CHAPTER 1

CREATING YOUR FIRST DATABASE

1.0   Topics Covered in Chapter 1

Getting into dBASE.

Creating a database.

Entering data into a database.

Looking at a database in the EDIT mode.

Looking at a database in the BROWSE mode.

Placing Memo fields in a database.

Appending new data to a database.

Printing out a listing of a Database Structure.

Printing out a listing of the contents of a database.

1.1   Preparing Your Diskette

Depending on just what type of system you have, you may enter dBASE4 in one of many ways. In this text, it will be assumed that the pathway (PATH, MAP or APPEND) has been defined to include the directory containing DBASE4. If this step is unclear to you, consult Appendix A. We will assume that you will be keeping your databases on drive A, throughout this text. If this is not the case in your situation, you may substitute whatever drive letter and directory you wish for the **A:\>** which will be used to represent the DOS[4] prompt.

Turn on your machine, and insert your diskette into Drive A: (if that is the drive you are using for your data). If the DOS prompt is not already addressing the drive you wish to use, change the logged disk drive to **A:\>** (or the one you will be using). For example, if you are currently logged into drive **C:** (if so you will see a prompt that begins with the letter **C** such as **C:\>**), then type **A:** at the DOS prompt and strike the enter key.

C:\> A: <Enter>

Your screen should now have your DOS prompt with the blinking cursor next to it. It should look like the following:

A:\>_

The dash represents the blinking cursor.

In order to keep everything orderly in your work, we are going to create individual directories for the various systems that you will be creating in the course of this book. If you think of your diskette as a file cabinet in which you store your files, then a directory is a drawer of the file cabinet. The topmost directory (that which already exists after you have newly formatted your diskette)

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[4]DOS refers to the Disk Operating System. It is assumed throughout the text that the user is utilizing either MS-DOS (written by Microsoft Corporation) or one of its DOS looks-alike.

is referred to as the "root" directory. You may think of the root directory as being the top drawer of your filing cabinet. We will not be using that drawer as DOS uses it for its own purposes.

Appendix A also tells you how to create the various subdirectories that we will be using in this course. If you have not already done so, go to Appendix A and follow the steps to create the directories[5] as well as to create a DOS prompt indicating what directory you are in.

We will now go to the COMPCLAS directory where we will be doing the bulk of the work in this text. This is done by typing CD\COMPCLAS at the DOS prompt. "CD" stands for change directory. Executing this command:

A:\> **CD\COMPCLAS**   <Enter>

note the DOS prompt changes to reflect the fact that we are now in a new directory. (From now on the word <Enter>, which refers to striking the Enter key will not be used. It will be assumed that a command is always executed by striking this key.)

A:\COMPCLAS>

1.2   Getting Into dBASE4

We are now ready to enter the dBASE4 environment. dBASE4 is an applications program just like a word processor or a spreadsheet or any other program that you have been using to do some application. We enter dBASE4 by typing **DBASE** at the DOS prompt as shown:

A:\COMPCLAS> **DBASE**

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[5]You may Make a new Directory called **COMPCLAS** by typing **MD\COMPCLAS** at the DOS prompt.

A:\> **MD\COMPCLAS**

You must make this directory before you can Change Directory to it.

Now your environment will change drastically. After the initial screen is shown, you will see one of two things depending on how your version of dBASE4 is configured. Either you will see a solitary dot in the lower left hand corner of the screen (see Fig. 1.1) or you will see the control center[6] with all its options (see Fig. 1.2). If what you get is the control center, strike the Escape key immediately. That is the key labeled: **Esc** . When it asks you, "Are you sure you want to abandon operation?", select "Yes" by hitting the left arrow key and then press the Enter key. (see Fig. 1.3) This will return you to the dot prompt which will be our home (Fig. 1.1).

```
                            Press the F1 key for HELP
.
Command ║
            Type a dBASE IV command and press the ENTER key (←┘)
```
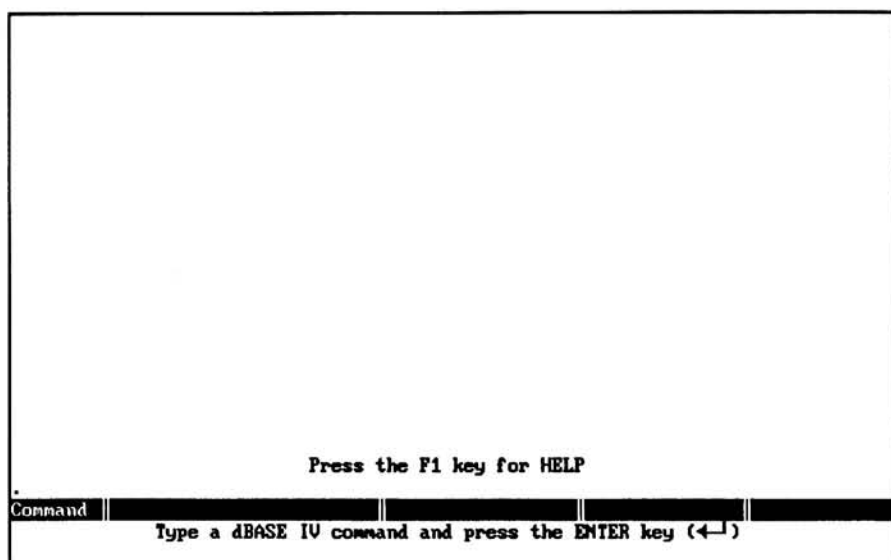
Figure 1.1 The opening screen of dBASE IV at the Dot Prompt.

The Control Center is helpful to the person who is interested in using the standard functions offered in dBASE4. However, for the person interested in going beyond and actually doing some programming in dBASE4, the Control Center can become a hindrance to learning the rich dBASE4 language. It is for this reason that we will stay away from the Control Center. Hence,

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[6]The Control Center may be reached by typing **ASSIST** at the dot prompt.
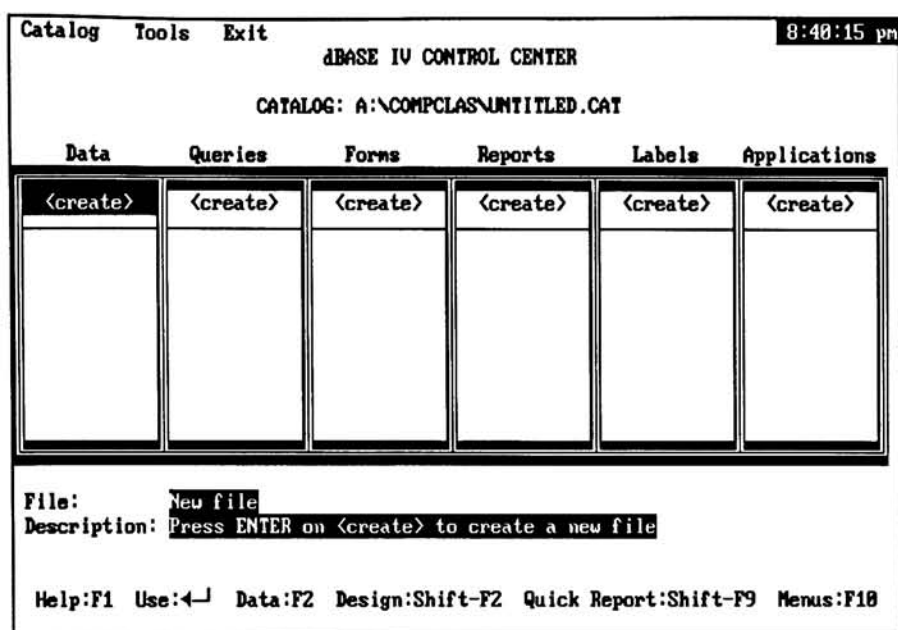
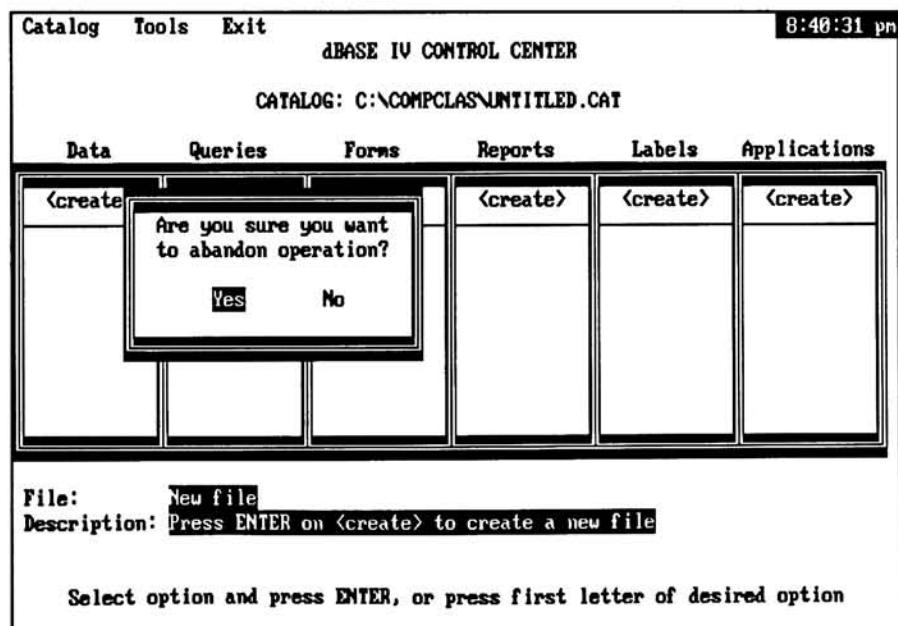**Figure 1.2** The dBASE IV Control Center Screen.

Figure 1.3 Exiting from the Control Center.

whenever you enter dBASE4 from now on, be sure that you go directly to the dot prompt.

1.3   Creating a Database

Let us begin by creating our first database. Since this is a computer course, the name of the database will be **COMPCLAS** , which stands for Computer Class. As we are only allowed 8 characters in a database or file name, we abbreviate our database name in this way. We create a database by typing the word: **CREATE** followed by the name of the database, that we wish to create, at the dot prompt.

. CREATE COMPCLAS

Figure 1.4 shows the screen that will appear. The Field Name refers to the name of the data field that you wish to tabulate in your database. If you examine the structure of the database COMPCLAS.dbf shown in Table 1.1, you'll notice that there are several different types of fields that a database can have. To be precise, there are six: 1) Character fields, 2) Logical fields, 3) Date fields, 4) Numeric fields, 5) Memo fields, and 6) Floating point numeric fields.

1.   Names are clearly good candidates for being **Character** fields, as they consist of strings of characters. We must specify the width of the field (or the number of characters that the field will reserve for the name). A width of 15 is chosen as most first and last names will not exceed 15 characters.

2.   The **Logical** field takes on the value of **True** or **False** (or a **Yes** or a **No**). In the computer course, a student has an option to take a final exam or to do a term project instead. The field **TERM_PROJ** indicates the student's choice. Needless to say, a field that takes either a **T** or an **F** need only be 1 character wide.

Figure 1.4 Database structure creation screen.

Table 1.1 Structure of COMPCLAS.DBF

Field	Field Name	Type	Width	Dec
1	FIRSTNAME	Character	15	
2	LASTNAME	Character	15	
3	TERM_PROJ	Logical	1	
4	EVALUATION	Date	8	
5	PROJ_GRADE	Numeric	3	0
6	COMMENTS	Memo	10	

3.   The field labeled **EVALUATION** refers to the date on which the student must come and demonstrate his or her project to the professor. Note that we have here another kind of field known as a **Date** field. A **Date** field is always 8 characters wide. If you count the number of characters in a date, 12-31-1992, it should be clear why a date field reserves 8 characters for its width.

4.   The field labeled **PROJ_GRADE** is a fixed point **Numeric** field and is used whenever you think you might be doing arithmetic with the numbers contained in the field. Since we'll probably be using the grade received on the project to compute the student's average, a **Numeric** field is a good choice. Since the grade we could give might be anywhere from 0 to 100, we need to allow 3 characters for the width (just in case someone gets 100). The column labeled **Dec** refers to the number of places needed after a decimal point. Since we're not interested in grading someone to one-tenth or one-hundredth of a point, we'll make this column zero width.[7] Obviously, the **Dec** column only has significance for a **Numeric** field, and is ignored in all other cases.

5.   The **COMMENTS** field is a **Memo** field. This field allows you to type in memos up to 524,288 characters in length. Since this is the size of a large novel, dBASE4 uses a separate file for this purpose.[8] Memos are entered using the built-in text editor or may be entered using a word processor.

6.   There is one more type of field that is available in dBASE4 and that is the **Floating** point numeric field. The problem with the fixed point **Numeric** field is that it only allows

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[7]If, on the other hand, we had a numeric field which held the hourly wage rate, given in dollars and cents, then we would want two decimal places after the decimal point. Thus we would choose the value in the **Dec** column to be **2**.

[8]This file has the extension **.DBT** rather than the **.DBF** extension that is given to the database file containing all the other fields. In our case, the name of this file is **COMPCLAS.DBT**. The "**T**" at the end of the extension **.DBT** stands for Text file. All other database fields are contained in the **.DBF** file.

numbers up to 10 quadrillion (10^{16}) which is approximately 2 thousand times the size of the United States National debt. Numbers that go beyond 10 quadrillion (that's a 1 with 16 zeroes following it) or its inverse, are too large or too small to be handled by the fixed point Numeric field. For numbers of this sort, they are handled using **Floating** point numeric fields which are ordinarily represented in scientific notation. However, unless you are a scientist or engineer, it is unlikely that you will have much need of the **Floating** point numeric field. We will not be using them in this text.

Now you may begin typing in the structure of the Computer Class Database. When you finish typing in **FIRSTNAME**, simply strike the Enter Key. All you need to do to specify the type of field is to strike the first letter of the field type. For example, all you would need to do to specify a Logical field is to type the letter "**L**". If you type nothing, a Character field will be assumed. In each case, striking the Enter key will move you on to the next item to enter. You may ignore the Index column for now. Simply strike the Enter key when the cursor goes to that column. Use the cursor movement keys (the four keys with arrows on them pointing in four different directions) to move the cursor around the database structure that you've entered. This is done for editing purposes.

Once you have entered all the data, and it looks identical to that shown in Table 1.1, then we need to access the menu at the top of the screen (see Figure 1.5). This is done by holding down the key labeled **Alt** and then striking the first letter of the word in the menu that you desire. For example, to Exit, all we need do is depress the **Alt** key and then strike: **E**. When that occurs, a window drops down below the "Exit" as shown in Figure 1.6. As the menu item already selected by default is: "Save changes and exit", strike the Enter key.

```
Layout   Organize   Append   Go To   Exit                    6:53:16 pm

                                              Bytes remaining:   3948
  ┌─────┬────────────┬────────────┬───────┬─────┬────────┐
  │ Num │ Field Name │ Field Type │ Width │ Dec │ Index  │
  ├─────┼────────────┼────────────┼───────┼─────┼────────┤
  │  1  │ FIRSTNAME  │ Character  │  15   │     │   N    │
  │  2  │ LASTNAME   │ Character  │  15   │     │   N    │
  │  3  │ TERM_PROJ  │ Logical    │   1   │     │   N    │
  │  4  │ EVALUATION │ Date       │   8   │     │   N    │
  │  5  │ PROJ_GRADE │ Numeric    │   3   │  0  │   N    │
  │  6  │ COMMENTS   │ Memo       │  10   │     │   N    │
  │  7  │            │ Character  │       │     │   N    │
  │     │            │            │       │     │        │
  └─────┴────────────┴────────────┴───────┴─────┴────────┘

Database A:\compclas\COMPCLAS        Field 7/7
            Enter the field name. Insert/Delete field:Ctrl-N/Ctrl-U
Field names begin with a letter and may contain letters, digits and underscores
```

Figure 1.5 Structure of database COMPCLAS.

```
Layout   Organize   Append   Go To   Exit                   10:21:48 am
                               ┌──────────────────────────┐
                               │ Save changes and exit    │ ing:   3948
  ┌─────┬────────────┬─────────│ Abandon changes and exit │
  │ Num │ Field Name │ Field Ty└──────────────────────────┘ Index  │
  ├─────┼────────────┼────────────┼───────┼─────┼────────┤
  │  1  │ FIRSTNAME  │ Character  │  15   │     │   N    │
  │  2  │ LASTNAME   │ Character  │  15   │     │   N    │
  │  3  │ TERM_PROJ  │ Logical    │   1   │     │   N    │
  │  4  │ EVALUATION │ Date       │   8   │     │   N    │
  │  5  │ PROJ_GRADE │ Numeric    │   3   │  0  │   N    │
  │  6  │ COMMENTS   │ Memo       │  10   │     │   N    │
  │  7  │            │ Character  │       │     │   N    │
  │     │            │            │       │     │        │
  └─────┴────────────┴────────────┴───────┴─────┴────────┘

Database A:\compclas\COMPCLAS        Field 7/7                      Caps
            Position selection bar: ↑↓    Select: ↵    Leave menu: Esc
               Save any changes made and leave database design
```

Figure 1.6 Exiting from database structure creation mode.

1.4   Appending Records to a Database

We have now completed creating the structure for the database, COMPCLAS, and we find ourselves back at the dot prompt. However, we have yet to enter any data into the database. The adding of new records into a database is done by means of the **APPEND** command. Typing **APPEND** at the dot prompt:

. **APPEND**

we get the data entry screen shown in Figure 1.7. You may now proceed to enter the data shown in Table 1.2.

Table 1.2 Contents of Database COMPCLAS.DBF

FIRSTNAME	LASTNAME	TERM PROJ	EVALUATION	PROJ GRADE
Gladys	Naboa	T	12/15/92	93
Consuelo	Naboa	T	12/16/92	89
Derek	Caruthers	F	/ /	
Wendel	Little	T	12/17/92	87
Jeremy	Witherspoon	T	12/19/92	82
Nancy	Hardwick	F	/ /	
Jonathan	Samuels	T	12/14/92	76
Raquel	Ransworth	F	/ /	
Matts	Engleberg	T	12/13/92	62
Mary Beth	Swazey	T	12/14/92	52

Once again you can use your cursor movement keys to move about. When necessary, strike the Enter key to move on to the next field (Note that when you type in the last space on the right in a field, the cursor automatically moves on to the next field). For now we can skip entering data in the **Memo** field, so simply strike the Enter key when you get to that field. Immediately a new blank record will appear. When you have entered all the data for the final record, Figure 1.8 shows what should appear on your screen.

Just as in the Database Structure Design, we left the mode by pressing the **Alt E** key combination and then struck Enter, to leave the Data Entry mode, we do the same thing.

Now for completion, let's close our database. If you think of a database file as a file folder that we have taken out of a file cabinet and spread out on our desk, then before we leave it to go take a coffee break, we want to close it and put it away. Suppose we don't and the window were left open. When we open the door, some of the file papers might blow out the window, and we'd lose them. In the same way, we should close our database whenever we

Figure 1.7 Blank data entry screen for database COMPCLAS.

leave it even for a few minutes. To do this type the word **USE** at the dot prompt. Paradoxically, the command **USE**, all by itself, closes the database thus preserving its integrity.

. USE

1.5   Editing the Database

Suppose you did not finish entering all the data, and you now wish to continue entering the data from Table 1.2. The first thing that we must do is to re-open our database, **COMPCLAS**. This is done by simply typing at the dot prompt, **USE COMPCLAS**.

. USE COMPCLAS

Now our database is opened, however, nothing seems changed. Where is that data entry screen that we had before? We'll get to that in a second. Now it's time to learn about the Status Line. At the bottom of your screen there should be a bar going across

```
 Records    Organize    Go To    Exit
FIRSTNAME    Mary Beth
LASTNAME     Swazey
TERM_PROJ    T
EVALUATION   12/14/92
PROJ_GRADE   52
COMMENTS     memo




















Edit    A:\compclas\COMPCLAS    Rec 10/10    File
```

Figure 1.8 Data entry screen for last record in COMPCLAS database.

which looks like that shown in Figure 1.1. If there is no such bar displayed on the screen, you can type:

. SET STATUS ON

This will cause the Status Line to go on.

Examining the status line you will notice that the name of our database is now prominently displayed on the line. This is a clear indication that the database, **COMPCLAS,** is indeed open. Other things to notice about the status line are the fact that **A:** is prominently displayed (unless you are using some other logged disk drive). This means that the drive all data will be read from and written to is the one indicated on the Status Line.

Finally, note that it says: **Rec: 1/10** over on the right hand side. This means that there have been 10 records of data entered into the database, but that we're currently positioned at record number 1. Now what does that mean? We still have only a blank screen in front of us.

If we type the word **EDIT,** we will see that we are indeed looking at record 1 (see Figure 1.9).

. EDIT

Note that we are looking at the same type of screen that we were looking at earlier, except that we are looking at the first record rather than at a blank screen. Looking at the Status Line we notice the word **EDIT** clearly written in the lower left hand corner. Both APPEND and EDIT modes have EDIT written in the lower left.

We are now free to use our cursor movement keys to move around and make whatever changes in the data as we deem necessary. To move onto the next record, simply strike the **PgDn** (Page Down) key. Note the change in the status line to **Rec: 2/10,** thus indicating that we are looking at Record 2. If we now choose to go back to Record 1, we need only strike the **PgUp** (Page Up) key. If we wish to continue stepping through the rest of the

database, a record at a time, we need only continue striking the **PgDn** key.

1.6   Browsing the Database

In the **EDIT** mode, we see the fields of the database listed vertically for each individual record. There is another way of looking at the database. If we list the fields across horizontally on the screen, and then list each record vertically, one line per record, we are able to see 17 records at one time. This is referred to as the **BROWSE** mode. We can enter the **BROWSE** mode very easily from the **EDIT** mode, by merely striking the **F2** function key. We may also enter the **BROWSE** mode from the dot prompt by typing **BROWSE**. If you are currently in the **EDIT** mode, strike the **F2** key, otherwise type at the dot prompt:

. **BROWSE**

Figure 1.9 Examining the first record in the Edit Mode.

Figure 1.10 shows what you should see when you have entered the **BROWSE** mode. Notice that since we only have 10 records currently in the database, we are able to look at its contents all at once. This broad view of a database makes the **BROWSE** a very popular means of examining as well as editing data in a database.

Using the cursor movement keys, notice how you can move around in each field and from record to record. Strike the Enter key several times, and note that you move from field to field. Note that striking the Enter key when you are positioned in the last field takes you automatically to the first field of the next record in sequence. You can move backwards in the same way by holding down the Shift key and striking the Tab key (This is the key directly below the "1" key on your keyboard. Note that it has arrows going in both directions).

Using the **PgUp** and **PgDn** keys we can move backward and forward through our database 16 records at a time. Of course with this short database, striking the **PgDn** key takes us immediately to

Records Organize Fields Go To Exit					
FIRSTNAME	LASTNAME	TERM_PROJ	EVALUATION	PROJ_GRADE	COMMENTS
Gladys	Naboa	T	12/15/92	93	memo
Consuelo	Naboa	T	12/16/92	89	memo
Derek	Caruthers	F	/ /		memo
Wendel	Little	T	12/17/92	87	memo
Jeremy	Witherspoon	T	12/19/92	82	memo
Nancy	Hardwick	F	/ /		memo
Jonathan	Samuels	T	12/14/92	76	memo
Raquel	Ransworth	F	/ /		memo
Matts	Engleberg	T	12/13/92	62	memo
Mary Beth	Swazey	T	12/14/92	52	memo
Browse A:\compclas\COMPCLAS Rec 1/10 File					

Figure 1.10 COMPCLAS examined in the BROWSE Mode.

the last record. Likewise striking **PgUp** takes us back to the first record again.

Although we could enter the **COMMENTS** into the **MEMO** fields directly in the **EDIT** mode, it is even easier to do it in the **BROWSE** mode. Begin by putting your cursor in the **memo** field of Gladys Naboa (use the cursor movement keys, Enter key, or Shift Tab to move to this field). Now strike the **F9** key to take you into the **MEMO** field text editor. Note the ruler at the top of the screen. This type of ruler is typical of text editors and word processors in general. Now you may type in the comment we wish to make about Gladys (see Table 1.3 below). The result should appear as shown in Figure 1.11.

Note that the text automatically wraps to the next line as you type (there is no need to strike the Enter key). When you have finished typing in the first comment, you may leave the **Memo** text editor in the usual way, by depressing the **Alt** key and striking **E** for Exit, and then striking the Enter key.

Table 1.3 Contents of the MEMO field COMMENTS for COMPCLAS.DBF

Record	
1.	Gladys does superior work. She seems to be very highly motivated.
3.	Derek elected to take the Final instead.
5.	Jeremy is bright, but he's just a little sloppy in his work. If he would take more time to be precise, he would do "A" work.
6.	Nancy elected to take the Final.
8.	Raquel elected to take the Final.
10.	Mary Beth clearly did not put any effort into her project. Her attendance has been very spotty also.

This takes us back to the **BROWSE** mode, right where we left it. Use the Down Arrow key to move directly to the **MEMO** field of the next record. Repeat the procedure adding in the second comment. Continue doing this till all records that should have comments have been entered. When you get done, the result should look like that shown in Figure 1.12.

Notice that all the records to which you added a comment now have the word **MEMO** capitalized, while those to which you didn't add comments, have **memo** in small letters. This is a way of telling, at a glance, which records have comments added in their **memo** fields, and which don't.

1.7   Appending to Your Database While in EDIT

Suppose you had not entered all the data contained in Table 1.2 before you quit the session, and now you have returned and want to continue entering data. Or suppose, you have some additional students you want to add to our database. If you have just restarted
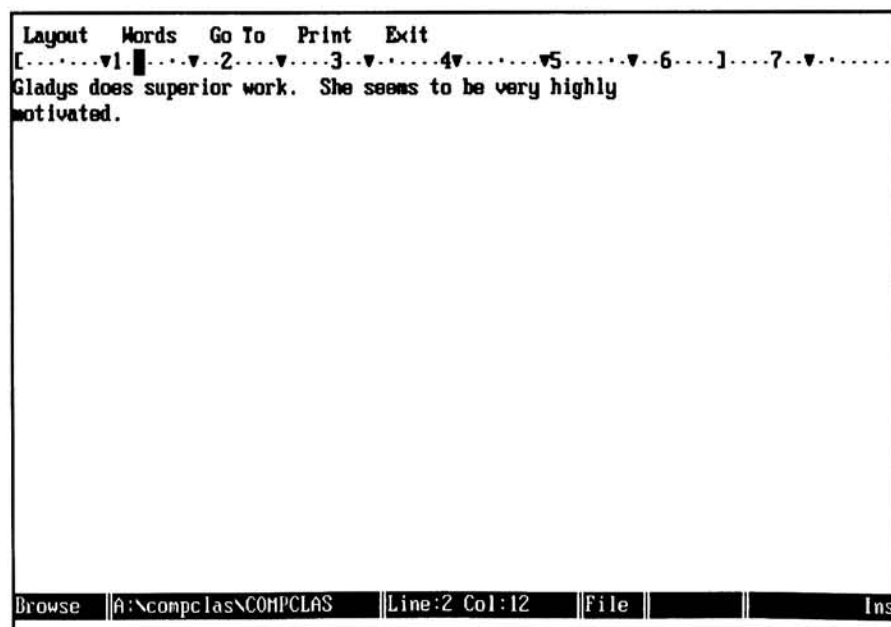
```
 Layout   Words   Go To   Print   Exit
[·······▼1·█···▼··2····▼····3··▼······4▼·······▼5·····▼··6····]····7··▼······
Gladys does superior work.  She seems to be very highly
motivated.




















 Browse  ||A:\compclas\COMPCLAS  ||Line:2 Col:12  ||File ||        ||        Ins
```

Figure 1.11 Memo Field Text editor with comment for first record.

dBASE4 and there is no file open, remember you must first open the database.

. USE COMPCLAS

You may, of course, simply add new records using the **APPEND** command as before. Another possibility is that you may be in the **EDIT** mode, and you may wish to add a record while you are there. Let's go into **EDIT** right now.

. EDIT

Having just opened the database, COMPCLAS, again, the screen that we would see is shown in Figure 1.13. Note that we are looking at the very first record in our database once more.

```
 Records    Organize    Fields    Go To    Exit

 FIRSTNAME       LASTNAME        TERM_PROJ EVALUATION PROJ_GRADE COMMENTS

 Gladys          Naboa           T         12/15/92        93 MEMO
 Consuelo        Naboa           T         12/16/92        89 memo
 Derek           Caruthers       F          /  /             MEMO
 Wendel          Little          T         12/17/92        87 memo
 Jeremy          Witherspoon     T         12/19/92        82 MEMO
 Nancy           Hardwick        F          /  /             MEMO
 Jonathan        Samuels         T         12/14/92        76 memo
 Raquel          Ransworth       F          /  /             MEMO
 Matts           Engleberg       T         12/13/92        62 memo
 Mary Beth       Swazey          T         12/14/92        52 MEMO



 Browse   ||A:\compclas\COMPCLAS    ||Rec 10/10      ||File ||          ||
```

Figure 1.12 Browse of COMPCLAS after having entered MEMO fields.

To switch into the **APPEND** mode from this point, we need to access the Menu option "Records" by depressing the **Alt** key and striking the **R** key. This brings down the window menu shown in Figure 1.14. Note that the menu item selected in the window is "Add new records". Striking the Enter key at this point gives you the screen in Figure 1.15, which is basically the same as the data entry screen we had in Figure 1.7.

```
 Records    Organize   Go To    Exit
FIRSTNAME   Gladys
LASTNAME    Naboa
TERM_PROJ   T
EVALUATION  12/15/92
PROJ_GRADE   93
ADDRESS     324 Catskill Terrace
CITY_ST_ZP  Sundown, NY  12782
COMMENTS    MEMO




Edit    A:\compclas\COMPCLAS    Rec 1/10    File
```

Figure 1.13 EDIT Mode showing Record Number 1.

Note that on the bottom right of the status line there appears: **Rec: EOF/10** . The number 10 indicates the number of records you have already entered. The word **EOF** stands for End Of File. This means that any new records that are added will be appended to the end of the file, which is exactly where you would expect to have them added.

We shall now add a new record to our database. Mary Wong, who had only been auditing our class is now interested in taking it for credit. Let's add Mary to our list. When you get done appending Mary, your screen should look like that shown in Figure 1.16.