session Code [__]

Number of Pupils Enrolled

Grade	I	II	III	IV	V	VI
AGE:						
6	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
7	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
8	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
9	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
10	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
11	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
12	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
13	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
14	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
15	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
16	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
17	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Total	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Public	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Non-public	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
No. of classes	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

Number of pupils by Religion:

Islam	Protestant	Katolik	Hindu	Budha	Total

Name of Principal_____ Signature_____ _____

Date:_____

*Delete as appropriate

Figure II

Questionnaire on Pupil Flow

Name of school _____ School Code [_____]

School Year [_____]

Session: Morning/Afternoon/Combined* Session Code [__]

	GRADE						
	I	II	III	IV	V	VI	Total
No. of repeaters							
Boys	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Girls	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
TOTAL	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
No. of new entrants							
Boys	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Girls	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
TOTAL	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

Age Distribution of Grade 1 New Entrants:

Age	< 6 yrs	7 yrs	8 yrs	9 yrs	10 & over
Total					

Number of Grade 6 pupils taking EBTA in last school year

No. of Grade 6 pupils	No. taking EBTA	No. passing EBTA

Name of Principal: _____ Signature: _____

Date: _____

*Delete as appropriate

Figure III

Teacher Questionnaire

Name of school _____ School Code [_____]

School Year [_____]

Session: Morning/Afternoon/Combined* Session Code [__]

Number of Teachers

Q	I	II	III	IV	V	VI	VII	VIII
Public Teacher:								
Head	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Class	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Religion	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Sports	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Nonpublic Teacher:								
Head	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Class	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Religion	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Sports	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Total	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

Q: Qualifications:

I-SD dan Sederajat
II-SGB, SPG, C1, C2, PGA dan UGA
III-SMTP bukan Keguruan
IV-SGA, SPG, SGPLB, SGO, SMOA, KPG
V-SMTA bukan Keguruan
VI-PGSLP
VII-PGSLA, B-1, Sarjana Muda
VIII-B-II, Sarjana

Number of nonteaching staff

Administrative		Labourer/Gardener		Other Staff	
P	N	P	N	P	N

Name of Principal:_____ Signature:_____

Date:_____

*Delete as appropriate

Figure IV

School Questionnaire

Name of school _____ School Code [_____]

School Year [_____]

Session: Morning/Afternoon/Combined* Session Code [__]

I. Facilities Available

	The condition of classrooms			
(a) Number of classrooms:	poor	fair	good	Total
owned	[ ]	[ ]	[ ]	[ ]
not owned	[ ]	[ ]	[ ]	[ ]

(b) Number of Science laboratories [ ]

(c) Whether a school library available [ ]

and if yes, number of library books [ ]

II. School Finances

(a) Recurrent Income for the Year

Central Govt. recurrent	Provincial/ local govt.	Parents' contrib.	Other contrib.	School profits	Total

(b) Nonrecurrent Income

Central Govt.	Provincial/local	Others	Totals

(c) Recurrent Expenditure

Teacher sal.	Other salaries	Admin. costs	Others	Total

(d) Nonrecurrent [ ]

(e) Desired level of expenditure: Recurrent [ ]

Nonrecurrent [ ]

Name of Principal:_____ Signature:_____

Date:_____

*Delete as appropriate

4.4 Program Development for Constructing Data Base

4.4.1 In designing the data base, it is always advisable to determine in advance:

(a) The data items to be included in data file;

(b) The field names for each data item, and the key field which would serve as the link to other related data files. It is noted that the maximum number of fields allowed in one data file is 128;

(c) The characteristics of the different fields, i.e., whether the field data type is numeric, character type, data type, logical, or memo type, and the length of the field;

(d) Whether allowance should be made for the inclusion of computed fields.

One need not be too worried about what the initial design is. With a flexible data base software like DBASE III, there is always room for changing the data base structure after the data have been entered. However, caution is required to avoid any drastic changes, as it takes both time and demands careful updating in changing the data base structure, especially when the data base contains a substantial number of records.

4.4.2 To accept and organize the statistics collected from the questionnaires into the microcomputer requires the development of at least the following:

(a) The data base file specifying the structure of the data base, i.e., the names of fields, field lengths, and characteristics;

(b) A program which could facilitate the entering of data into the data base, the so-called ADD program;

(c) A program which could validate data entered, and computations on the data. This program could be linked to the ADD program;

(d) A program to create the index file which could facilitate subsequent data retrieval, data editing and reporting.

4.4.3 Besides the writing of programs to facilitate the input of data into the data files (see 7.4.1(b) above), one can conveniently make use of the various commands and the

assistant in DBASE III for data entry and indexing. This would be demonstrated in the practical session (see Section 8 User Manual).

4.4.4 As discussed above, a school master file would be created as well. This master would contain basic information about the schools in the province, such as name, address and possible other physical facilities such as the number of classrooms. Information contained in this file should not change very often, so that it is not necessary to include such information in the regular surveys of schools. The file could be updated when new classrooms are constructed in the school, or after the school has been closed down, or when new schools are built. For the purposes of the present module, only the following information items are included in the school master file:

(a) school code,
(b) name of school, and
(c) address of school.

Additional information can of course be added into this data base.

5. User Manual

5.1 Getting Started

5.1.1 The user manual is designed for:

(a) The instructors in demonstrating the various steps involved in constructing a data file and in subsequent information retrieval and reporting;

(b) The trainees in having "hands-on" use of the various microcomputer software which has been designed for the unit, during the practical sessions.

5.1.2 The practical exercises are designed to be run on any IBM compatible microcomputer, operating on DOS 2.0 or above, with at least 256 K bytes of memory, 2 double sided floppy disk drives or 1 double sided disk drive and a hard disk.

5.1.3 The standard software packages used in this unit are DBASE III (Plus or Version 1.1) and QUICKCODE III. In booting up the microcomputer, it is recommended to reserve 20 file and 24 disk buffers (the default values are 8 and 2 respectively) using the CONFIG.SYS file in the DOS diskette.

5.1.4 The various data files and programs designed for this unit are stored in the diskette labeled "EPP Mod.v.1" and "EPP Mod.v.2." The files in the original diskette are protected against modifications and deletion. It is therefore necessary to make a backup copy of the diskettes and use the backups for practical exercises. Any accidental deletion or deliberate amendments to the various data files and programs during the practical sessions would not affect the original data files and programs.

5.1.5 In starting up the system, the following procedure should be adopted:

(a) After the microcomputer has been booted up, change the system prompt (i.e., >) to the B drive or the C drive for the system with a hard disk;

(b) Start up the DBASE III program from the B drive (or the C drive);

(c) Put the Diskette "EPP Mod.v.2 (or 1)" in Drive A.

5.2 Creation of the School Master File

5.2.1 Using the simple school master file which contains only three data items (namely school code, school name and address), the essential steps in the initial development of a data base are demonstrated. In planning the data base design, the following have to be considered:

(a) Defining data characteristics, which is to assign to each data item:

(1) the field name, which can be any name not more than 10 characters long. If the data item appears in more than one data base, the same field name should be used. It is essential not to duplicate the field name in the same data file. The following field name is suggested for the school master file:

school code:	SCH_CODE
school name:	NAME
address:	ADDRESS

The school code (SCH_CODE) is the common field which links the school master file with other data files.

(2) field type, which reflects the attribute of the data for the data item (or field) concerned. The type selected determines the type of manipulation

of the data which is allowed in the system. Five types are allowed in DBASE III:

- character with a max. width of 254 characters
- numeric, with a max. width of 19 and accurate up to 15 digits
- date, with a default width of 8 and reckoned as MM/DD/YY with the slashes automatically provided by DBASE III
- logical, with a default field width of 1 and can only be a T(rue)/F(alse) or Y(es)/N(o) response
- memo which is useful for storing comments about the record. In DBASE III PLUS, up to 5000 characters (more than two full pages of text) can be stored in the memo field. The memo field is stored in a separate file in the disk.

Since no arithmetic operation will be performed on the three fields in the school master file, all the three fields are designated as character fields.

(3) field width is an intelligent guess that has to be made according to the length of the data items. Assigning too short a field width would cause the data items which are longer than the field width to be truncated. The following field widths are suggested:

school code:	12 characters
school name:	30 characters
address:	100 characters

(b) Indexing which plays a central role in any data base system. The main advantage of indexing is to considerably speed up data retrieval, as building an index is much faster than sorting a file. Up to 7 indexes may be opened at any one time for a data base, and doing so is much more efficient than maintaining 7 sorted files. As the school master file may have to be assessed based on the different type of school, the status of school, the province, district, and subdistrict of the school, it is advisable to have separate fields for these keys:

school type:	ST
school status:	SS
province:	SP
district:	SKA
subdistrict:	SKE
school number:	SE

The above 6 fields make up the field of school code (SCH_CODE).

(c) computed field--as the 6 fields listed in (b) above are, taken together, the same as the field for school code (i.e., SCH_CODE). In order to avoid the need to input the same information twice during data entry, it is convenient if the value of the field for school code could be generated from the inputs to the 6 other fields. This can be done by concatenating the character strings in the 6 fields listed in (b) above.

5.2.2 The actual process of creating the school master data file is shown in paragraph 8.2.3 below, making use of the CREATE command in DBASE III. The CREATE command accomplishes three tasks:

(a) Creating the data base file;
(b) Defining the structure of the data file; and
(c) Opening the file for data entry, if required.

In the procedures given in paragraph 8.2.3, all DBASE III commands are written in UPPER CASE only and are preceded with an asterisk (*) for ease of reference. As the school master file (names SCHMAS) has already been constructed and stored in the diskette "EPP Mod.v.2," in creating another school master file during the practical sessions, a different file name (say SCHMAS1) should be assigned.

5.2.3 The following steps are suggested in actually creating the school master file:

(a) Start up DBASE III, and at dot command type *SET DEFAULT TO A to specify the drive to store the file;

(b) *CREATE SCHMAS1 and DBASE III will display a screen with highlighted blocks for entry of field names, types of fields, field widths and the numbers of decimal places required;

(c) Enter the information requested as per paragraph 8.2.1 above;

(d) After completing defining the data base, the system will prompt whether one would proceed to data input. One can proceed to data input immediately. Alternatively, one can input data by:

    (1) *USE SCHMAS1 to open the data file;
    (2) *APPEND to begin adding records;

(e) *DISPLAY STRUCTURE in order to examine the structure of the school master file. The output can be directed to the printer using *DISPLAY STRUCTURE TO PRINT. The following should show up either on screen or from the printer.

Figure V: Structure of SCHMAS

Structure for data base: A:schmas.dbf
Number of data records: 69
Date of last update: 07/21/86

Field	Field Name	Type	Width	Dec
1	ST	Character	2	
2	SS	Character	1	
3	SP	Character	2	
4	SKA	Character	2	
5	SKE	Character	2	
6	SE	Character	3	
7	SCH_CODE	Character	12	
8	NAME	Character	30	
9	ADDRESS	Character	100	
Total			155	

(f) There are several ways of viewing the records in the SCHMAS data file:

(1) *USE SCHMAS to open the data file in Diskette "EPP Mod.v.3";

(2) *DISPLAY ALL which causes DBASE III to list the data base on screen, 20 lines (20 records if one record per line) at a time;

(3) *BROWSE which is a full-screen, menu assisted command for editing and appending records;

(g) To create the computed field SCH_CODE, perform the commands:

(1) *REPLACE ALL SCH_CODE WITH ST+SS+SP+SKA+SKE+SE to concatenate the character strings in the 6 fields.

(2) the system would respond after manipulation with "69 records replaced";

(3) *DISPLAY NEXT 10 will list the contents of 10 records after the replace command. The results are shown in the figure following.

Figure VI: Show SCHMAS with DISPLAY

Record#	ST	SS	SP	SKA	SKE	SE	SCH_CODE	NAME
1	10	1	23	05	02	001	101230502001	SDN NOI KEMPO
2	10	1	23	05	02	002	101230502002	PEKAT
3	10	1	23	05	02	003	101230502003	KWANGKO
4	10	1	23	05	02	004	101230502004	SORO
5	10	1	23	05	02	005	101230502005	SORIUTU
6	10	1	23	05	02	006	101230502006	NO2 KEMPO
7	10	1	23	05	02	007	101230502007	BANGGO
8	10	1	23	05	02	008	101230502008	DOROPETI
9	10	1	23	05	02	009	101230502009	NAPA
10	10	1	23	05	02	010	101230502010	NANGAMIRO

(4) It can be noted from the above table that the values for the field SCH_CODE have all been computed;

(h) To create an index file SCHMAS.NDX by:

(1) *INDEX ON SCH_CODE TO SCHMAS

(2) *DISPLAY NEXT 5 and Figure VII gives the results after the SCHMAS file has been indexed:

Figure VII: Show Indexed SCHMAS by DISPLAY

Record#	ST	SS	SP	SKA	SKE	SE	SCH_CODE	NAME
18								
69								
1	10	1	23	05	02	001	101230502001	SDN NOI KEMPO
2	10	1	23	05	02	002	101230502002	PEKAT
3	10	1	23	05	02	003	101230502003	KWANGKO

Records 18 and 69 are displayed first because the two records do not contain any information.

(i) Before closing this subsection, it is useful to introduce two commands which DBASE III provides, for controlling the display and collection of data. They are the @SAY and GET. The entry screen provided by the APPEND command, as demonstrated in the previous exercise, are rather crude and would be difficult to use when a large number of fields are involved. If the field names used are very short abbreviations (e.g., ST, SS, & SKA used in the SCHMAS data file), there would be problems using such crude data entry screen by those clerical officers who are unfamiliar with the data base system. It is not proposed to introduce complex programming into this module, as it is not always deemed

necessary for most purposes. However, it would still be useful to know this tool is available in DBASE III, and an understanding of the two commands would be helpful in looking at the programming generated by QUICKCODE III in the next subsection.

(1) It is necessary first to create a format file called SCHMAS.FMT, using the DBASE III editor:

```
*MODIFY COMMAND SCHMAS.FMT
```

(2) The suggested format file is as follows:

```
@ 3,25 SAY "CUSTOM SCREEN FOR SCHMAS FILE"
@ 4,25 SAY "----------------------------"
@ 6,2 SAY "SCHOOL STATUS & SESSION CODES" GET ST
  PICTURE "99"
@ 6,40 GET SS PICTURE "9"
@ 8,2 SAY "SCHOOL DISTRICT CODES" GET SP PICTURE
  "99"
@ 8,30 GET SKE PICTURE "99"
@ 8,40 GET SKA PICTURE "99"
@ 10,2 SAY "SCHOOL NAME:" GET NAME
@ 12,2 SAY "ADDRESS:" GET ADDRESS
```

(3)
```
*SET FORMAT TO SCHMAS
*EDIT
```
These would cause the SCHMAS data file to be displayed according to the format defined in the format file. The display on the screen will look like the following:

Figure VIII: Custom Screen for SCHMAS

```
     CUSTOM SCREEN FOR SCHMAS FILE
     -----------------------------

SCHOOL STATUS & SESSION CODES 10          1

SCHOOL DISTRICT CODES 23      02          05

SCHOOL NAME:  SDN NOI KEMPO

ADDRESS:

EDIT  |  <A:>|SCHMAS  |Rec:  1/69    |          |
```

(4) It is also noted that a format file does not need to include all fields in SCHMAS file. The field SCH_CODE has been omitted, as no information needs to be input into this field from the keyboard.

5.3 Creation of Pupil and Teacher Data Files

5.3.1 It may be seen from the demonstration in paragraph 5.2 above on the creation of the school master file that there are limitations in the DBASE III APPEND command, as well as in the use of the format file employing the SAY and GET commands. For example:

(a) It is not possible to cater for computer fields at the data entry stage;

(b) No allowance can be made for the use of default values for fields whose values remain the same for a large number of records. An example is the school year for a pupil file;

(c) When a large number of fields are involved, writing a format file becomes a rather cumbersome assignment.

5.3.2 In this subsection, an utility program called QUICKCODE III is introduced. It is a program generator, thus taking off most of the bor ; work from the data base designers in writing and debugging programs. The main drawback of the program is that it cannot handle more than one data base at a time, and the processing time is rather slow, when QUICKCODE III generated programs are used to input data into a data base.

5.3.3 QUICKCODE III is quite user-friendly. The main steps involved in building a group of utility programs are as follows (all commands are given in UPPER CASE only and are preceded by an asterisk (*)):

(a) Using the Quickscreen Mode to design the input screen to DBASE III:

(1) Starting QUICKCODE III by putting the program disk in Drive A and type *QC and the following screen will appear:

Figure IX: QUICKCODE III Opening Menu

```
                    Q U I C K C O D E   I I I
To Design Your Screen:   Q            |                To Exit:   E

                         SCREEN SELECTION
                 NEW Name For Your Screen:        N
                 Get an OLD Screen From Disk:     O
                 Get a TEXT File From Disk:       T

                         CUSTOMIZATION
Customize Your Screen Design Commands:                    C
Customize Your Screen Settings (widths, lengths, etc.):   S
Turn on the QUICKMENU Menu Generator:                     M
Change Your Output Options (see list below):              X

                    GENERATE dBASE-III PROGRAMS
Generate ALL Programs:       ESC        Generate just one:  G

          ADD            DBF     ED      FAU      GET
                GO       IO              OUT      PRG
                         RPT     SCR     VAL

CURRENT SCREEN IS:       NONAME      (AUTO PILOT ON)
                 ENTER COMMAND
```

(2) Naming the screen by choosing *N (for new name), and then *C:PUPIL1 to create a file PUPIL1 in drive C;

(3) Then select the Quickscreen Mode by typing *Q;

(4) When the blackboard appears, just type the name of the field (preceded by ";") at any position desired, and any other instructions and titles in the same manner;

(5) In the following 3 figures, the Quickscreen Mode for the three data files, namely PUPIL_RC, FLOW_RC and TEA_RC (which have been created and stored in Diskette "EPP Mod.v.2") are displayed to demonstrate how the blackboard in the Quickscreen Mode can be drawn up:

Figure X: Quickscreen Design for PUPIL RC

```
LIN: 2    COL: 0          (AUTO PILOT)     SCR: pupil_rc  DBF: pupil_rc
----------------------%MQ_MODE-----------------------------------------
                 Pupil Stock Questionnaire (Format RC)
=============================================================================
Year ;yr#  |School Code |  ;st   |  ;ss   |  ;sp    |  ;ska   |  ;ske
      serial no.   | ;se        +--------+----- Session      |  ;sess
=============================================================================
Grade |        I       II       III       IV          V          VI
Enrollment
 Boys        ;em1#    ;em2#    ;em3#     ;em4#      ;em5#      ;em6#
 Girls       ;ef1#    ;ef2#    ;ef3#     ;ef4#      ;ef5#      ;ef6#
 Classes     ;c1#     ;c2#     ;c3#      ;c4#       ;c5#       ;c6#
=============================================================================
Age group  6 yrs or lower   7-12 years     13 yrs and above      Total
-----------------------------------------------------------------------------
Enrollment       ;ea6#          ;ea7#              ;ea13#          ;et#
-----------------------------------------------------------------------------
Religion   Moslem  Protestant/Christian  Khatolik   Hindu   Budha
-----------------------------------------------------------------------------
;sch_code   ;erm#            ;erp#           ;erk#    ;erh#   ;erb#
=============================================================================
```

Figure XI: Quickscreen for FLOW RC

```
LIN: 2    COL: 1          (AUTO PILOT)     SCR: flow_rc  DBF: flow_rc
----------------------%MQ_MODE-----------------------------------------
                 Pupil Flow Questionnaire (Format RC)
=============================================================================
Year ;yr#  |School Code |  ;st   |  ;ss   |  ;sp    |  ;ska   |  ;ske
      serial no.   | ;se        +--------+----- Session      |  ;sess
=============================================================================
Final Examination  No. of Grade VI pupils  No. Registered  No. Passed
for last year            [ ;gl# ]            [ ;gt# ]      [ ;gp# ]
-----------------------------------------------------------------------------
New students for   No. Registered  No. planned to accept  No. Accepted
Grade I              [ ;elr# ]          [ ;elp# ]          [ ;ela# ]
-----------------------------------------------------------------------------
By age group   6 yrs & below    7 yrs    8 yrs    9 yrs    10 yrs & over
                 [ ;ey6# ]     [;ey7#]  [;ey8#]  [;ey9#]    [ ;ey10# ]
-----------------------------------------------------------------------------
Repeaters        I        II       III       IV        V        VI
by Grade   [ ;rt1# ] [ ;rt2# ] [ ;rt3# ] [ ;rt4# ] [ ;rt5# ] [ ;rt6# ]
=============================================================================
   ;sch_code                                              ;rtt#    ;eyt#
=============================================================================
```

Figure XII: Quickscreen for TEA RC

```
LIN: 2    COL: 1          (AUTO PILOT)     SCR: tea_rc  DBF: tea_rc
----------------------%MQ_MODE-----------------------------------------
                Teacher Stock Questionnaire (Format RC)

Year ;yr#  |School Code |  ;st   |  ;ss   |  ;sp    |  ;ska   |  ;ske
       serial no.   | ;se        +--------+----- Session      |  ;sess

Nonteaching staff     Administrative       Watchman          Total
  Public                   ;ap#              :lp#              ;tp#
  Nonpublic                ;an#              ;ln#              ;tn#
-------------------------------------------------------------------------
Teaching Staff     Male = ;tm#     Female = ;tf#      Total = ;tt#
-------------------------------------------------------------------------
No. by   I      II      III     IV      V      VI      VII     VIII     TOTAL
 Cert. ;np1#  ;np2#  ;np3#  ;np4#  ;np5# ;np6#   ;np7#   ;np8#     ;npt#
-------------------------------------------------------------------------
No. by grade        Head     Class     Religion    Sport/Art     Total
  Public            ;ph#     ;pc#        ;pr#        ;ps#         ;pt#
  Nonpublic         ;nh#     ;nc#        ;nr#        ;ns#         ;nt#

;sch_code     ;nqt#   ;nht#    ;nct#   ;nrt#     ;nst#    ;gtt#
```

(b) Using the Field Mode to define the characteristics of the fields given in the Quickscreen, the default values desired, the range check, the indexes to be used and the computed fields. The main procedures involved are as follows (for detailed instructions, it is necessary to consult the User Manual):

(1) From Quickscreen Mode, one can go to the Field Mode by pressing *CTRL B;

(2) Using the cursor movement arrows to move around in the Field Mode. One can change the following information given in the Field Mode:

- Column 3 data type; noting that in Quickscreen one may have already defined an integer field type by assigning an "#" after the field name, and a money field type (numerical field with two decimal points) by assigning an "$" after the field name;

- Column 4 field length;

- Column 5 file status for each field. This is where one would define the index field by assigning in descending order from 0 to 9;

- Column 6 is where one enters the default value for the field concerned;

- Columns 7 & 8 are for entering the maximum and minimum values for the field.

(3) As a demonstration, the following tables give the design of the field modes for the PUPIL_RC, FLOW_RC and TEA_RC data bases:

Figure XIII: Field Mode for PUPIL RC

#	FIELDNAME	T	LEN	F	DEFAULT	MIN.	MAX.	ERROR MESSAGE	VAL	ER
0	MQ_MODE	C	7		*NONE*	*NONE*	*NONE*	*NONE*	*	3
1	yr	I	4	F	1985	1970	2000	*NONE*	*	0
2	st	C	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
3	ss	C	1	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
4	sp	C	2	0	*NONE*	*NONE*	*NONE*	*NONE*	*	0
5	ska	C	2	1	*NONE*	*NONE*	*NONE*	*NONE*	*	0
6	ske	C	2	2	*NONE*	*NONE*	*NONE*	*NONE*	*	0
7	se	C	3	3	*NONE*	0	999	*NONE*	*	0
8	sess	C	1	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
9	em1	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
10	em2	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
11	em3	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
12	em4	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
13	em5	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
14	em6	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
15	ef1	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
16	ef2	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
17	ef3	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
18	ef4	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
19	ef5	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
20	ef6	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
21	c1	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
22	c2	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
23	c3	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
24	c4	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
25	c5	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
26	c6	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
27	ea6	I	4	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
28	ea7	I	4	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
29	eal3	I	4	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
30	et	I	4	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
31	sch_code	C	12	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
32	erm	I	4	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
33	erp	I	4	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
34	erk	I	4	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
35	erh	I	4	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
36	erb	I	4	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0

Figure XIV: Field Mode for FLOW RC

#	FIELDNAME	T	LEN	F	DEFAULT	MIN.	MAX.	ERROR MESSAGE	VAL	ER
0	MQ_MODE	C	7		*NONE*	*NONE*	*NONE*	*NONE*	*	3
1	yr	I	4	F	1985	1970	2000	*NONE*	*	0
2	st	C	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
3	ss	C	1	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
4	sp	C	2	0	*NONE*	*NONE*	*NONE*	*NONE*	*	0
5	ska	C	2	1	*NONE*	*NONE*	*NONE*	*NONE*	*	0
6	ske	C	2	2	*NONE*	*NONE*	*NONE*	*NONE*	*	0
7	se	C	3	3	*NONE*	*NONE*	*NONE*	*NONE*	*	0
8	sess	C	1	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
9	gl	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
10	gt	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
11	gp	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
12	elr	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
13	elp	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
14	ela	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
15	ey6	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
16	ey7	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
17	ey8	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
18	ey9	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
19	ey10	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
20	rt1	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
21	rt2	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
22	rt3	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
23	rt4	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
24	rt5	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
25	rt6	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
26	sch_code	C	12	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
27	rtt	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
28	eyt	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0

Figure XV: Field Mode for TEA RC

#	FIELDNAME	T	LEN	F	DEFAULT	MIN.	MAX.	ERROR MESSAGE	VAL	ER
0	MQ_MODE	C	7		*NONE*	*NONE*	*NONE*	*NONE*	*	3
1	yr	I	4	F	1985	1970	2000	*NONE*	*	0
2	st	C	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
3	ss	C	1	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
4	sp	C	2	0	*NONE*	*NONE*	*NONE*	*NONE*	*	0
5	ska	C	2	1	*NONE*	*NONE*	*NONE*	*NONE*	*	0
6	ske	C	2	2	*NONE*	*NONE*	*NONE*	*NONE*	*	0
7	se	C	3	3	*NONE*	*NONE*	*NONE*	*NONE*	*	0
8	sess	C	1	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
9	ap	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
10	lp	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
11	tp	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
12	an	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
13	ln	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
14	tn	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
15	tm	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
16	tf	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
17	tt	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
18	np1	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
19	np2	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
20	np3	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
21	np4	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
22	np5	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
23	np6	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
24	np7	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
25	np8	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
26	npt	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
27	ph	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
28	pc	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
29	pr	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
30	ps	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
31	pt	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
32	nh	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
33	nc	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
34	nr	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
35	ns	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
36	nt	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
37	sch_code	C	12	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
38	nqt	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
39	nht	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
40	nct	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
41	nrt	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
42	nst	I	2	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0
43	gtt	I	3	F	*NONE*	*NONE*	*NONE*	*NONE*	*	0

(4) To create computed fields and determine which fields should be displayed in the data entry screen, one needs to display another part of the Field Mode by pressing the *F6 key. Pressing *F5 key brings one back to the previous display. For the other part of the Field Mode, one can only change the following:

- Column 6 to determine whether the field concerned should appear in the data entry screen or not:
  YES for show
  NO for do not show;

- Column 7 for specifying the computation required for the fields concerned. The computation can use any of the fields defined earlier than the computed field itself.

(5) The following figures illustrate the use of the various computed fields in the three data files, PUPIL_RC, FLOW_RC, and TEA_RC, and those fields which do not appear in the data entry screen:

Figure XVI: Field Mode for Computed Fields for PUPIL_RC

#	FIELDNAME	T	LEN	F	SHOW	COMPUTATION	ER
22	c2	I	2	F	YES	*NONE*	0
23	c3	I	2	F	YES	*NONE*	0
24	c4	I	2	F	YES	*NONE*	0
25	c5	I	2	F	YES	*NONE*	0
26	c6	I	2	F	YES	*NONE*	0
27	ea6	I	4	F	YES	*NONE*	0
28	ea7	I	4	F	YES	*NONE*	0
29	eal3	I	4	F	YES	*NONE*	0
30	et	I	4	F	YES	ea6+ea7+eal3	0
31	sch_code	C	12	F	NO	st+ss+sp+ska+ske+se	0
32	erm	I	4	F	YES	*NONE*	0
33	erp	I	4	F	YES	*NONE*	0
34	erk	I	4	F	YES	*NONE*	0
35	erh	I	4	F	YES	*NONE*	0
36	erb	I	4	F	YES	*NONE*	0

Figure XVII: Field Mode for Computed Fields for FLOW RC

#	FIELDNAME	T	LEN	F	SHOW	COMPUTATION	ER
22	rt3	I	2	F	YES	*NONE*	0
23	rt4	I	2	F	YES	*NONE*	0
24	rt5	I	2	F	YES	*NONE*	0
25	rt6	I	2	F	YES	*NONE*	0
26	sch_code	C	12	F	NO	st+ss+sp+ska+ske+se	0
27	rtt	I	3	F	YES	rt1+rt2+rt3+rt4+rt5+rt6	0
28	eyt	I	3	F	YES	ey6+ey7+ey8+ey9+ey10	0

Figure XVIII: Field Mode for Computed Fields for TEA RC

#	FIELDNAME	T	LEN	F	SHOW	COMPUTATION	ER
0	MQ_MODE	C	7		YES	*NONE*	3
1	yr	I	4	F	YES	*NONE*	0
2	st	C	2	F	YES	*NONE*	0
3	ss	C	1	F	YES	*NONE*	0
4	sp	C	2	0	YES	*NONE*	0
5	ska	C	2	1	YES	*NONE*	0
6	ske	C	2	2	YES	*NONE*	0
7	se	C	3	3	YES	*NONE*	0
8	sess	C	1	F	YES	*NONE*	0
9	ap	I	2	F	YES	*NONE*	0
10	lp	I	2	F	YES	*NONE*	0
11	tp	I	3	F	YES	ap+lp	0
12	an	I	2	F	YES	*NONE*	0
13	ln	I	2	F	YES	*NONE*	0
14	tn	I	3	F	YES	an+ln	0
15	tm	I	3	F	YES	*NONE*	0
16	tf	I	3	F	YES	*NONE*	0
17	tt	I	3	F	YES	tm+tf	0
18	np1	I	2	F	YES	*NONE*	0
19	np2	I	2	F	YES	*NONE*	0
20	np3	I	2	F	YES	*NONE*	0
21	np4	I	2	F	YES	*NONE*	0
22	np5	I	2	F	YES	*NONE*	0
23	np6	I	2	F	YES	*NONE*	0
24	np7	I	2	F	YES	*NONE*	0
25	np8	I	2	F	YES	*NONE*	0
26	npt	I	3	F	YES	np1+np2+np3+np4+np5+np6+np7+np8	0
27	ph	I	2	F	YES	*NONE*	0
28	pc	I	2	F	YES	*NONE*	0
29	pr	I	2	F	YES	*NONE*	0
30	ps	I	2	F	YES	*NONE*	0
31	pt	I	3	F	YES	ph+pc+pr+ps	0
32	nh	I	2	F	YES	*NONE*	0
33	nc	I	2	F	YES	*NONE*	0
34	nr	I	2	F	YES	*NONE*	0
35	ns	I	2	F	YES	*NONE*	0
36	nt	I	3	F	YES	nh+nc+nr+ns	0
37	sch_code	C	12	F	NO	st+ss+sp+ska+ske+se	0
38	nqt	I	3	F	NO	np1+np3+np5	0
39	nht	I	2	F	NO	ph+nh	0
40	nct	I	2	F	NO	pc+nc	0
41	nrt	I	2	F	NO	pr+nr	0
42	nst	I	2	F	NO	ps+ns	0
43	gtt	I	3	F	YES	pt+nt	0

(6) Some of the computed fields which appear on the data entry screen are useful in facilitating on-line checking of the accuracy of the data. These include, for instance, the GTT field in the TEA_RC data file and the RTT field in the FLOW_RC data file.

(c) Using the Main Menu to generate the programs required. An illustration of the Main Menu is given in Figure IX.

(1) The program generation is activated by *ESC (for generating all programs listed in the Main Menu) or *G (for generating individual programs). One can go to the X menu to change the list of programs displayed on the Main Menu;

(2) The 12 programs usually required are:

- main menu program (.PRG)
- input/output screen program (.IO)
- the output display program (.OUT)
- program for adding records (.ADD)
- program for running reports (.RPT)
- program for finding individual records (.GET)
- program for editing a record (.ED)
- program for setting default values (.FAU)
- program for validation (.VAL)
- program for creating an index file (.GO)
- the screen definition program (.SCR)
- the data base file (.DBF)

(3) After the programs have been generated, it would be quite informative to browse over the programs using either an ordinary Wordstar program or the DBASE III MODIFY COMMAND to look at the programs. Alternatively, they can be printed.

5.3.4 The Pupil Files. Two pupil stock files have been created using QUICKCODE III:

(a) The PUPIL file, based on the questionnaire given in Figure I is stored in Diskette "EPP Mod.v.1." There are 11 programs and the data base file, all of which are assigned the name PUPIL.XXX (XXX being the name used to distinguish the type of files, e.g., .DBF refers to data base file and .ADD refers to the program to add records). No records have been added to the data base.

(b) To have a look at the PUPIL data file, the following procedure may be followed:

(1) Start up DBASE III from Drive C or Drive B, and put the Diskette in Drive A;

(2) *SET DEFAULT TO A

(3) *DO PUPIL will tell DBASE III to run the program called PUPIL.PRG which will display a screen from which different programs can be selected:

- ADD program for adding records. It is useful to examine the data input screen design;

- GET/EDIT program for retrieving and editing individual records;

- INDEX program is to create the Index file PUPIL.NDX according to the index keys created in the GO program. The index keys are defined in the Field Mode;

- RUN report program is to run reports using report format already defined or create reports using the DBASE III report generator.

(4) A specimen screen for the program menu generated by the PUPIL_RC.PRG program is shown in Figure XIX below:

Figure XIX: Screen Design for PUPIL RC.PRG

```
                          MAIN MENU
SYSTEM:  pupil_rc                          DBF:   pupil_rc

                A to ADD data
                G to GET/EDIT data
                R to RUN report

                I to INDEX data base

                Q to QUIT (exit to DOS)
                D to return to DBASE III

                PLEASE ENTER YOUR CHOICE:
```

(c) The pupil file which will be used for demonstration in this module is the PUPIL_RC file. It is based on the questionnaire "Format RC" used by Balitbang. The data

file is contained in the Diskette "EPP Mod.v.2." The following procedure may be used in examining this data file:

(1) Start up DBASE III from Drive C or Drive B and put the Diskette in Drive A;

(2) *SET DEFAULT TO A;

(3) *USE PUPIL_RC;

(4) *LIST STRUCTURE TO PRINT. This will give the data base structure of PUPIL_RC, as follows:

Figure XX: Data Structure of PUPIL RC

Structure for Data Base A:Pupil_RC
Number of data records: 65
Date of last update: 07/26/86

Field	Field Name	Type	Width	Dec
1	YR	Numeric	4	
2	ST	Character	2	
3	SS	Character	1	
4	SP	Character	2	
5	SKA	Character	2	
6	SKE	Character	2	
7	SE	Character	3	
8	SESS	Character	1	
9	EM1	Numeric	3	
10	EM2	Numeric	3	
11	EM3	Numeric	3	
12	EM4	Numeric	3	
13	EM5	Numeric	3	
14	EM6	Numeric	3	
15	EF1	Numeric	3	
16	EF2	Numeric	3	
17	EF3	Numeric	3	
18	EF4	Numeric	3	
19	EF5	Numeric	3	
20	EF6	Numeric	3	
21	C1	Numeric	2	
22	C2	Numeric	2	
23	C3	Numeric	2	
24	C4	Numeric	2	
25	C5	Numeric	2	
26	C6	Numeric	2	
27	EA6	Numeric	4	
28	EA7	Numeric	4	
29	EA13	Numeric	4	
30	ET	Numeric	4	
31	SCH_CODE	Character	12	
32	ERM	Numeric	4	
33	ERP	Numeric	4	
34	ERK	Numeric	4	
35	ERH	Numeric	4	
36	ERB	Numeric	4	
Total			114	

It is useful to cross reference the data structure shown in the above with the Quickscreen design for the PUPIL_RC given in Figure X and the Field Mode in Figure XIII.

(5) To add records, browse or edit the existing records in the PUPIL_RC data base, one can use the DBASE III command such as APPEND, BROWSE or EDIT. However, it would be more convenient to use the various programs generated by QUICKCODE III, which will present the data in a better manner on the screen:

- *DO PUPIL_RC to run the menu program;

- From the menu, one can select a variety of functions such as add, get, or edit.

5.3.5 Pupil Flow Files. Two data files have also been created for the pupil flow data:

(a) The FLOW data file which is modeled on the questionnaire design given in Figure II. This data file is only used for demonstration purposes as no data have been added into the file.

(b) The FLOW_RC data file which is based on the questionnaire "Format RC" used by the Balitbang. Sample records have been added into this data file.

(c) To view the design of FLOW, the following procedure may be taken:

(1) Start up DBASE III from Drive C or Drive B, and put the Diskette "EPP Mod.v.1" in Drive A;

(2) *SET DEFAULT TO A;

(3) *DO FLOW to start up the Flow program menu from which a variety of functions such as add, get and edit may be performed.

(d) To view the data in the FLOW_RC file, the following procedure may be taken:

(1) Start up DBASE III from Drive C or Drive B and put the Diskette "EPP Mod.v.3" in Drive A;

(2) *SET DEFAULT TO A;

(3) *USE FLOW_RC to open the data file;

(4) *LIST STRUCTURE TO PRINT to examine the data structure of the file. The following should appear on the printer:

Figure XXI: Data Structure for FLOW_RC

Structure for data base: A:flow_rc.dbf
Number of data records: 67
Date of last update: 07/27/86

Field	Field Name	Type	Width	Dec
1	YR	Numeric	4	
2	ST	Character	2	
3	SS	Character	1	
4	SP	Character	2	
5	SKA	Character	2	
6	SKE	Character	2	
7	SE	Character	3	
8	SESS	Character	1	
9	GL	Numeric	3	
10	GT	Numeric	3	
11	GP	Numeric	3	
12	E1R	Numeric	3	
13	E1P	Numeric	3	
14	E1A	Numeric	3	
15	EY6	Numeric	3	
16	EY7	Numeric	3	
17	EY8	Numeric	3	
18	EY9	Numeric	3	
19	EY10	Numeric	3	
20	RT1	Numeric	2	
21	RT2	Numeric	2	
22	RT3	Numeric	2	
23	RT4	Numeric	2	
24	RT5	Numeric	2	
25	RT6	Numeric	2	
26	SCH_CODE	Character	12	
27	RTT	Numeric	3	
28	EYT	Numeric	3	
Total			81	

It would be useful to cross-reference the above data structure with the Quickscreen design for the data base, as shown in Figure XI and the corresponding Field Mode definitions given in Figure XIV;

(5) The records in the FLOW_RC data base can be viewed or edited using the DBASE III commands such as EDIT, BROWSE, or DISPLAY as already discussed in the previous subsections.

Alternatively, the menu program generated by QUICKCODE III can be used to add, retrieve or print the records:

- *DO FLOW_RC;

- And select from the program menu a variety of functions such as add, get, or edit.

5.3.6 Teacher Files. Two data files have also been created for the Teacher File:

(a) One is the TEACHER file which is based on the questionnaire design given in Figure III and is stored in the Diskette "EPP Mod.v.1." This file will be used for reference, and not for actual demonstration as no records have been entered into the data base;

(b) The other is the TEA_RC file which is based on the questionnaire Format RC and a number of records have been added into the data base. The data file, together with other utility programs are stored in the Diskette "EPP Mod.v.2";

(c) To view the design of the data base TEACHER and the other programs generated, the following procedures may be followed:

    (1) Start up DBASE III from either Drive C or Drive B and put the Diskette "EPP Mod.v.1" in Drive A;

    (2) *SET DEFAULT TO A, and *DO TEACHER; and select from the program menu a variety of functions such as add, get, and edit;

(d) To view the contents of the data base TEA_RC and run some of the programs generated, the following procedures may be followed:

    (1) Start up DBASE III from either Drive C or Drive B and put the diskette "EPP Mod.v.2" into Drive A;

    (2) *SET DEFAULT TO A, and *USE TEA_RC to open the data base;

    (3) *LIST STRUCTURE TO PRINT to print the data base structure of TEA_RC, and the following should be printed:

Figure XXII: Data Structure for TEA RC

Structure for data base: A:tea_rc.dbf
Number of data records: 67
Date of last update: 07/28/86

Field	Field Name	Type	Width	Dec
1	YR	Numeric	4	
2	ST	Character	2	
3	SS	Character	1	
4	SP	Character	2	
5	SKA	Character	2	
6	SKE	Character	2	
7	SE	Character	3	
8	SESS	Character	1	
9	AP	Numeric	2	
10	LP	Numeric	2	
11	TP	Numeric	3	
12	AN	Numeric	2	
13	LN	Numeric	2	
14	TN	Numeric	3	
15	TM	Numeric	3	
16	TF	Numeric	3	
17	TT	Numeric	3	
18	NP1	Numeric	2	
19	NP2	Numeric	2	
20	NP3	Numeric	2	
21	NP4	Numeric	2	
22	NP5	Numeric	2	
23	NP6	Numeric	2	
24	NP7	Numeric	2	
25	NP8	Numeric	2	
26	NPT	Numeric	3	
27	PH	Numeric	2	
28	PC	Numeric	2	
29	PR	Numeric	2	
30	PS	Numeric	2	
31	PT	Numeric	3	
32	NH	Numeric	2	
33	NC	Numeric	2	
34	NR	Numeric	2	
35	NS	Numeric	2	
36	NT	Numeric	3	
37	SCH_CODE	Character	12	
38	NQT	Numeric	3	
39	NHT	Numeric	2	
40	NCT	Numeric	2	
41	NRT	Numeric	2	
42	NST	Numeric	2	
43	GTT	Numeric	3	
Total			108	

It would be useful to cross-reference the above data structure with the Quickscreen design for the data base, as shown in Figure XII, and the definitions used in the Field Mode as shown in Figure XV;

(4) *DO TEA_RC to bring up the program menu, from which a variety of functions such as add, get, and edit may be selected to run.

5.3.7 School File. Only one school file which is based on the questionnaire design given in Figure IV, has been created using QUICKCODE III, namely SCHOOL. The data base file and 11 utility programs generated are stored in the Diskette "EPP Mod.v.1." No record has been added into this data file. The following procedure may be followed to examine the design of this data file:

(a) Start up DBASE III from either Drive C or Drive B, and put the Diskette "EPP Mod.v.1" into Drive A;

(b) *SET DEFAULT TO A, and *DO SCHOOL to bring up the program menu from which various other programs may be selected to run.

Learning Activities

6.1 Microcomputer Tutorial Sessions

6.1.1 The purpose of the tutorial sessions is to familiarize the participants on the various techniques on data base construction and usage which are discussed in the User Manual section. In the User Manual Section, the various steps involved in constructing the four data files (namely the school master "SCHMAS," pupil stock "PUPIL_RC," pupil flow "FLOW_RC," and teacher stock "TEA_RC") have been illustrated in detail. This is because it is considered of fundamental importance to have the data base set up properly before any use can be made of the information stored in the data base. The participants are required to go through by themselves the various steps explained in the User Manual Section to:

(a) Construct 4 data files on pupil, pupil flow, teacher and school master, following exactly the same design as proposed in the User Manual Section;

(b) Perform simple manipulations of the four data files by:

(1) Following the procedures suggested in the User Manual section;

(2) And exploring as well the use of other DBASE III functions and commands, which can be found in the application user manual. During this part of the exercise, the instructors will go through some of the commands that could be of use to the participants, which include, for instance:

- GO TOP,
- DELETE, RECALL and PACK,
- COPY STRUCTURE,
- MODIFY STRUCTURE,
- CHANGE FIELDS.

6.1.2 It is stressed that the objective of the tutorial sessions is not to train the participants to become proficient programmers or users of the DBASE III language. It is important also to emphasize that the various commands need NOT be memorized, as there is on-line help and as there is always the opportunity to consult the application user manual. Furthermore, in view of the rapid development in the field of computer hardware and software, any software package could easily become outdated very quickly.

6.2 Group Work Session

6.2.1 The OBJECTIVE of the group work session is to sensitize participants in the versatility and flexibility of a computerized data base, and the ease with which a data base can be designed and modified.

6.2.2 The participants will be divided into groups. Based on the results of the group discussion in Unit 2, the participants, working in groups, will be asked to:

(a) Identify data items which have been omitted from the data bases (namely SCHMAS, PUPIL_RC, FLOW_RC and TEA_RC) which should be included;

(b) Comment on the design of the data base, in terms of:

(1) the format of the data input forms;
(2) the relationship between fields for the computed fields;
(3) additional computed fields that are considered necessary;
(4) the choice of the index fields;

(c) Suggest any validation rules that could be built into the data input system, which could be accommodated in the QUICKCODE III system;

(d) And based on the results of the discussion in (a), (b) and (c) above, design and construct a different information system comprising pupil, pupil flow, teacher, and school data bases. The techniques they have learned, as discussed in the User Manual section, may be employed to undertake this task.

6.2.3 The instructors would be available to help different groups of trainees in the group work sessions.

7. Post-assessment

7.1 The purpose of this post-assessment section is to help the instructors evaluate to what extent the learners are able to understand the contents of the training materials and to perform what is expected from them which is stated in the specific performance objectives given for this Unit.

7.2 The participants are asked to undertake the following exercise individually. However, if microcomputers are not available for each of the participants, they may have to work in groups. The assignment is as follows:

(a) It is desired to develop a data base on pupils in a particular province which could provide planners with the following information:

(1) The total enrollment by sex in junior high schools which have 3 grades from grade 1 to grade 3 in the province in question;

(2) The proportion of children in the junior high school age group (i.e., 13-15 years) who are enrolled in the high schools;

(3) The proportion of overaged children in junior high schools;

(4) The estimated number of dropouts by grade from junior high schools.

(b) Other statistical information available is the number of children in the 13-15 age range, by single years of age, for the province in question.

(c) The learners are expected to perform the following tasks:

(1) Determine the data items required to be collected on pupils;

(2) Design the questionnaire for data collection;

(3) Create a pupil data base and design the data input program for the pupil data file which will include at least the following functions:

- a screen format design for data input which should preferably be similar to the data collection questionnaires;
- adding data to the data base;
- editing data and search for specific records in the data base using the school code as index.

III. Unit 2: Information Retrieval

8. Performance Objectives

8.1 This is an introductory section on the topic of information retrieval from the data bases constructed in the previous section. More in-depth discussion will be held in Module III on the Use of the Education Management Information System for Management Control.

8.2 Upon completion of this section, the participants are expected to be able to:

(a) Do simple manipulation of the data stored in the data base, such as sum, average, and the creation of summary data files;

(b) Produce simple reports from the data bases.

9. Instructional Activities

9.1 Querying the Data Base

9.1.1 In the last section, a number of techniques have been discussed on retrieving information from the data base, using command level language such as DISPLAY and BROWSE, as well as the use of the GET and EDIT programs provided by QUICKCODE III. The operation is essentially done at one data file level. Using the SET RELATION command, two data files may be accessed at the same time. Furthermore, with the use of programming and software like QUICKREPORT, more than two data files may be accessed at one time. Access to multiple data bases will NOT be discussed in this Module, which will be the subject for Module III.

9.1.2 One can specify the condition for the retrieval of records from a data base, thus enhancing the usefulness of the DISPLAY or BROWSE command. The ability of setting selection criteria in retrieving information is a very powerful feature of many data base software packages like DBASE III.

9.1.3 In addition, it may often be necessary to perform simple calculations with a data base. For example, it may be required to compile summary statistics such as the total number of teachers, the average number of pupils per school for the whole province, or for a selected district, or even for a given type of school within a selected district. These summary statistics are required, for example, for stocktaking purposes as discussed in paragraph 4.2.1(a). It is always possible to compile such summary statistics from a data base, making use of the arithmetic commands provided by DBASE III. The next consideration would then be how to capture the information. There could be several ways of displaying and capturing the results:

(a) Displaying the results on-screen;

(b) Sending the results to a printer;

(c) When a lot of information is generated from the arithmetical operation, it would be wiser to try to store the data so that the results could be retrieved at a later stage, or used in another operation. To achieve this, one can store the results in the memory variables provided by DBASE III;

(d) As the values stored in the memory variables would disappear once the machine is turned off, the results could also be stored to an external file on-disk.

9.2 Reporting

9.2.1 One of the commonest functions of data collection is for the purposes of compiling various reports. Very often, because of the inflexibility in the production of reports provided by an information system, piles of reports have to be produced in advance in anticipation of possible demand from users. However, these reports in general are never read or utilized by users. With a better designed computerized information system, reports that are not frequently used need not be produced in advance, in anticipation of an unlikely requirement that might arise in the course of time. These reports, required on an ad hoc basis, could easily be compiled from the data base, making use of a host of tabulation programmes available for both mainframe computers and microcomputers.

9.2.2 Information stored in a computerized data base can also be written onto a diskette or a removable hard disk if the data volume is very large. Such information can easily be transported from the provincial offices to the central ministry. By doing so:

(a) Considerable amounts of clerical efforts required in transcribing the data can be saved;

(b) The data would be free from manual errors of all sorts;

(c) The central ministry can then have access to the data in the same level of details as the provincial offices, thus enabling:

- a better analysis of the statistics be made at the central ministry;

- a more effective control and monitoring by the central ministry over the activities of the provincial and district offices.

9.2.3 This subsection will examine the simple reporting facilities that could be built into the computerized information system. There are two main approaches:

(a) Information retrieval <u>individually</u> from the 5 data bases (pupil stock, pupil flow, teacher, school, and school master). This can be performed by:

(1) On-line inquiry using the Assistant facilities available in DBASE III to retrieve information about schools;

(2) The creation of a report form to generate reports giving information about a group of schools or summary statistics about a given subdistrict, district, or province, or even about a given type of school within the district specified;

(b) Information retrieval by <u>linking</u> several data bases. This enables information to be retrieved, for example, on pupils as well as teachers. One approach that can be adopted is to <u>join</u> two different data bases into one new file. This is a more powerful feature of a relational data base like DBASE III. By doing so, a new file containing only information needed for the analysis can be used to generate reports, bypassing the inconvenience of having to create reports from multiple data files. This feature will be explored in detail in Module III.

10. User Manual

10.1 Getting Started

10.1.1 The user manual is designed for both the instructor as well as the trainees. The purpose of this user manual is to put into DBASE III languages from the various functions outlined in this unit, so that:

(a) The instructor can use it to demonstrate, during the practical session, the various steps involved in retrieving information and producing reports from the data bases;

(b) The trainees can follow the steps shown in doing their practical exercises.

10.1.2 The software package needed is DBASE III (Version 1.1 or Plus). The various programs and data files required for the practical session are all contained in the Diskette "EPP Mod.v.2." The files in the original diskette are protected against modifications and deletions. It is therefore necessary to create a backup of this diskette and to use the backup in the practical sessions.

10.1.3 This user manual is divided into three parts as follows:

(a) Part I introduces the techniques of querying the data bases, displaying records selectively. This on-line inquiry is useful in meeting, very quickly, the demand for information about certain schools or types of schools;

(b) Part II demonstrates the use of the arithmetic functions of DBASE III in compiling summary statistics;

(c) Part III outlines the use of report generator to prepare simple reports on the data bases.

10.2 On-Line Inquiry

10.2.1 The techniques of querying the data bases using the commands of DBASE III, such as BROWSE and DISPLAY, have been demonstrated in the previous Unit. The facility allowed in DBASE III to select certain groups of records will be demonstrated in this subsection. With this facility, any types of records can be selected for display either on the screen, to the printer or to a file, provided there are suitable keys in the data base to identify these groups of records.

10.2.2 The following demonstrate one method of selectively displaying a specified group of records:

(a) Start up DBASE III from either Drive C or Drive B, and put the Diskette "EPP Mod.v.2" in Drive A;

(b) *SET DEFAULT TO A;

(c) *USE PUPIL_RC to open the data base PUPIL_RC;

(d) *DISPLAY OFF SCH_CODE, ET FOR SKA="05" .AND. SKE="01", and the following would appear on the screen:

sch_code	et
101230501001	284
101230501002	201
101230501003	341
101230501004	249
101230501005	147
101230501006	182
101230501007	220
101230501008	327
101230501010	208
101230501011	113
102230501032	196
102230501033	269
102230501034	287
102230501035	148
102230501037	242
102230501038	235
102230501039	275
102230501040	158
102230501041	229
102230501042	267

(e) The above procedure may be repeated for the FLOW_RC data file by:
*USE FLOW_RC

(f) *DISPLAY OFF SCH_CODE,GP,ELA,RTT FOR SKE="04" TO PRINT, and the following will be printed:

sch_code	gp	ela	rtt
101230504001	21	43	15
101230504002	16	12	114
101230504003	12	28	2
101230504004	18	17	43
101230504005	0	35	0
101230504006	9	0	1
101230504007	31	27	27
101230504008	13	14	26
101230504009	2	23	39
101230504010	21	20	18
101230504011	0	0	17

(g) A further demonstration is shown here using the TEA_RC data base:

*USE TEA_RC

(h) *DISPLAY OFF SCH_CODE,NHT,NCT,NRT,NST,TT FOR SKA="05" .AND. SKE="02", and the following will be displayed on the screen:

sch_code	nht	nct	nrt	nst	tt
101230502001	1	4	1	0	6
101230502002	1	2	0	0	3
101230502003	1	4	1	0	5
101230502004	1	3	1	0	6
101230502005	1	5	1	0	7
101230502006	1	6	1	1	9
101230502007	1	3	1	0	5
101230502008	1	2	1	0	4
101230502009	1	1	1	0	3
101230502010	1	2	1	1	5
101230502011	1	4	1	0	6
101230502012	1	5	1	0	7
101230502013	1	4	1	0	6
101230502014	1	4	1	0	6
101230502015	1	5	2	2	10
101230502016	1	3	0	1	5
101230502017	1	9	2	0	12

10.3 Summary Statistics

10.3.1 The basic arithmetic commands used in DBASE III are SUM and AVERAGE:

(a) The SUM command adds up numeric fields in a data base and displays the results on the screen. Fields may be selected for summation from a data base. Furthermore, the results could be stored to a memory variable if the data are required to be retained for subsequent usage;

(b) The AVERAGE command is used to compute the (arithmetic) mean of the fields in a data base. As with the SUM command, fields may be selected based on given criteria, and the results could be stored to a memory variable.

10.3.2 In the demonstration to follow, the results of the SUM and AVERAGE commands are stored in a separate text file using the SET ALTERNATE TO command. Storing the results in an external file on disk will facilitate future retrieval and the printing of the results in reports. The procedures that may be adopted are as follows:

(a) Start up DBASE III in either Drive C or Drive B, and put the Diskette "EPP Mod.v.3" in Drive A;

(b) *SET DEFAULT TO A;

(c) *USE PUPIL_RC to open the data base PUPIL_RC;

(d) *SET ALTERNATE TO PU, and the results will be stored in an external text file called PU.TXT in the Diskette "EPP Mod.v.3";

(e) *SET ALTERNATE ON;

(f) *SUM ALL C1,C2,C3,C4,C5,C6,ET gives the summary statistics on the total number of classes by grade and the total enrollment. The following will be written to PU.TXT as well as displayed on the screen:

```
   65 records summed
c1   c2   c3   c4   c5   c6      et
76   70   66   65   62   72   11785
```

(g) *SUM ALL C1,C2,C3,C4,C5,C6,ET FOR SKE="01", and this will cause the selection of those schools in the subdistrict with the code of "01." This gives the total number of classes by grade and the total enrollment in subdistrict "01." The following will be written to the PU.TXT as well as displayed on the screen:

```
. sum all c1, c2, c3, c4, c5, c6, et for
ske="01"
   20 records summed
c1   c2   c3   c4   c5   c6      et
28   27   24   22   22   19    4578
```

(h) *SUM ALL C1,C2,C3,C4,C5,C6 FOR SKE="04", causes the selection of only those schools in the subdistrict with the code of "04." This gives the total number of classes and the total enrollment in subdistrict "04." The following will be written to the PU.TXT and displayed on the screen:

```
. sum all c1, c2, c3, c4, c5, c6 for ske="04"
   11 records summed
c1   c2   c3   c4   c5   c6
11   10   11   11    9    8
```

(i) *AVERAGE EM1,EF1,ET gives the average male and female enrollment in Primary 1 and the average total enrollment per school. The following will be written to PU.TXT and displayed on the screen:

```
. average eml, efl, et
   65 records averaged
eml   efl   et
 19    19  181
```

(j) *AVERAGE EM1,EF1,ET FOR SKE="01" gives the corresponding averages for schools in subdistrict "01." The following will be written to PU.TXT and displayed on the screen:

```
. average eml, efl, et for ske="01"
   20 records averaged
eml   efl   et
 23    23  229
```

(k) Similarly, *AVERAGE EM1,EF1,ET FOR SKE="04" gives the averages for schools in subdistrict "04":

```
. average eml, efl, et for ske="04"
   11 records averaged
eml   efl   et
 18    13  142
```

(l) Before using the text file, it should be closed by:

```
*SET ALTERNATE OFF
*CLOSE ALTERNATE;
```

(m) Similar procedure may be followed for the FLOW_RC data base by first selecting the file with the command:

*USE FLOW_RC
*SET ALTERNATE TO FL will cause the results to be written to a text file named FL.TXT. This file should contain the following:

```
. sum all gl, gp, elr, ela, rtt
   67 records summed
  gl     gp     elr     ela     rtt
1461   1241    1822    1767    2428

. sum all gl, gp, elr, ela, rtt for ske="01"
   23 records summed
  gl     gp     elr     ela     rtt
 652    584     666     666    1172

. sum gl, gp, elr, ela, rtt for ske="02"
   17 records summed
  gl     gp     elr     ela     rtt
 291    255     494     490     529
```

```
. sum gl, gp, elr, ela, rtt for ske="03"
   16 records summed
  gl      gp      elr      ela      rtt
 325     259      443      392      425

. average gl, gp, elr, ela, rtt
   67 records averaged
  gl      gp      elr      ela      rtt
  22      19       27       26       36

. average gl, gp, elr, ela, rtt for ske="01"
   23 records averaged
  gl      gp      elr      ela      rtt
  28      25       29       29       51

. average gl, gp, elr, ela, rtt for ske="02"
   17 records averaged
  gl      gp      elr      ela      rtt
  17      15       29       29       31

. average gl, gp, elr, ela, rtt for ske="03"
   16 records averaged
  gl      gp      elr      ela      rtt
  20      16       28       24       27
```

(n) For the TEA_RC file, a similar text file has also been created (named TE.TXT) and stored in the Diskette "EPP Mod.v.2." This file should contain the following:

```
. sum all tm, tf, tt, nqt, nht, nct, nrt, nst, for
ske="01"
   23 records summed
 tm     tf     tt     nqt     nht     nct     nrt     nst
128     84    212       7      23     155      23      11

. sum all tm, tf, tt, nqt, nht, nct, nrt, nst, for
ske="02"
   17 records summed
 tm     tf     tt     nqt     nht     nct     nrt     nst
 85     20    105       0      17      66      17       5

. sum all tm, tf, tt, nqt, nht, nct, nrt, nst, for
ske="03"
   16 records summed
 tm     tf     tt     nqt     nht     nct     nrt     nst
111     24    135       0      16      96      18       6

. sum all tm, tf, tt, nqt, nht, nct, nrt, nst, for
ske="04"
   11 records summed
 tm     tf     tt     nqt     nht     nct     nrt     nst
 54     10     64       0      10      38      11       5
```

```
. sum all tm, tf, tt, nqt, nht, nct, nrt, nst, for
   67 records summed
 tm    tf    tt    nqt    nht    nct    nrt    nst
378   138   516      7     66    355     69     27

. average tm, cf, tt, nht, nct, nrt, nst
   67 records averaged
 tm    tf    tt    nht    nct    nrt    nst
  6     2     8     1      5      1      0

. average tm, tf, tt, nht, nct, nrt, nst for
ske="01"
   23 records averaged
 tm    tf    tt    nht    nct    nrt    nst
  6     4     9     1      7      1      0

. average tm, tf, tt, nht, nct, nrt, nst for
ske="02"
   17 records averaged
 tm    tf    tt    nht    nct    nrt    nst
  5     1     6     1      4      1      0

. average tm, tf, tt, nht, nct, nrt, nst for
ske="03"
   16 records averaged
 tm    tf    tt    nht    nct    nrt    nst
  7     2     8     1      6      1      0

. average tm, tf, tt, nht, nct, nrt, nst for
ske="04"
   11 records averaged
 tm    tf    tt    nht    nct    nrt    nst
  5     1     6     1      3      1      0
```

10.3.3 Another powerful command of DBASE III in providing summary statistics is the TOTAL command. Like the SUM command, it adds up the values of the numeric fields in a data base. However, the totals can be added based on a grouping key. The results are summarized in a new data base. In other words, a summary data file is created by the TOTAL command, with each subtotal being a record in the new data base. The original data base must be indexed on the key field which determines where the subtotal breaks occur. Using the field option, one can select the fields to be totaled. The following procedures may be followed in creating the summary files:

(a) Start up DBASE III in either Drive C or Drive B, and put the Diskette "EPP Mod.v.3" in Drive A;

(b) *SET DEFAULT TO A;

(c) As the TOTAL will create numeric totals which may cause the data fields in the existing data file to overflow, it would be necessary to increase the field length to avoid overflow. Thus, a duplicate data base has to be created in order to avoid disturbing the original data file. In the following demonstration, the PUPIL_RC data base will be used. A duplicate PUPIL1 has been created using:

```
*USE PUPIL_RC
*COPY TO PUPIL;
```

(d) The duplicate PUPIL1 will be used for the demonstration:

*USE PUPIL1, to open the PUPIL1 and close the PUPIL_RC;

*MODIFY STRUCTURE to increase the field lengths;

*DISPLAY STRUCTURE will give the new structure for PUPIL1 as follows:

Structure for data base A:pupill.dbf
Number of data records: 65
Date of last update: 08/10/86

Field	Field Name	Type	Width	Dec
1	YR	Character	4	
2	ST	Character	2	
3	SS	Character	1	
4	SP	Character	2	
5	SKA	Character	2	
6	SKE	Character	2	
7	SE	Character	3	
8	SESS	Character	1	
9	EM1	Numeric	5	
10	EM2	Numeric	5	
11	EM3	Numeric	5	
12	EM4	Numeric	5	
13	EM5	Numeric	5	
14	EM6	Numeric	5	
15	EF1	Numeric	5	
16	EF2	Numeric	5	
17	EF3	Numeric	5	
18	EF4	Numeric	5	
19	EF5	Numeric	5	
20	EF6	Numeric	5	
21	C1	Numeric	4	
22	C2	Numeric	4	
23	C3	Numeric	4	
24	C4	Numeric	4	
25	C5	Numeric	4	
26	C6	Numeric	4	
27	EA6	Numeric	6	
28	EA7	Numeric	6	
29	EA13	Numeric	6	
30	ET	Numeric	6	
31	SCH_CODE	Character	12	
32	ERM	Numeric	6	
33	ERP	Numeric	6	
34	ERK	Numeric	6	
35	ERH	Numeric	6	
36	ERB	Numeric	6	
Total			168	

(e) Before using the TOTAL command, the new data file has to be indexed on the key field which determines the breaking subtotals. In this case, the subdistrict field "SKE" will be used as the index:

*INDEX ON SKE TO PU1SKE, which creates a new index file called PU1SKE.NDX;

(f) *TOTAL ON SKE TO PU1RP and the following will show up on the screen:

```
65 Record(s) totaled
 4 Records generated
```

This means a new data base with only 4 records, each representing the totals for a subdistrict, has been created. The new data base has been named as PU1RP;

(g) *USE PU1RP to open this data base and then to view its content;

(h) *DISPLAY STRUCTURE will give the following:

Structure for data base A:pulrp.dbf
Number of data records: 4
Date of last update: 08/10/86

Field	Field Name	Type	Width	Dec
1	YR	Character	4	
2	ST	Character	2	
3	SS	Character	1	
4	SP	Character	2	
5	SKA	Character	2	
6	SKE	Character	2	
7	SE	Character	3	
8	SESS	Character	1	
9	EM1	Numeric	5	
10	EM2	Numeric	5	
11	EM3	Numeric	5	
12	EM4	Numeric	5	
13	EM5	Numeric	5	
14	EM6	Numeric	5	
15	EF1	Numeric	5	
16	EF2	Numeric	5	
17	EF3	Numeric	5	
18	EF4	Numeric	5	
19	EF5	Numeric	5	
20	EF6	Numeric	5	
21	C1	Numeric	4	
22	C2	Numeric	4	
23	C3	Numeric	4	
24	C4	Numeric	4	
25	C5	Numeric	4	
26	C6	Numeric	4	
27	EA6	Numeric	6	
28	EA7	Numeric	6	
29	EA13	Numeric	6	
30	ET	Numeric	6	
31	SCH_CODE	Character	12	
32	ERM	Numeric	6	
33	ERP	Numeric	6	
34	ERK	Numeric	6	
35	ERH	Numeric	6	
36	ERB	Numeric	6	
Total			168	

(i) A number of commands may be issued to view the contents of this new data base:

(1) *DISPLAY ALL C1,C2,C3,C4,C5,C6,ET will cause the display of the four records showing the number of classes in each grade from Primary 1 to 6 and the total enrollment for the four subdistricts:

Record#	c1	c2	c3	c4	c5	c6	et
1	28	27	24	22	22	19	4578
2	22	18	15	18	17	32	3126
3	15	15	16	14	14	13	2518
4	11	10	11	11	9	8	1563

(2) DISPLAY ALL EM1, EM2, EM3, EM4, EM5, EM6, EF1, EF2, EF3, EF4, EF5, EF6, ET will give the enrollment by sex in each grade from Primary 1 to Primary 6 and the total enrollment for the four subdistricts:

Record#	em1	em2	em3	em4	em5	em6	ef1	ef2	ef3	ef4	ef5	ef6	et
1	453	490	437	370	390	276	462	402	333	353	347	258	4578
2	337	294	268	283	251	227	349	255	245	244	227	201	3126
3	268	214	249	213	157	152	251	247	216	199	191	144	2518
4	194	134	128	137	116	116	148	108	125	122	116	120	1563

(3) *DISPLAY ALL EA6, EA7, EA13, ET will show the total enrollment by age group for each of the four subdistricts:

Record#	ea6	ea7	ea13	et
1	316	3878	384	4578
2	293	2608	225	3126
3	234	2212	72	2518
4	97	1328	138	1563

(4) *DISPLAY ALL ERM, ERP, ERK, ERH, ERB, ET will give the total enrollment by religion for each of the four subdistricts:

Record#	erm	erp	erk	erh	erb	et
1	4555	30	11	40	4	4578
2	3137	9	4	59	3	3126
3	2515	0	1	0	0	2518
4	1563	0	0	0	0	1563

10.3.4 Similar procedures may be followed to produce summary files for the FLOW_RC and TEA_RC using the TOTAL command. It is not proposed to go through these procedures in this User Manual Section. The participants will be asked during the

practical sessions to try to create summary files for the FLOW_RC and TEA_RC data bases (see Trainee Activities subsection below).

10.4 Compilation of Simple Reports

10.4.1 In the previous sections, the various commands like DISPLAY have been discussed, which could be used to produce listing of records very quickly. In this subsection, the automatic report generator provided in the DBASE III system will be discussed for creating simple reports from a single data base. In Module III, more complicated report compilation using multiple data bases will be discussed.

10.4.2 The automatic report generator is very easy to use. It can provide totals as well as subtotals for the report generated. Once the report format (whose file name has the extension ".frm") has been defined, it can be used repeatedly. Needless to say, one has to plan the format of the report before activating the report generator. The following procedures may be followed in creating a report using the report generator:

(a) The TEA_RC data base will be used as an illustration. First of all, one has to start up DBASE III in either Drive C or Drive B, and put the Diskette "EPP MOD.v.3" in Drive A;

(b) *SET DEFAULT TO A,
*USE TEA_RC;

(c) If subtotals are required for certain fields like the province (SP), district (SKA) or subdistrict (SKE), one has to index the data base first so that the data base can be accessed in a sequence set down by the index fields:

*INDEX ON SKE TO TESKE which will create an index file TESKE.NDX;

(d) To create a report format type:

*CREATE REPORT TERP1 where TERP1 is the file name assigned to the report format, and a full-screen mode will appear. By following the instructions given, resorting to on-line help where required by pressing *F1, one can create a report on, for example, the number of teachers by sex and the number of nonteaching staff by status, with subtotals given for each subdistrict. The following fields need to be included in the report:

(1) SCH_CODE for school code;
(2) TM for the number of male teachers;
(3) TF for the number of female teachers;
(4) TT for the total number of teachers;
(5) TP for the number of public nonteaching staff;
(6) TN for the number of nonpublic nonteaching staff;

(e) After the report headings and fields have been defined and selected, the screen will look like the following:

```
Options     Groups     Columns     Locate          Exit     08:06:18 pm

                                   SCH_CODE
                                   TM
                                   TF
                                   TT
                                   TP
                                   TN

---------------------------Report Format-----------------------------
School          Total No. of Teachers by Sex          Nonteaching Staff
 Code
                 Male       Female     Total          Public  Nonpublic
-----------------------------------------------------------------------

XXXXXXXXX         ###        ###        ###            ###      ###
-----------------------------------------------------------------------
CREATE REPORT     |<A:>|TERP1.FRM    |Opt:  1/6              |      |
  Position selection bar - .  Select - -+.  Leave Menu - .
Step to any column immediately by selecting the column expression.
```

(f) To run the report, one may select the option of printing only the summary totals for each subgroup defined (i.e., subdistricts in this case) by issuing the following command:

*REPORT FORM TERP1 SUMMARY and the report will be shown on the screen. Alternatively, the report can be printed or written to an external text file on disk:

*REPORT FORM TERP1 TO PRINT SUMMARY, or
*REPORT FORM TERP1 TO FILE TE1 SUMMARY.

The following report should be shown:

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Teacher Statistics by Subdistrict

School Code	Total No. of Teachers by Sex Male	Female	Total	Nonteaching Staff Public	Nonpublic
**Subdistrict Code: 01					
Subtotal	128	84	212	21	0
**Subdistrict Code: 02					
Subtotal	85	20	105	5	0
**Subdistrict Code: 03					
Subtotal	111	24	135	11	0
**Subdistrict Code: 04					
Subtotal	54	10	64	3	0
*** Total ***	378	138	516	40	0

(g) Selection criterion may be introduced so that only schools for a certain subdistrict will be printed on the report. For example:

*REPORT FORM TERP1 FOR SKA="05" .AND. SKE="01" and the following report should be shown:

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Teacher Statistics by Subdistrict

School Code	Total No. of Teachers by Sex Male	Female	Total	Nonteaching Staff Public	Nonpublic
**Subdistrict Code: 01					
101230501001	7	8	15	1	0
101230501002	6	4	10	1	0
101230501003	5	5	10	1	0
101230501004	8	1	9	1	0
101230501005	8	3	11	1	0
101230501006	4	3	7	0	0
101230501007	6	1	7	1	0
101230501008	7	4	11	1	0
101230501009	2	7	9	1	0
101230501010	6	4	10	1	0
101230501011	5	1	6	0	0
102230501032	5	4	9	1	0
102230501033	5	5	10	1	0
102230501034	6	4	10	1	0
102230501035	5	4	9	1	0
102230501036	5	7	12	1	0
102230501037	6	3	9	1	0
102230501038	7	3	10	1	0
102230501039	5	2	7	1	0
102230501040	5	1	6	1	0
102230501041	7	1	8	1	0
102230501042	4	5	9	1	0
102230501043	4	4	8	1	0
** Subtotal **	128	84	212	21	0
*** Total ***	128	84	212	21	0

10.4.3 Following similar procedures, a variety of reports can be produced either by modifying the already defined report formats (using the MODIFY REPORT command) or by creating a fresh report format. It will be left to the participants to try out a number of reports during the practical sessions.

11. Learning Activities

11.1 Microcomputer Tutorial Session

11.1.1 This tutorial session is divided into two parts. In the first part, the following exercises are proposed:

(a) The participants will be asked to practice the various techniques discussed in this Unit on the querying of the data bases, compiling statistics and the production of simple reports, following exactly the same procedures outlined in the User Manual Section;

(b) In the Diskette "EPP Mod.v.2," apart from the four data bases (SCHMAS.DBF, PUPIL_RC.DBF, FLOW_RC.DBF, and TEA_RC.DBF) and the associated utility programs generated by QUICKCODE III, there are a number of files generated in the User Manual in this Unit:

(1) PU.TXT, FL.TXT and TE.TXT for storing the results of the various arithmetical computations. FL.TXT and TE.TXT have been deliberately erased from the Diskette. The participants are asked to recreate these text files and check their results with those given in the User Manual Section;

(2) the index file for SCHMAS (SCHMAS.NDX) and for TEA_RC (TESKE.NDX) which is indexed to the subdistrict code (SKE). These files have been retained in the Diskette. Thus, in repeating the indexing exercise, the participants have to assign a different index file name (such as SCHMAS1.NDX and TESKE1);

(3) the report format file TERP1.FMT which has been created for the report on the teaching file (TEA_RC). This file has also been retained in the Diskette;

(4) the summary file for PUPIL_RC which has been created using the TOTAL command (i.e., PU1RP) and the duplicate of the PUPIL_RC (i.e., PUPIL1) and the index file PU1SKE created for the TOTAL COMMAND. These files have been retained in the Diskette.

(c) Apart from recreating the text files FL.TXT and TE.TXT and going through the various steps in the User Manual Section, the participants will also be asked to experiment with other commands in the DBASE III system, such as:

(1) "FOR ....OR.", "FOR.....<..";
(2) SET FILTER TO;
(3) COPY STRUCTURE TO and APPEND FROM.

11.1.2 It is stressed that the objective of this tutorial session is to demonstrate the ease in creating simple reports from the data bases, and NOT to train the participants to

become proficient in using the DBASE III report generator. The participants do not need to memorize all the steps involved in the creation of reports.

11.2 Group Work Session

11.2.1 The purpose of the group work session is to explore the alternative use of the data bases for reporting and the compilation of summary statistics. Similar to the group work session in Unit 2, the ultimate objective is to sensitize the participants on the relative ease in information retrieval from a computerized data base.

11.2.2 As in Unit 2, the participants will be divided into groups, preferably in the same manner as in Unit 2. Based on the outcomes of the discussions and group work in Unit 2, the participants will be asked to identify:

(a) the type of reports, and
(b) the kind of summary statistics

which need to be produced by the revised data base design. The required report formats and summary statistics will then be produced by the participants, working in groups, using microcomputers and the DBASE III software package.

11.2.3 The instructors should be available to help the participants during the group work session. In particular, the desired formats of the reports and the types of arithmetical manipulation that need to be performed to produce the required summary statistics have to be discussed among the instructors and trainees. Additional functions provided by the DBASE III system may have to be employed for this practical session.

12. Post-assessment

12.1 The purpose of the post-assessment is to enable the instructors to evaluate the effectiveness of the instructional and learning process in achieving the performance objectives stated above. A number of simple exercises have been suggested below to test the capability of the learners in using the software programs to retrieve information from the data bases.

12.2 The participants will be asked to perform the following tasks on their own:

(a) Produce summary files on the FLOW_RC and TEA_RC data bases using the TOTAL command;

(b) After the summary files have been created, to display some of the records in these new files;

(c) Prepare one report each on the FLOW_RC and PUPIL_RC data bases, following either the format adopted in the User Manual Section, or any other format considered appropriate;

(d) Modify the report format TERP1 by replacing the fields on the number of nonteaching staff (TP and TN) by the fields on the number of head and class teachers (which are the computed fields named NHT and NCT) and print the report;

(e) Using the modified report format in (d) above, to print the subtotals by type of schools rather than by subdistrict. In other words, the data base has to be indexed on the field SS instead of SKE.