TABLE OF CONTENTS

Abstract .................................................. 1
Introduction ................................................ 2

Chapter I: Overview

User environment ........................................... 5
Files descriptions ......................................... 6

Chapter 2: Descriptions of modules

Introduction ................................................ 14
Main menu module ......................................... 14
Initialization module ...................................... 15
Personnel module .......................................... 15
Personnel professional module ......................... 17
Personnel experience module ......................... 17
Time module ............................................... 18
Room module .............................................. 19
Course module ........................................... 20
Time and room module ................................... 20
Scheduling courses module ............................... 21
Scheduling instructors module ......................... 22
Scheduling office hours module ....................... 25

Chapter 3: Conclusions

Summary .................................................... 26
Conclusions ............................................... 28
Recommendations ......................................... 29
References ............................................... 30
This project consists of the design and implementation of a set of programs designed to act as an aid to a college department chairperson. These programs constitute a software package to be used as a filer and a college scheduler for instructors, courses, rooms, and times. Separate modules were developed to maintain each of these areas. Indexed files are created initially and used throughout the execution of the modules to hold data and facilitate the output of the various modules. The software acts as a filer for personnel data. The programs will store and retrieve various data on instructors which a chairperson would generally need throughout the day in running his department. The software is also able to store and retrieve personnel data that would aid instructor scheduling to the extent that the needs and wants of the instructors as well as their areas of expertise and past experience could be considered.

This software package also functions as scheduler to aid the user in scheduling class times, selecting rooms during the appropriate times, assigning courses to these rooms, and then to assign instructors to these courses. Various displays and printouts are available to the user to aid the scheduling process of the user.
Introduction

This project provides a solution to a problem concerning the scheduling of college instructors and of assigning courses, rooms, and class times. The problem is to determine a method to schedule instructors. Research and other investigations indicated that to solve this problem a software package could be developed that would allow a user to schedule instructors according to the preferences of the instructors and/or their areas of specialty. (Barth, p. 30) Prior to scheduling instructors, class times must be matched with available rooms. These rooms and times must then be assigned courses. These courses must then be assigned to instructors. The problem may then be summarized as having to determine a method to combine instructors, courses, rooms, and class times. Research consisted of locating and studying literary articles on scheduling packages already developed for this type of scheduling and interviewing college department chairpersons who were involved in the scheduling process. A search of the literature showed that unlike the scheduling of secondary public schools where state guidelines dictate the curriculum requirements of students and the teachers are scheduled to meet these needs, in a college environment the desires and interests of the instructors are considered more important. (Birkhearn, p. 13) Interviews with department chairpersons also supported this idea. Therefore when courses and class times are selected
they should be associated with the desires and interests of the instructors.

The solution to this problem was fashioned in a modular approach. Several programs were written to handle the different parts of the scheduling process including three programs which comprise the filer for personnel data. The filer allows the user to store, and display or print personnel data that may be of use in the scheduling process. This data component deals with topics such as areas of interests of the instructors, the degrees held, types of classes taught, current employment status of the instructors, and other data such as phone numbers, addresses, and social security numbers.

After the filer programs there are separate programs for scheduling class times, room assignments, courses and sections, and scheduling instructors. The basic functions of the programs are as follows:

(1) Time Module: The user is allowed to input times, which includes the class hours and the days classes are offered.

(2) Room Module: The user inputs room numbers and their seating capacities.

(3) Course Module: The user inputs courses, the number of sections offered of each course, and the number of hours credited toward instructor work load.

(4) Time and Room Module: The user combines the class times with available rooms to form time-room combinations.
(5) Scheduling Courses Module: The user combines the available courses and their sections to form time-room-course combinations.

(6) Scheduling Instructors Module: The user assigns instructors to the scheduled courses and sections.

(7) Scheduling Office Hours Module: The user enters the office hours of the instructors to provide a report indicating the times the instructors are available.

The above programs allow the data files to be updated and also maintain the integrity of the files during any updating procedures. There are two other programs. One program is used to initialize data files and the other program is used to run all of the program components of the software package from an on-screen main menu. This main menu performs calls to each respective program where subprograms are activated. All the programs return to the main menu to exit the package.

There is also a program which contains a shell sort. This program is called by some of these modules to sort the files before printing.
Chapter I Overview

User Environment

(1) Equipment to be used:

The project source code was keyed into an Epson QX-10 microcomputer. The operating system is CP/M-80, version B2.20. The files are stored on dual floppy-disk drives of 5 1/4 inch diskettes. The printers are a Panasonic KX-P3151 daisy wheel printer and Epson RX-80 dot-matrix printer. The object computer is also an Epson QX-10 microcomputer. The COBOL compiler and run-time routines are from RM/COBOL, version 2, revision 1, Ryan-McFarland Corporation. The editor used to input the source code is Nevada Edit, Ellis Computing, version 3.1.

The equipment used and the software developed for this project will be demonstrated on the campus of Corpus Christi State University.

(2) Programming language used:

The programming language is Common Business Oriented Language (COBOL).
Files Descriptions

All of the files used in the project are indexed files with dynamic access. All of the files are allowed to be updated. Some of the files allow records to be added, modified, or deleted while other files only allow records to be added or deleted. In files where updating is limited to the addition or deletion of records this is done because the record consists entirely of a primary key which cannot be changed.

The indexed files are ordered by primary keys when read in sequence. When the records are printed in order other than by their primary key the module is able to perform print routine. The routine reads the file into a table, calls a shell sort program to sort the table, and writes the table back to the original file. A START command and a READ/NEXT statement is then used to read the records to be printed in the desired order.

PERSONNEL-FILE:

The primary key for the PERSONNEL-FILE is a three character alphanumeric field called PERSONNEL-ID. This file is used throughout several modules to validate that an instructor has been entered into this file first before attempting to enter the instructor into any other file. The other data fields hold frequently used data about the instructor such as phone number, address, and social
security number.

PROFESSIONAL-FILE:

The PROFESSIONAL-FILE uses a field called PROFESSIONAL-ID as a primary record key. This key contains data synonymous to the data in the PERSONNEL-ID field of the PERSONNEL-FILE. Both of these primary record key fields refer to the instructors' identification numbers. Before an instructor may be entered in the PROFESSIONAL-FILE the instructor must be entered in the PERSONNEL-FILE. The PROFESSIONAL-FILE holds up to three degrees held by each instructor, three areas of interest of each instructor, and the employee status of each instructor. The status field is a two character alphanumeric field. The values may consist of FA for a full-time, active instructor currently scheduled for classes, FI for a full-time, inactive instructor who is usually full-time but is doing something other than teaching this semester, PA for a part-time instructor who is currently scheduled for classes, and PI for a part-time, inactive instructor who is not currently scheduled for classes. This allows the user to identify the current employment status of each faculty member.

This file may be referenced by the user through the module as an aid in determining the interests or specialties of the faculty for scheduling purposes.

EXPERIENCE-FILE:
This file uses a primary record key called EXPERIENCE-ID which is synonymous to the PERSONNEL-ID in the PERSONNEL-FILE. An instructor must first be added to the PERSONNEL-FILE before being added to the EXPERIENCE-FILE. The EXPERIENCE-FILE holds up to ten courses that each instructor has taught previously. It can be used to reference what courses an instructor has taught before as an aid in scheduling.

TIME FILE:

The TIME-FILE is used to acquire the time periods for classes of the department. The data in a record consists of a primary record key made up of an alphanumeric field called TIME-REC which consists of five subfields. The subfields are BEGINNING-HOUR, BEGINNING-MINUTE, ENDING-HOUR, ENDING-MINUTE, and CLASS-DAY which are the days of the week the class period is held. Because each record is a primary key, the records are either added or deleted and to modify a record it is deleted and a new record is added. The TIME-FILE also uses the CLASS-DAY as an alternate record key with duplicates. The Time and Room Module reads the TIME-FILE by CLASS-DAY to use in scheduling rooms with times.

ROOM-FILE:

The ROOM-FILE has a six character alphanumeric field called ROOM-NO as primary record key. Each record contains
one other data field for storing the seating capacity of each room. The room capacities will be an aid to users who need to be concerned about the number of students in certain courses. Data from the ROOM-FILE and the TIME-FILE are combined in the Time and Room Module to form combinations of class rooms and the class times those rooms are available to the department.

COURSE-FILE:

The COURSE-FILE contains data for course sections offered by the department. The primary record key is a six character alphanumeric field called COURSE-SECTION-NO. This field is further subdivided into two fields, COURSE-NO and SECTION-NO. Other data fields in each record are SUBJECT-ABRE, which is the subject abbreviation, COURSE-NAME, and INSTRU-CREDIT, which is the number of hours credit the instructor will receive toward the respective teaching load.

TIME-ROOM-FILE:

The TIME-ROOM-FILE is composed of data from the TIME-FILE and the ROOM-FILE. When rooms are matched with the times in the Time and Room Module the rooms are available, these combinations are written to the TIME-ROOM-FILE. The primary record key is a nineteen character alphanumeric field called TIME-ROOM. TIME-ROOM is subdivided into seven fields. The fields include TIME-ROOM-B-HOUR, which is the beginning class hour,
TIME-ROOM-B-MIN, which is the beginning class minute,
TIME-ROOM-PM-AM, which designates PM or AM,
TIME-ROOM-END-HOUR, which is the ending hour,
TIME-ROOM-END-MIN which is the ending minute, DAY-2 which is
the days of the week for the class period, and ROOM-NO-2
which is the assigned room number.

TIME-ROOM-COURSE-FILE:

The TIME-ROOM-COURSE-FILE is composed of data from the
TIME-ROOM-FILE and the COURSE-FILE. The course sections are
combined with the time and room data that the user selects
for each course section. This combination of data is written
to the TIME-ROOM-COURSE-FILE. The primary record key is a
nineteen character alphanumeric field called
TIME-ROOM-OP-TRC. This record key is further subdivided into
five subfields. The subfields are TRC-B-HOUR-MIN-PM-AM,
which is the beginning class time, TRC-E-HOUR which is the
ending hour, TRC-E-MIN, which is the ending minute, TRC-DAY,
which is the days of the week of the class period, and
TRC-ROOM which is the class room. The field
TRC-B-HOUR-MIN-PM-AM is further subdivided into three fields.
These fields are TRC-B-HOUR, which is the beginning hour,
TRC-B-MIN, which is the beginning minute, and TRC-B-PM-AM,
which designates PM or AM.

The file also has two alternate record keys
TRC-COURSE-SECTION and TRC-INSTRUCTOR-ID. The field
TRC-COURSE-SECTION is used to select records by course
sections in the Scheduling Courses Module and the Scheduling Instructors Module. The other alternate record key, TRC-INSTRUCTOR-ID, is used to select records and assign instructors to course sections in the scheduling process of the Scheduling Instructors Module. Other data fields in records are TRC-CAPACITY, which is room capacity, TRC-CREDIT, which is the class hours credit given toward the instructor work loads, TRC-COURSE-NAME, which is the name of the course, and TRC-AVAILABLE which indicates if the course section is available for scheduling when the data is moved into a table.

The TIME-ROOM-COURSE-FILE is also used in the Schedule Instructors Module. In this module, instructor data from the PERSONNEL-FILE is combined with records from the TIME-ROOM-COURSE-FILE. An instructor is combined with the time, room, and course data of the course section to schedule the instructor for and this data is rewritten to the respective time, room, and data course record.

OFFICE-TIME-FILE:

The OFFICE-TIME-FILE has a primary record key of a fourteen character alphanumerical field called OFFICE-REC. This primary record key is composed of six subfields. The subfields are BEGIN-HOUR, which is the beginning office hour, BEGIN-MINUTE, which is the beginning minutes of the office hour, PM-OR-AM, which designates PM or AM, END-HOUR, which is the ending office hour, END-MINUTE, which is the
ending office hour minutes, and CLASS-DAY, which is the days of the office hour. This file also has an alternate record key with duplicates called OFFICE-TIME-ID. Records may be added or deleted to the file through the use of the primary record key and they are printed through the use of the alternate record key to be able to print out data grouped by instructor.

The file is used to store office hours data for each instructor as an aid to the office staff.

INSTRUCTOR-CREDIT-FILE:

The INSTRUCTOR-CREDIT-FILE has two fields. The primary record key is a three character alphanumeric field called INSTRUCTOR-CREDIT-ID which is synonymous with the other instructor identification fields of previous files, including the fields PERSONNEL-ID, PROFESSIONAL-ID, EXPERIENCE-ID, and TRC-INSTRUCTOR-ID. The other field is called LOAD which is defined as a numeric data item. This file is used to keep track of the class load of each instructor. The Scheduling Instructor Module uses this file to display the current class load of instructors.

ASSIGNED-COURSE-FILE:

The ASSIGNED-COURSE-FILE has two data fields. The primary record key is a six character alphanumeric fields called COURSE-SECT. COURSE-SECT is subdivided into two subfields, COURSE and SECTION-1. This file is used in the
Scheduling Courses Module to facilitate keeping track of the courses that are scheduled to class time periods.
Description of Modules

The modules programs are called by a main menu program. Each module within itself has a submenu which allows a range of selections such as adding, deleting, or modifying data, and an exit which returns control of the software to the main menu. At the main menu, the user may select the same selection again, a different selection, or exit the package. The eleven modules are described below in order of their position and in the order they are usually used when doing scheduling.

When data is entered, data entry controls were developed to help maintain the accuracy and reliability of the data. Some safeguards used are a check for numeric data when the receiving field was defined to be numeric and checking for numerical bounds when making selections from a menu. Another data entry control involves checking for numerical limits on data entry involving dates and also checking for incorrect responses when asking the user for a specific key. These safeguards are included in all the modules.

MAIN MENU MODULE:

The opening screen is an introduction to the software package. After pressing any key the user observes the main menu. From the main menu twelve selections may be made including a decision to exit the software package entirely.
Each selection leads to another program which is called by the main menu. This module is a program in itself and serves no other purpose but to direct the control of the rest of the modules.

INITIALIZATION MODULE:

The Initialization Module prepares the data files for use in the rest of the modules. This module allows the data files to be made ready for entering data. When the files are initialized all current data is erased in preparation for new data. The initialization module also allows the user to initialize all the files at one time or to initialize only selected files depending on user choice. When the user attempts to initialize a data file which contains data that is being used in other files a warning is given that informs the user that data in the file is being used in other files. The user is then exited out of the command without processing the command. An example of this action is to attempt to initialize the PERSONNEL-FILE and not the rest of the files which contain instructor identification numbers which must first be input in the PERSONNEL-FILE. This routine serves to protect the integrity of the data files.

PERSONNEL MODULE:

The Personnel Module allows the user to enter data concerning the instructors that may be of use to the office
personnel of the department. Examples of this data include name, address, phone numbers, and social security number. The data in this module may be displayed or printed at any time. This module is the first module of three file modules that the software contains. The module keeps data on the instructor that the chairperson usually finds useful in the daily management of the department. The primary key is a three character alphanumeric instructor's identification number which is used in several other modules as record keys to assign data records to instructors. Each instructor managed in this software must first be assigned a unique identification number in this module.

Records may be added to this module with the restriction that each PERSONNEL-ID data value be unique. This software package will not allow a PERSONNEL-ID to be duplicated. The user may use alphabetic or numeric data. Deletion of records involves a more complicated restriction process. Deletion of an instructor may only be performed at the Personnel Module. This action was programmed in this manner to protect the integrity of the data files containing instructor data. When the user asks to delete an instructor the four files that also may contain instructor data are searched for data involving the instructor to be deleted. The files are the PROFESSIONAL-FILE, EXPERIENCE-FILE, TIME-ROOM-COURSE-FILE, and the OFFICE-TIME-FILE. The START statement, with the identification number as a key, is used to find the record if it exists. This statement is used to
facilitate searching. If the START statement does not result in an invalid key the instructor is used in the file. If any of these files contain data on the instructor a message is sent to the user stating that the instructor will not be deleted and the reason why. The instructor is not allowed to be deleted while this other data exists.

PERSONNEL PROFESSIONAL MODULE:

The Personnel Professional Module contains data for each instructor concerning issues which could aid the department chairperson in making decisions about which courses the instructor would like to teach. It contains the degrees held by each instructor and the areas of interest of each instructor. The data in this module may be displayed or printed at any time. The file used in this module is an indexed file with a primary key called PROFESSIONAL-ID. This identification number is synonymous to the identification number record key used in the Personnel Module. Before an instructor may be added in this module, the module checks to see if the instructor was added to the PERSONNEL-FILE in the Personnel Module. If the instructor is not found in the PERSONNEL-FILE the user is prompted to enter the instructor in the Personnel Module before attempting to enter the instructor in the Professional Module.

PERSONNEL EXPERIENCE MODULE:
The Experience Module allows the user to enter up to ten courses that the instructor has previously taught. This is to aid the chairperson in keeping a record of what each instructor has taught before to further aid in scheduling. The module uses an indexed file whose primary record key is EXPERIENCE-ID. This identification number is synonymous to the PERSONNEL-ID of the Professional Module. Before an instructor may be added in this module, the module checks to see if the instructor was added to the PERSONNEL-FILE in the Personnel Module. If the instructor is not found in the PERSONNEL-FILE the user is prompted to enter the instructor in the Personnel Module before attempting to enter the instructor in this module.

TIME MODULE:

The Time Module allows the user to enter the times classes are held for the department. The times entered in order are the beginning hour, the beginning minutes, the ending hour, the ending minutes, and the days the classes meet for this particular time period. These times together comprise a record, with a record made for each different class period. The file built in this module is the TIME-FILE. The primary record key is composed of the beginning hour, the beginning minutes, the ending hour, the ending minutes, AM or PM, and the day or days of the week the classes meet for this time period.

Adding times in the Time Module has only the
restriction that the time not be a duplication. Deletion of
times involves a more complicated restriction process. The
TIME-ROOM-FILE is searched for time data related to the time
to be deleted. If such data is found the user is informed
by a display message and the time is not allowed to be
deleted while the other data exists. The
TIME-ROOM-COURSE-FILE is not searched because this file is
dependent on the TIME-ROOM-FILE and any time data in the
TIME-ROOM-COURSE-FILE must also be in the TIME-ROOM-FILE.

ROOM MODULE:

The Room Module allows room numbers and their seating
capacities to be entered. The module builds an indexed file
called the ROOM-FILE. The primary record key is a six
character alphanumeric field called room-no. The size was
selected to accommodate common size room numbers.

Adding a room in the Room Module has only the
restriction that the room being added not be a duplication.
Deletion of rooms involves a more complicated process.
Before a room number may be deleted, the TIME-ROOM-FILE is
searched for the room number in a record. The START
statement is used with the room number as a key. If the
START statement does not result in an invalid key, the room
number is present in the TIME-ROOM-FILE. If the data exists
the user is informed that the room data is used in the
TIME-ROOM-FILE and will not be deleted. Since the room
number must be input into the TIME-ROOM-FILE before it can
be input into the TIME-ROOM-COURSE-FILE, the
TIME-ROOM-COURSE-FILE is not searched.

COURSE MODULE:

The Course Module allows the title of the department
to be input along with the course name and course number.
Along with the course number, the user is allowed to input
section numbers and the number of hours credit each
section counts toward the class load hours for
instructors. Section numbers are allowed to be input for
courses without having to rewrite the course information
for each section number input.

Adding courses has only the restriction of not
allowing duplications. Deletion of courses has more
complicated restrictions. The TIME-ROOM-COURSE-FILE must
be searched for any record using the course. The START
statement is used with the course as a key to facilitate
the search. If the START statement does not result in an
invalid key the user is informed that the course is being
used in the TIME-ROOM-COURSE-FILE and may not be
deleted.

TIME AND ROOM MODULE:

The Time and Room Module allows the user to combine the
data from the TIME-FILE and the ROOM-FILE. The chairperson
is able to associate room numbers which the department is
able to use with the class period times when the rooms are
available to the department. The Time and Room Module also builds two files from the process of combining some of the data from the Time Module and Room Module. One of the files is the TIME-ROOM-FILE which is merely used to keep track of which time periods are combined with room numbers. The other file is the TIME-ROOM-COURSE-FILE which is used later to combine course sections with room numbers and class times in the ninth module.

This module also allows time and room combinations to be modified and to safeguard the integrity of the data files, some restrictions are applied. Before a combination of a time and room is allowed to be modified so as to separate the room from the time, the TIME-ROOM-COURSE-FILE is searched. The record with the time and room combination is read randomly and if a course number exists in the record, the user is informed that this time and room combination is assigned a course and will not be modified.

SCHEDULING COURSES MODULE:

The Scheduling Courses Module divides the screen into two parts, a left side for course sections and a right side for times. This module uses a file called the TIME-ROOM-COURSE-FILE with only times and room numbers as data to the file in each record and the COURSE-FILE. The records are rewritten with assigned course and section numbers added to the selected records. This module allows the user to combine course sections with previously
associated time and rooms. The times and rooms must have been assigned to each other in the time and room module and written together as a record in the TIME-ROOM-COURSE-FILE in the Time and Room Module. The scheduling courses module takes the TIME-ROOM-COURSE-FILE with only the time and room as data to each record and allows a course to be added to the record. This module will also allow courses previously assigned a time and room to be changed.

Combining a course to a time and room has only the restriction that no duplications are allowed. Modifying the time, room, and course combinations is allowed with restrictions. Before a combination of a course assigned to a time and room can be separated the record containing this combination is checked for a scheduled instructor. If an instructor's identification number is found, the user is informed through the monitor screen that the combination is currently scheduled an instructor and will not be modified.

SCHEDULING INSTRUCTORS MODULE:

The Scheduling Instructors Module uses the TIME-ROOM-COURSE-FILE and the PERSONNEL-FILE as input files and divides the screen into two parts, top and bottom. The TIME-ROOM-COURSE-FILE uses an alternate record key called TRC-INSTRUCTOR-ID which allows duplicates. The PERSONNEL-FILE is used to get instructor data such as the identification number and the instructor name for scheduling purposes. When the user selects option one in the submenu
the screen asks for an instructor's identification number. The number is accepted as the PERSONNEL-ID, the primary record key to the PERSONNEL-FILE. The PERSONNEL-FILE is read for the record with the identification number as a primary record key. If the record exists, the instructor's name is displayed along with the identification number, otherwise an error routine is invoked. The PERSONNEL-ID is moved to the TRC-INSTRUCTOR-ID. The TIME-ROOM-COURSE-FILE is read using TRC-INSTRUCTOR-ID as an alternative record key to see if there exists any classes for which that instructor has been previously scheduled. If such classes exist the classes are displayed on the top half of the screen, otherwise a message is displayed indicating none exists. The user is prompted with various selections which includes a choice to see course along with their times and rooms. If a choice is made to schedule courses to an instructor the user is prompted to enter a course number. This course number is used as an alternative record key, with duplication allowed, to the TIME-ROOM-COURSE-FILE. The file is read and all the records with this course number are moved to a table. Each record will be differentiated by a different section number. Up to six records may be read into the table. The table elements are displayed on the bottom screen. Some of the data displayed are course and section numbers, course titles, room numbers, class times, instructor load hours and total class load hours for the instructor. The total class load is obtained by reading the
appropriate record indexed by the instructor's identification number as a key. The user may also see more sections of the same course if they exist. The user is then able to select sections of the course to assign to the instructor above. To assign a course section the user is asked to enter the reference number of the section chosen. The reference number becomes the subscript number to the table. The table element is checked for an instructor's identification number. If that number exists in that table element the course section has previously been scheduled and an appropriate message is displayed, otherwise the table element with the section is moved to another table for display purposes. If it has not been scheduled the section and all the information that goes with it, including the instructor's class load, is displayed in the information in the top portion of the screen after the record along with the scheduled instructor's identification number and is rewritten back to the TIME-ROOM-COURSE-FILE. The credit-file is also updated to include the additional class load hours for the instructor. During the scheduling process of this module the user may select to see more sections of the same course if there exists any or a display of different course sections or the user may exit and return to the submenu.

The class schedule may be printed in order by instructor or viewed individually by the instructor's identification number throughout the scheduling selection
SCHEDULING OFFICE HOURS MODULE:

The Scheduling Office Hours Module uses the PERSONNEL-FILE to obtain the name of the instructor through the use of the instructor's identification number as a primary key. Office hours are written to the office-hours-file. In the submenu if the choice of adding hours is selected the user is prompted to enter the instructor's identification number which is used to read the respective record in the PERSONNEL-FILE. The Scheduling Office Hours Module will not permit office hours to be entered for an instructor who has not been entered in the PERSONNEL-FILE. If the instructor's identification number is found in the PERSONNEL-FILE the name is displayed on the screen and the user is prompted to enter the office hours and the day of the week of the office hours. If the combination for the beginning office hour, the beginning minute, the ending hour, the ending minute, and the days of the week for such hours is already on file as a record an error message is displayed. The office hours of each instructor may be displayed or printed.
Summary

The collection of modules described in this project report contain the programs needed to maintain data on both actively employed and inactive instructors, and to schedule instructors to classes. Before the actual scheduling of an instructor is accomplished in the Schedule Instructors Module, the other modules must be executed in a systematic order. The data files must first be initialized so that records may be written to the files. Then the instructors to be scheduled may be added at this time or this process may wait until just before the execution of the Scheduling Instructors Module. The Time Module, Room Module, and Course Module can be executed in any order. The Time and Room Module may be executed after the TIME-FILE and ROOM-FILE have been updated in the Time Module and Room Module respectively. The Scheduling Courses Module may only be executed after the COURSE-FILE is updated in the Course Module and after rooms have been assigned times in the Time and Room Module. The Scheduling Instructors Module may only be executed after Scheduling Courses Module has been executed.

The user is also able to store personal data on the instructors in the filer modules which consist of the Personnel Module, the Professional Module, and the Personnel Experience Module. These modules may be referred to at any time during the use of this software by exiting the
respective module and entering the filer modules through the main menu.

The user is also able to display or print out the data in each module. If the user wishes to use the same data in some of the files in the following semester the respective files may be selected not to be initialized and therefore not cleared of data. Those files which will require a majority of new data may be selected individually to be initialized and thus cleared of data.
Conclusions

The project satisfies the needs outlined in the introduction of this report. The goals outlined in the project proposal were accomplished. A new data file, INSTRUCTOR-CREDIT-FILE, was added to the project to help facilitate the scheduling of instructors. The use of this file is beneficial to the program in that the class load total for each instructor is readily available without having to read each schedule course record for the respective instructor and total the class hours load.

The package was developed to be useable by the chairpersons of any department in any college or university that uses scheduling data of the type and size defined in the record fields. The developer of the project considered the scheduling habits of several departments at Texas Southmost College. Some past schedules for Pan American University and Corpus Christi State University were observed and considered in developing patterns for displaying screens and printing reports.
Recommendations

The following recommendations were observed by the developer and by potential users who were interviewed:

1.) create an alternate version of the software package to run on an MS-DOS system

2.) add more modules for printing and displaying other reports

3.) add more modules to fit individual user desires
REFERENCES
