

CASE STUDY

fifteen
University
Information System

case study
OVERVIEW

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CS15.1 *Application Overview and Model Development*

Due to the large enrollment at the average university, a database larger than Excel would probably be needed to maintain data about all the students (such as Microsoft Access). However, we can still use Excel's spreadsheet functionalities to perform data analysis by extracting data from such a database. Excel allows us to easily perform statistical analysis calculations about students and faculty as well as create simple charts and other reports for the user. In this application, we present a menu of options for the students, faculty, and administration at a university. Students can check their transcripts, department audits, and courses offered and can also create a schedule. Faculty can view course information and enter or modify student grades. Finally, the administration can view student statistics and faculty statistics. We perform all of these options by querying an Access database.

CS15.1.1 **Model Definition and Assumptions**

This application performs dynamic database queries with a pre-developed Access database. This database, which consists of six tables and one query, contains information on students, faculty, courses, sections, and grades. (See Figure CS15.1.) The Access database file "UniversityInformationSystem.mdb" must be in the same directory as the Excel application in order to perform the live queries, but it does not have to be open.

We will not discuss database design in this chapter or in this book. If the reader is unfamiliar with databases or Access, then we recommend referring to another text. For this application development description, we will focus on building the queries and creating a dynamic interface in which the user may run live queries for various options.

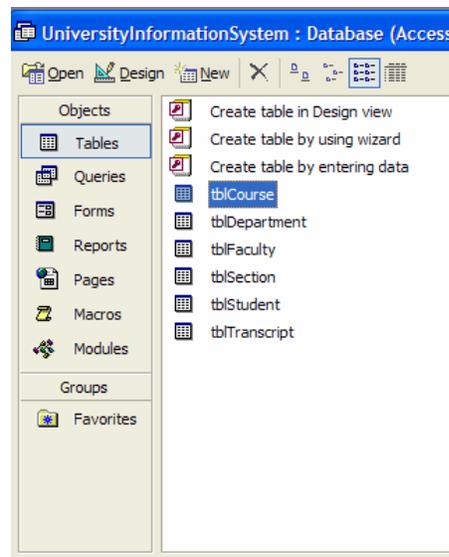


Figure CS15.1 (a)

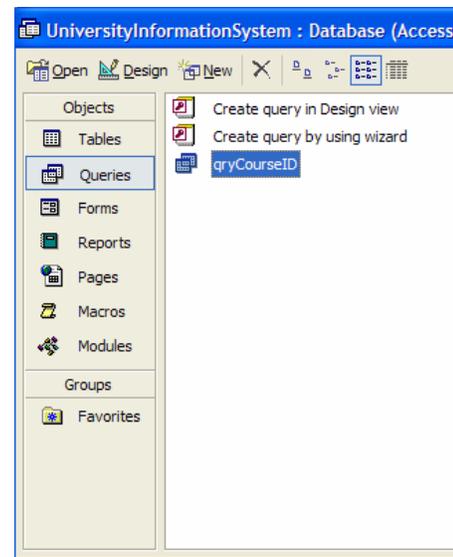


Figure CS15.1 (b)

Figure CS15.1 The Access database "UniversityInformationSystem" has six tables and one query.

We will now provide an overview of the tables and queries in this database. It is important to understand where different information is located before creating this application's queries.

The first table is “TblCourse”; it contains information about the courses offered at the university. (See Figure CS15.2.) The titles of the fields stored in this table are: “CourseID,” “DepartmentID,” “CourseName,” “Description,” “CreditHours,” and “CourseType.”

CourseID	DepartmentID	CourseName	Description	CreditHours	CourseType
▶ CISE1234	CISE	Comp Programming 1		3	Required
CISE2345	CISE	C++		3	Required
CISE3456	CISE	DataBase Management		3	Elective
CISE4567	CISE	Comp Archi		4	Elective
CISE5678	CISE	Comp Simulation		4	Required
CISE6789	ECE	Comp Graphics		3	Required
ECE3456	ECE	Computer Animation		3	Elective
ECE5412	ECE	Artificial Intelligence		3	Required
ESI0897	ISE	Decision Support System Undergrad		3	Required
ESI0987	ISE	Operation Research		3	Required
ESI1234	ISE	Digital Simulation		4	Required
ESI2345	ISE	Supply Chain Management		4	Elective
ESI3456	ISE	Network Analysis		4	Elective
ESI4567	ISE	Total Quality Management		3	Elective
ESI5678	ISE	Manufacturing Management		3	Required
ESI6789	ISE	Decision Support System Grad		4	Required
MAN3423	DIS	Production and Logistics		3	Required
MAN5621	DIS	International Logistics		3	Elective
MAN6784	DIS	Operations Management		3	Required
*				0	

Figure CS15.2 The table “TblCourse.”

The second table is “TblDepartment”; it contains information about the departments of the university. (See Figure CS15.3.) The titles of the fields stored in this table are: “DepartmentID,” “Name,” “OfficeAddress,” and “Phone.”

DepartmentID	Name	OfficeAddress	Phone
▶ + CISE	Comp And Information Science Engineering	2345, CISE , Gnv	3922001
+ DIS	Decision Information Sciences	700 Stuzin Hall	3925555
+ ECE	Electronics and Comp Engineering	2345, ECE	3921256
+ ISE	Industrial And System Engineering	303, Weil Hall, Gainesville, FL-32411	3921464
*			0

Figure CS15.3 The table “TblDepartment.”

The third table, “TblFaculty,” contains information about the faculty at the university. (See Figure CS15.4.) The titles of the fields stored in this table are: “FacultyName,” “DepartmentID,” “Status,” “Nationality,” “Gender,” and “Phone.”

FacultyName	DepartmentID	Status	Nationality	Gender	Phone
▶ A. Patters	DIS	Assistant	African America	Male	352-392-4514
D. Henry	ISE	Chair	American	Male	352-392-9595
D. Suthers	ISE	Assistant	American	Female	352-392-8457
E. Aleman	ECE	Assistant	Turkish	Female	352-392-1111
E. Richards	ISE	Associate	Dutch	Male	352-371-2173
R. Abherito	ISE	Full Prof	Indian	Male	352-392-1193
S. Balow	CISE	Associate	Chinese	Male	345-123-1234
S. Edwards	DIS	Chair	Turkish	Male	352-392-5643
S. Sender	CISE	Chair	Indian	Male	352-190-1900
*					

Figure CS15.4 The table “TblFaculty.”

The fourth table, “TblSection,” contains information about the sections of each course offered at the university. (See Figure CS15.5.) The titles of the fields stored in this table

are: “SectionNum,” “CourseID,” “FacultyName,” “Year,” “Semester,” “YearSem,” “Day,” “Time,” “RoomNumber,” “Capacity,” and “Evaluation.”

SectionNum	CourseID	FacultyName	Year	Semester	YearSem	Day	Time	RoomNumber	Capacity	Evaluation
1	ESI4567	D. Henry	1998	Fall	1998	Fall	MWF	12:00 PM WEIL 270	30	4.5
3	CISE3456	E. Richards	1999	Fall	1999	Fall	T R	12:00 PM FLG 260	50	4.8
13	ESI4567	E. Richards	1999	Spring	1999	Spring	MWF	3:00 PM FLG 270	50	4.5
2	CISE2345	E. Aleman	1999	Spring	1999	Spring	MWF	12:00 PM WEIMER 1060	40	4.3
10	ESI4567	E. Aleman	1999	Spring	1999	Spring	MWF	12:00 PM WEIL 273	30	4.7
7	ESI1234	E. Richards	1999	Summer	1999	Summer	MTWRF	11:00 AM WEIL 321	30	4.6
16	CISE3456	R. Abherito	2000	Fall	2000	Fall	T R	12:00 PM FLG 270	50	4.3
5	CISE6789	S. Balow	2000	Fall	2000	Fall	MWF	3:00 PM FLG 260	50	4.7
15	CISE2345	E. Richards	2000	Spring	2000	Spring	MWF	3:00 PM WEIMER 1060	40	4.6
18	CISE5678	D. Henry	2000	Spring	2000	Spring	MWF	10:00 AM WEIL 270	50	4.8
24	ECE5412	R. Abherito	2000	Spring	2000	Spring	T R	9:00 AM NEB 200	40	4.7
25	MAN5621	S. Edwards	2000	Spring	2000	Spring	MWF	12:00 PM STZ 100	45	4.8
4	CISE4567	R. Abherito	2000	Spring	2000	Spring	T R	2:00 PM WEIL 273	40	4.7
8	ESI0987	R. Abherito	2000	Spring	2000	Spring	MWF	1:00 PM WEIMER 1084	40	4.5
12	ESI3456	R. Abherito	2000	Summer	2000	Summer	MTWRF	8:00 AM WEIL 273	30	4.3
33	ESI1234	E. Aleman	2000	Summer	2000	Summer	T R	9:00 AM FLG 270	40	4.6
26	MAN3423	A. Patters	2001	Fall	2001	Fall	T R	4:00 PM STZ 125	35	4.6
6	ESI5678	S. Sender	2001	Spring	2001	Spring	T R	1:00 PM WEIL 270	60	3.9
9	ESI0987	E. Richards	2001	Spring	2001	Spring	MWF	3:10 PM FLG 260	40	4.8

Figure CS15.5 The table “TblSection.”

The fifth table is “TblStudent”; it contains information about the students enrolled at the university. (See Figure CS15.6.) The titles of the fields stored in this table are: “Name,” “DepartmentID,” “StudentType,” “Email,” “Address,” “DateEntered,” “Nationality,” and “Gender.”

Name	DepartmentID	StudentType	Email	Address	DateEntered	Nationality	Gender
A. Castanza	DIS	Undergrad	acas@ufl.edu	562 43rd St	1/1/2002	American	Male
A. McBeal	ISE	Undergrad	amcb@ufl.edu	12 South Dorm	8/1/1999	American	Male
C. Iceman	DIS	Undergrad	cice@ufl.edu	18 Hume Hall	8/1/2000	American	Male
F. Hunts	ISE	Undergrad	fhunts@ufl.edu	13 New Hall	1/1/2001	Hispanic	Female
F. Johnson	ISE	Undergrad	fjohn@ufl.edu	12 New Hall	8/1/2000	African America	Male
J. McKenzie	CISE	Grad	jmck@ufl.edu	54 20th Ave	1/1/2000	Turkish	Male
K. ElHamad	CISE	Grad	kelham@ufl.edu	78 University Av	8/1/1998	Russian	Male
L. Tau	ISE	Undergrad	ltau@ufl.edu	32 16th St	8/1/2001	Chinese	Female
M. Carey	DIS	Undergrad	mcar@ufl.edu	30 New Hall	1/1/2001	Indian	Female
M. Henderson	ISE	Grad	mhen@ufl.edu	45 6th Ave	8/1/2002	American	Female
O. Smith	ISE	Grad	osmit@ufl.edu	621 15th St	8/1/2001	Turkish	Male
P. Gonzalez	ISE	Grad	pgon@ufl.edu	44 13th St	8/1/2000	Hispanic	Male
R. Rica	CISE	Undergrad	rrica@ufl.edu	37 North Dorm	8/1/2001	Hispanic	Male
T. Jones	ISE	Undergrad	tj@ufl.edu	500 34th St	1/1/2000	American	Female

Figure CS15.6 The table “TblStudent.”

The sixth table, “TblTranscript,” contains information about the student grades for all the courses offered. (See Figure CS15.7.) The titles of the fields stored in this table are: “SectionNum,” “StudentName,” and “Grade.”

The one query in the database is “qryCourseID”; it appends the “CourseID” field to “TblTranscript.” (See Figure CS15.8.) The titles of the fields stored in this query are: “CourseID,” “SectionNum,” “StudentName,” and “Grade.”

We will use the query function described in Chapter 21, Section 21.1.2.2 to create each query; we call this function “QueryData.” (See Figure CS15.9.) We pass the following parameters to this function: “Src” is the string of SQL code that defines the query; “OutputRange” is the range to which we copy the recordset; and i and j are “Offset” parameters for this output range. Please refer to Chapter 21 for a more detailed explanation of query components.

	SectionNum	StudentName	Grade
▶	1	A. McBeal	4
	1	F. Hunts	4
	1	J. McKenzy	4
	1	L. Tau	4
	1	M. Carey	3.5
	2	K. ElHamad	4
	3	P. Gonzalez	4
	3	R. Rica	3.5
	3	T. Jones	3
	3	L. Tau	4
	4	A. McBeal	3.5
	4	F. Hunts	4
	5	J. McKenzy	4
	6	K. ElHamad	3.2
	6	P. Gonzalez	4
	6	M. Carey	3
	7	R. Rica	4
	8	T. Jones	3.5
	8	A. McBeal	3.5
	9	A. McBeal	4
	9	F. Hunts	1
	11	M. Henderso	4
	15	C. Iceman	3.5
	17	T. Jones	3
	17	R. Rica	4
	18	C. Iceman	3
	18	L. Tau	4
	18	F. Johnson	3.5
	22	A. Castanza	3
	23	C. Iceman	3.5
	23	A. Castanza	3.5

Figure CS15.7 The table "TblTranscript."

	CourseID	SectionNum	StudentName	Grade
▶	ESI4567	1	A. McBeal	4
	ESI4567	1	F. Hunts	4
	ESI4567	1	J. McKenzy	4
	ESI4567	1	L. Tau	4
	ESI4567	1	M. Carey	3.5
	CISE2345	2	K. ElHamad	4
	CISE3456	3	P. Gonzalez	4
	CISE3456	3	R. Rica	3.5
	CISE3456	3	T. Jones	3
	CISE3456	3	L. Tau	4
	CISE4567	4	A. McBeal	3.5
	CISE4567	4	F. Hunts	4
	CISE6789	5	J. McKenzy	4
	ESI5678	6	K. ElHamad	3.2
	ESI5678	6	P. Gonzalez	4
	ESI5678	6	M. Carey	3
	ESI1234	7	R. Rica	4
	ESI0987	8	T. Jones	3.5
	ESI0987	8	A. McBeal	3.5
	ESI0987	9	A. McBeal	4
	ESI0987	9	F. Hunts	1
	CISE1234	11	M. Henderso	4
	CISE2345	15	C. Iceman	3.5
	CISE4567	17	T. Jones	3
	CISE4567	17	R. Rica	4
	CISE5678	18	C. Iceman	3
	CISE5678	18	L. Tau	4
	CISE5678	18	F. Johnson	3.5
	ECE3456	22	A. Castanza	3
	ECE3456	23	C. Iceman	3.5
	ECE3456	23	A. Castanza	3.5
	ECE3456	23	F. Johnson	3.5
	ECE3456	23	M. Henderso	3.5
	ECE3456	23	C. Smith	4

Figure CS15.8 The query "qryCourseID."

```

Function QueryData(Src, OutputRange, i, j)

    dbUnivInfo = ThisWorkbook.Path & "\UniversityInformationSystem.mdb"
    Set cntStudConnection = New ADODB.Connection
    CnctSource = "Provider=Microsoft.Jet.OLEDB.4.0; Data Source=" & dbUnivInfo & ";"
    cntStudConnection.Open ConnectionString:=CnctSource

    Set rstNewQuery = New ADODB.Recordset
    rstNewQuery.Open Source:=Src, ActiveConnection:=cntStudConnection
    Range(OutputRange).Offset(i, j).CopyFromRecordset rstNewQuery

    Set rstNewQuery = Nothing
    cntStudConnection.Close
    Set cntStudConnection = Nothing

End Function

```

Figure CS15.9 The “QueryData” function creates each query.

CS15.1.2 **Input**

The input for this application depends on which option the user has selected. The input may be among the following:

- Student name
- Course name
- Department name
- Faculty name

CS15.1.3 **Output**

The output for this application depends on which option the user has selected. The output may be among the following:

- Student transcript and GPA
- Student department audit
- Course information for students
- Course schedule for students
- Student grades for a particular course for faculty to view or modify
- Faculty statistics for the administration to view

There are two more output options that are left for the reader to develop. (See the “Extensions” section.) These are:

- Course information for faculty
- Student statistics for the administration to view

CS15.2 *Worksheets*

This application requires seven main sheets: the welcome sheet, the student transcript sheet, the department audit sheet, the course information sheet, the student schedule sheet, the faculty grades sheet, and the faculty statistics sheet.

The welcome sheet contains the title, the description of the application, and the “Start” button, which displays a main menu form. (See Figure CS15.10).

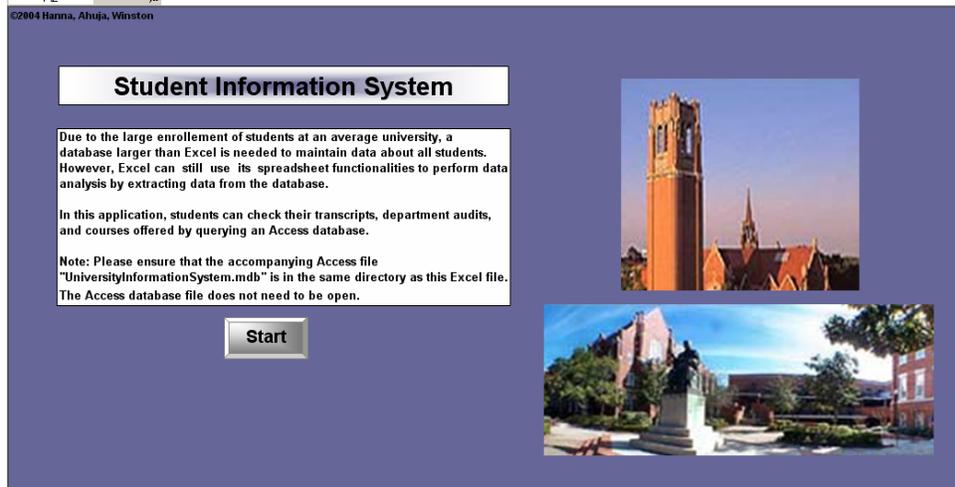


Figure CS15.10 The welcome sheet.

The student transcript sheet displays a selected student's transcript and GPA. (See Figure CS15.11.) The transcript includes all of the courses that the selected student has taken. The "Select New Student" button allows the user to view the transcript for a new student. The "Back to Student Menu" button takes the user back to the student menu form. The "Exit" button returns the user to the welcome sheet. (See the "Applications" section in Chapter 21 for details on the student transcript option.)

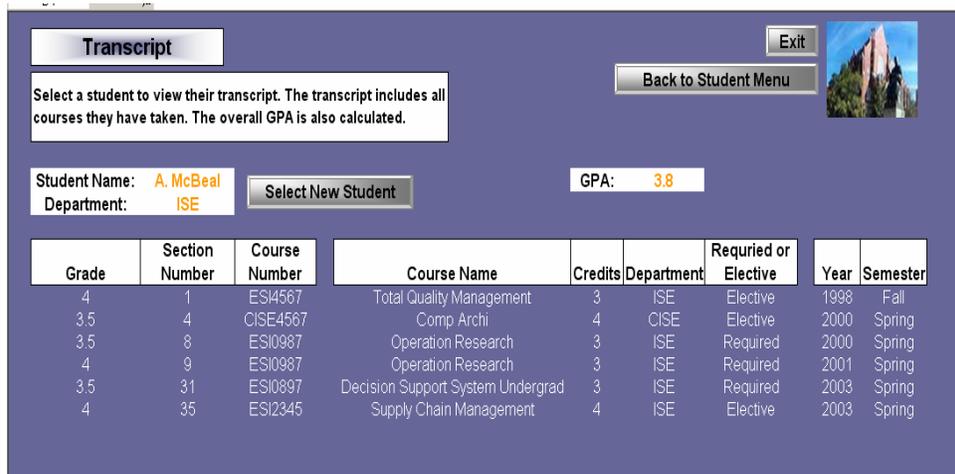


Figure CS15.11 The student transcript sheet.

The department audit sheet displays the audit of courses for a selected student and his or her department. (See Figure CS15.12.) The user can view all of the courses that are required or the electives in the student's department. The "Select New Student," "Back to Student Menu," and "Exit" buttons are also available on this sheet.

The course information sheet presents a list of sections for a selected course in a selected department. (See Figure CS15.13.) The user can view information for all of the sections offered of the selected course in the selected department. The course evaluation of each section is also displayed. The "Select New Course" and "Select New Department" buttons allow the user to view information for a new course in the same or another department, respectively. The "Back to Student Menu" and "Exit" buttons are also available.

Department Audit

View all of the courses which are Required or Electives in the department to which the selected student belongs.

Student Name: **T. Jones**
 Department: **ISE**

Course Number	Course Name	Required or Elective	Taken or Not Taken	Section Number
ESI0897	Decision Support System Undergrad	Required	Not Taken	
ESI0987	Operation Research	Required	Taken	8
ESI1234	Digital Simulation	Required	Not Taken	
ESI2345	Supply Chain Management	Elective	Taken	35
ESI3456	Network Analysis	Elective	Not Taken	
ESI4567	Total Quality Management	Elective	Not Taken	
ESI5678	Manufacturing Management	Required	Not Taken	
ESI6789	Decision Support System Grad	Required	Not Taken	

Figure CS15.12 The department audit sheet.

Course Reviews

View all sections offered of selected course in selected department. The Course Evaluation of each section is shown.

Department: **ISE**

Course Number	Course Name	Required or Elective
ESI2345	Supply Chain Management	Elective

Section Number	Faculty	Year	Semester	Day	Time	Room	Course Evaluation (out of 5)
30	D. Suthers	2003	Spring	MWF	09:00 AM	WEIL 270	0.0
35	S. Balow	2003	Spring	TR	10:00 AM	Weil 270	0.0

Figure CS15.13 The course information sheet.

The student schedule sheet allows a user to create a schedule for the current semester. (See Figure CS15.14.) To do so, the user can view all the sections offered of a selected course in a selected department. From the given list of sections, he or she can select a section number and press the “Add” or “Remove” buttons to add the course to or remove it from his or her schedule. [See Figure CS15.14 (a).] The user can click the “View Weekly Schedule” button to see all of the courses already added to the weekly schedule. [See Figure CS15.14 (b).] Additionally, the “Select New Department,” “Select New Course,” “Back to Student Menu,” and “Exit” buttons are available on this sheet.

Create Schedule
Exit

Create student schedule for the current semester. View all sections offered of selected course in selected department (for the current semester only). Select a Section Number and Add or Remove the course to the schedule. Click View Weekly Schedule to see all courses added.

Year and Semester: 2003 Spring
Back to Student Menu

Department: ISE
Select New Department

Course Number	Course Name	Required or Elective
ESI2345	Supply Chain Management	Elective

Select New Course

Section Number	Day	Time	Room	Faculty
30	MWF	09:00 AM	WEIL 270	D. Suthers
35	TR	10:00 AM	Weil 270	S. Balow

To Add or Remove a course to your schedule, select the Section Number from the table on the left and click a button below.

Add

Remove

View Weekly Schedule

Figure CS15.14 (a)

Weekly Schedule
Edit Schedule

Times	Monday	Tuesday	Wednesday	Thursday	Friday
8:00 AM					
9:00 AM					
10:00 AM					
11:00 AM					
12:00 PM					
1:00 PM					
2:00 PM					
3:00 PM					
4:00 PM					
5:00 PM					

Figure CS15.14 (b)

Figure CS15.14 The student schedule sheet.

Faculty members can refer to the faculty grades sheet to view or modify student grades for a course they are currently teaching. (See Figure 6.17.) They can then either modify the grades by pressing the “Modify Grades of Current Students” button or add new students and grades by pressing the “Add New Students and Grades” button. These actions occur for the selected section number in the given table. After the faculty member makes any changes, he or she can press the “Save” button to update the database. The “Select New Faculty” button allows the user to perform these actions for a new faculty member and the corresponding list of courses that he or she taught. The “Back to Faculty Menu” button returns the user to the faculty menu form, and the “Exit” button returns the user to the welcome sheet.

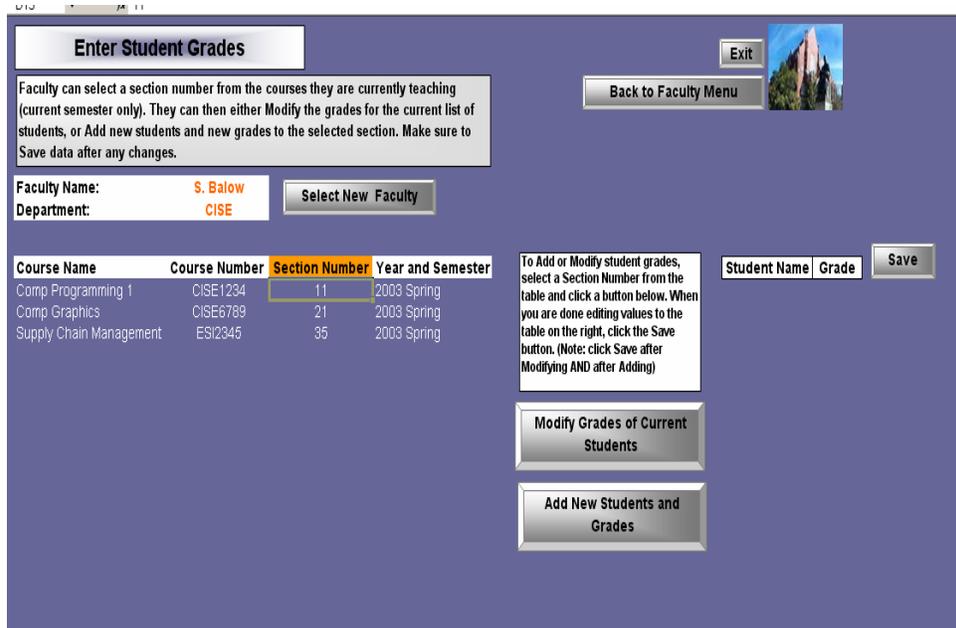


Figure CS15.15 The faculty grades sheet.

The administration uses the faculty statistics sheet to view statistics for all the faculty in a selected department. (See Figure CS15.16.) The main statistics include the student/faculty ratio, the graphs for the number of courses taught per faculty member, the average evaluation per faculty, the nationality distribution of the faculty in the department, and the gender distribution of faculty in the department. [See Figure CS15.16 (a).] The user can also view individual statistics for each faculty member in the selected department by pressing the “View Details per Faculty” button. [See Figure CS15.16 (b).] The user can return to the main statistics sheet by pressing the “View Summary per Department” button. The “Select New Department” and “Exit” buttons are also available on this sheet. Finally, the “Back to Administration Menu” button returns the user to the administration menu form.

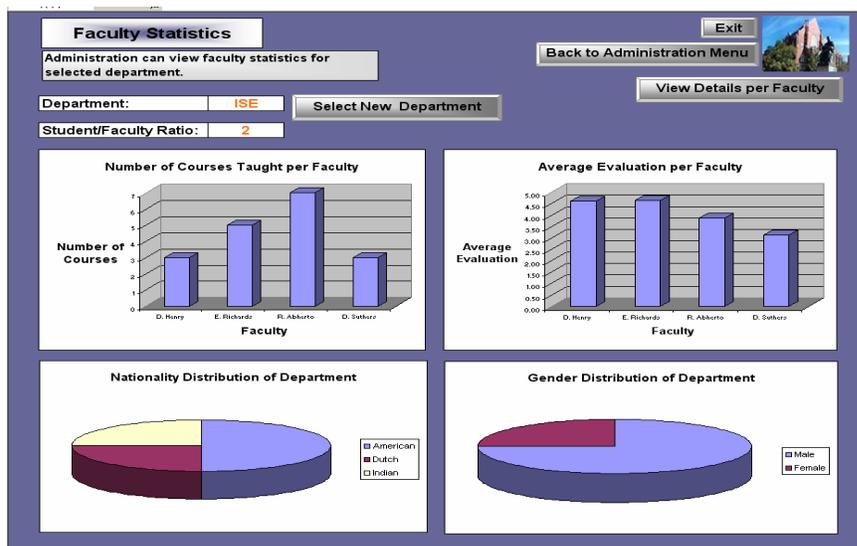


Figure CS15.16 (a)

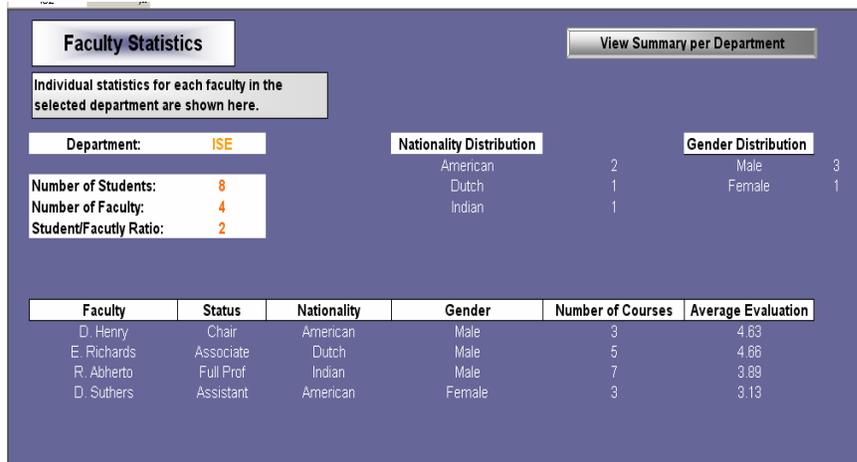


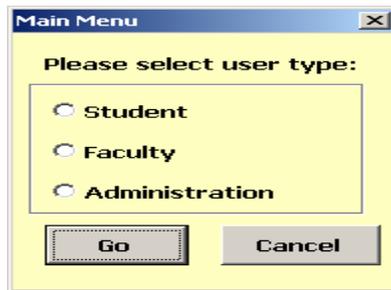
Figure CS15.16 (b)
Figure CS15.16 The faculty statistics sheet.

 Summary	Welcome sheet	Contains the application description and the “Start” button.
	Student transcript sheet	Displays the transcript and GPA for a selected student.
	Department audit sheet	Displays the list of courses taken and those still needed (including required and elective courses) for a selected student and his or her corresponding department.
	Course information sheet	Displays the list of sections for a selected course in a selected department.
	Student schedule sheet	Allows a student to create a schedule by choosing sections available from a selected course in a selected department.
	Faculty grades sheet	Allows a faculty member to view or modify student grades in courses currently being taught.
	Faculty statistics sheet	Allows the administration to view faculty statistics for a selected department.

CS15.3 *User Interface*

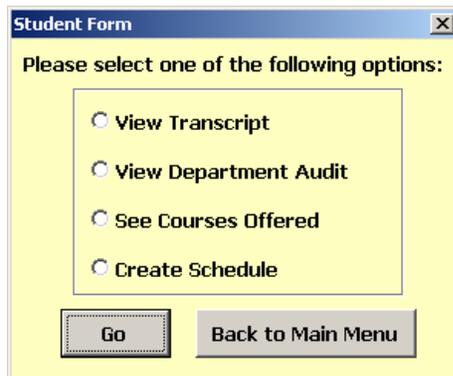
For this application’s user interface, we use navigational and functional buttons as well as nine user forms. When the user presses the “Start” button on the welcome sheet, the main menu form appears. (See Figure CS15.17.) This form, which allows the user to select from the student, faculty, or administration options, requires a frame and three option buttons.

The student form, which requires a frame and four option buttons, presents the user with the student options. (See Figure CS15.18.) He or she can select between viewing a transcript, viewing a department audit, seeing what courses are offered, and creating a schedule.



A dialog box titled "Main Menu" with a yellow background. It contains the text "Please select user type:" followed by three radio button options: "Student", "Faculty", and "Administration". At the bottom, there are two buttons: "Go" and "Cancel".

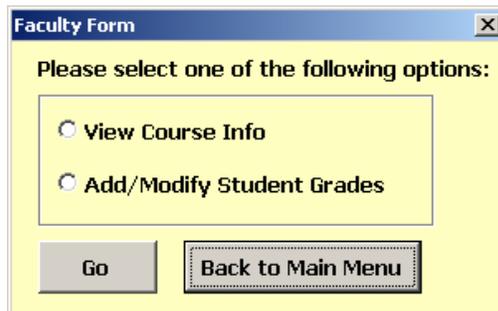
Figure CS15.17 The main menu form.



A dialog box titled "Student Form" with a yellow background. It contains the text "Please select one of the following options:" followed by four radio button options: "View Transcript", "View Department Audit", "See Courses Offered", and "Create Schedule". At the bottom, there are two buttons: "Go" and "Back to Main Menu".

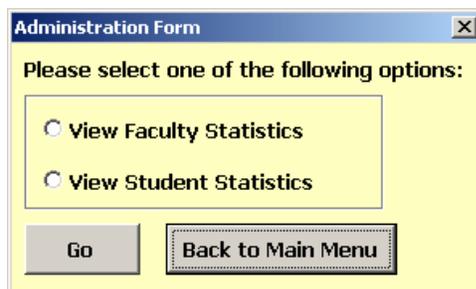
Figure CS15.18 The student form.

The faculty form, which requires a frame and two option buttons, presents the user with the faculty options. (See Figure CS15.19.) The user can view course information or add and modify student grades.



A dialog box titled "Faculty Form" with a yellow background. It contains the text "Please select one of the following options:" followed by two radio button options: "View Course Info" and "Add/Modify Student Grades". At the bottom, there are two buttons: "Go" and "Back to Main Menu".

Figure CS15.19 The faculty form.



A dialog box titled "Administration Form" with a yellow background. It contains the text "Please select one of the following options:" followed by two radio button options: "View Faculty Statistics" and "View Student Statistics". At the bottom, there are two buttons: "Go" and "Back to Main Menu".

Figure CS15.20 The administration form.

The administration form, which requires a frame and two option buttons, presents the administration options to the user. (See Figure CS15.20.) Here, the user can view faculty statistics or student statistics.

The student choice form appears when the user needs to select a student. (See Figure CS15.21.) The combo box lists all the students in the database. A query is always performed to update this list with the most current database information before the user views it.

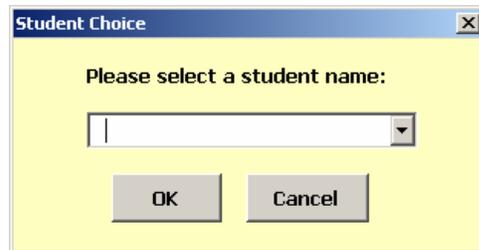
The image shows a dialog box titled "Student Choice" with a yellow background. It contains the text "Please select a student name:" followed by a single-line text box with a dropdown arrow on the right. Below the text box are two buttons: "OK" and "Cancel".

Figure CS15.21 The student choice form.

When the user needs to select a department, the department choice form appears. (See Figure CS15.22.) The combo box lists all the departments in the database. A query is always performed to update this list with the most current database information before the user views it.

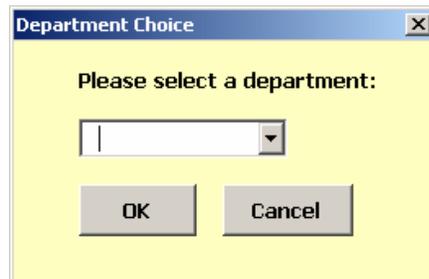
The image shows a dialog box titled "Department Choice" with a yellow background. It contains the text "Please select a department:" followed by a single-line text box with a dropdown arrow on the right. Below the text box are two buttons: "OK" and "Cancel".

Figure CS15.22 The department choice form.

The course choice form is presented when the user needs to select a course. (See Figure CS15.23.) The combo box lists all the courses in the database. A query is always performed to update this list with the most current database information before the user views it.

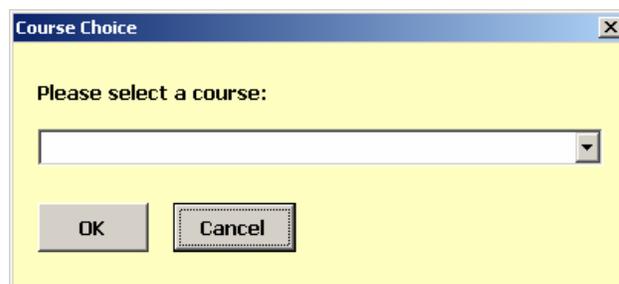
The image shows a dialog box titled "Course Choice" with a yellow background. It contains the text "Please select a course:" followed by a single-line text box with a dropdown arrow on the right. Below the text box are two buttons: "OK" and "Cancel".

Figure CS15.23 The course choice form.

The faculty choice form appears when the user needs to select a faculty member. (See Figure CS15.24.) The combo box lists all the faculty members in the database. A query is always performed to update this list with the most current database information before the user views it.

Figure CS15.24 The faculty choice form.

Figure CS15.25 The student grades form.

 Summary	Main menu form	The user can choose between student, faculty, or administration options.
	Student menu form	The user can choose among the following student options: view transcript, view department audit, view course information, and create a schedule.
	Faculty menu form	The user can choose among the following faculty options: view course information, view/modify student grades.
	Administration menu form	The user can choose among the following administration options: view student statistics, view faculty statistics.
	Student choice form	A student can be selected from the current list of students in the database.
	Department choice form	A department can be selected from the current list of departments in the database.
	Faculty choice form	A faculty member can be selected from the current list of faculty in the database.
	Course choice form	A course can be selected from the current list of courses in the database.
	Student grades form	Multiple students can be selected from the current list of students in the database.
Navigational buttons	“Exit,” “Back to Student Menu,” “Back to Faculty Menu,” “Back to Administration Menu,” “View Details per Faculty,” “View Summary per Department.”	
Functional buttons	“Select New Student,” “Select New Department,” “Select New Course,” “Select New Faculty,” “Add,” “Remove,” “Modify Grades of Current Students,” “Add New Students and Grades.”	

Faculty members use the student grades form to select students to add to a course and/or to enter their grades. (See Figure CS15.25.) This form is similar to the student choice form in that a query is always performed to update the list with the most current database information before the user views it. However, the “Add” and “Done” buttons allow the user to select more than one name from the form in order to populate their course list on the faculty grades sheet.

CS15.4 *Procedures*

We will now outline the procedures for this application beginning with the variable declarations and initial sub procedures. (See Figure CS15.26.) The “Main” procedure, which is called from the “Start” button, displays the main menu form to the user.

```
Option Explicit

Public ws As Worksheet, dbUnivInfo As String, CnctSource As String, Src As String, _
cntStudConnection As ADODB.Connection, rstNewQuery As ADODB.Recordset, OutputRange As String, _
StudName As String, CourseNum As String, DeptName As String, FacName As String, _
CourseTime As String, CourseDay As String, YearSem As String, _
i As Integer, j As Integer, _
ChangeCourse As Boolean, SchSub As Boolean, NewSch As Boolean, NewNat As Boolean, _
ModGrd As Boolean, AddGrd As Boolean, NoShow As Boolean, _
EditSearch As Double, GPA As Double, SelCourse As Range, EditSec As Integer

Sub Main()
    ChangeCourse = False
    SchSub = False

    frmMainMenu.Show
End Sub
```

Figure CS15.26 The variable declarations and the “Main” procedure.

The main menu form procedures are presented in Figure CS15.27. Depending on which option the user selects, the corresponding menu form for that option appears.

```
Sub cmdCancel_Click()
    Unload Me
End Sub

Sub cmdGo_Click()
    If optStudent Then
        Unload Me
        frmStudents.Show
    ElseIf optFaculty Then
        Unload Me
        frmFaculty.Show
    ElseIf optAdmin Then
        Unload Me
        frmAdmin.Show
    Else
        MsgBox "Please select one of the user types"
    End If
End Sub
```

Figure CS15.27 The main menu form procedures.

The procedures for the student menu form are presented in Figure CS15.28. These procedures take the user to the sheet that corresponds to the student option selected. A corresponding sub procedure is also called.

```

Sub cmdCancel_Click()
    Unload Me
    Worksheets("Welcome").Activate
    Worksheets("Welcome").Visible = True
    frmMainMenu.Show
End Sub

Sub cmdGo_Click()
    If optTranscript Then
        Unload Me
        Worksheets("StudentTranscript").Activate
        Worksheets("StudentTranscript").Visible = True
        Worksheets("Welcome").Visible = False
        Call Transcript
    ElseIf optAudit Then
        Unload Me
        Worksheets("StudentAudit").Activate
        Worksheets("StudentAudit").Visible = True
        Worksheets("Welcome").Visible = False
        Call Audit
    ElseIf optCourses Then
        Unload Me
        Worksheets("StudentCourses").Activate
        Worksheets("StudentCourses").Visible = True
        Worksheets("Welcome").Visible = False
        Call Courses
    ElseIf optSched Then
        Unload Me
        Worksheets("StudentSchedule").Activate
        Range("N10:R27").ClearContents
        Worksheets("StudentSchedule").Visible = True
        Worksheets("Welcome").Visible = False
        NewSch = True
        Call Schedule
    Else: MsgBox "Please select one of the options"
    End If
End Sub

```

Figure CS15.28 The student menu form procedures.

The first student option calls the “Transcript” procedure, which we will discuss in detail in Chapter 21’s “Applications” section.

The second student option calls the “Audit” procedure, which prepares the department audit for a selected student. (See Figure CS15.29.) The student is selected using the student choice form procedures. (See Figure CS15.30.) These procedures initialize the form by calling the “CreateStudentList” procedure. (See Figure CS15.31.) The “CreateStudentList,” “CreateFacList,” “CreateDeptList,” and “CreateCourseList” procedures all query the database to retrieve the current list of student names, faculty names, department names, and course IDs and names, respectively.

Once the student has been selected, the “Department” procedure is then called from the “Audit” procedure. The “Department” procedure collects from the database the department name that corresponds with the selected student. The “Audit” procedure then creates a query to find all of the course IDs, course names, and course types with the selected department ID. For each of these courses, another query finds the section number that the selected student was enrolled in; these queries are performed with a loop.

Note: All queries performed in these procedures use the “QueryData” function procedure described in Section CS6.1.1.

```

Sub Audit()
Worksheets("StudentAudit").Activate
Range(Range("ACourseTBL"), Range("ACourseTBL").End(xlDown).Offset(0, 5)).ClearContents
frmStudentChoice.Show

Application.ScreenUpdating = False
Range("AStudent").Value = StudName
Range("AStudent").Columns.AutoFit
Call Department("Audit")

Src = "SELECT CourseID, CourseName, CourseType FROM tblCourse WHERE DepartmentID = " & Range("ADepartment").Value & ""
OutputRange = "ACourseTBL"
Call QueryData(Src, OutputRange, 0, 0)

Range("ACourseTBL").Columns(2).AutoFit
i = 0
Do Until Range("ACourseTBL").Offset(i, 0).Value = ""
    Src = "SELECT SectionNum FROM qryCourseID WHERE CourseID = " & Range("ACourseTBL").Offset(i, 0).Value
    Src = Src & " and StudentName = " & StudName & ""
    OutputRange = "ACourseTBL"
    Call QueryData(Src, OutputRange, i, 5)

    If Range("ACourseTBL").Offset(i, 5).Value <> "" Then
        Range("ACourseTBL").Offset(i, 4).Value = "Taken"
    Else
        Range("ACourseTBL").Offset(i, 4).Value = "Not Taken"
    End If
    i = i + 1
Loop
Application.ScreenUpdating = True
End Sub

```

Figure CS15.29 The "Audit" procedure.

```

Sub cmdCancel_Click()
Unload Me
End
End Sub

Sub cmdOK_Click()
If cmbStudent.Value = "" Then
MsgBox "Please select a student."
Exit Sub
End If

StudName = cmbStudent.Value
Unload Me
End Sub

Sub UserForm_Initialize()
Call CreateStudentList
cmbStudent.RowSource = "StudList"
End Sub

```

Figure CS15.30 The student choice form procedures.

```

Sub CreateStudentList()
Application.ScreenUpdating = False
Set ws = ActiveSheet
Worksheets("Temp").Activate
Worksheets("Temp").Cells.ClearContents

Src = "SELECT Name FROM tblStudent"
OutputRange = "A1"
Call QueryData(Src, OutputRange, 0, 0)

Range(Range("A1"), Range("A1").End(xlDown)).Name = "StudList"
Application.ScreenUpdating = True
ws.Activate
End Sub

Sub CreateFacList()
Application.ScreenUpdating = False
Set ws = ActiveSheet
Worksheets("Temp").Activate
Worksheets("Temp").Cells.ClearContents

Src = "SELECT FacultyName FROM tblFaculty"
OutputRange = "A1"
Call QueryData(Src, OutputRange, 0, 0)

Range(Range("A1"), Range("A1").End(xlDown)).Name = "FacList"
Application.ScreenUpdating = True
ws.Activate
End Sub

```

Figure CS15.31 (a)

```

Sub CreateDeptList()
    Application.ScreenUpdating = False
    Set ws = ActiveSheet
    Worksheets("Temp").Activate
    Worksheets("Temp").Cells.ClearContents

    Src = "SELECT DepartmentID FROM tblDepartment"
    OutputRange = "A1"
    Call QueryData(Src, OutputRange, 0, 0)

    Range(Range("A1"), Range("A1").End(xlDown)).Name = "DeptList"
    Application.ScreenUpdating = True
    ws.Activate
End Sub

Sub CreateCourseList()
    Application.ScreenUpdating = False
    Set ws = ActiveSheet
    Worksheets("Temp").Activate
    Worksheets("Temp").Cells.ClearContents

    Src = "SELECT CourseID, CourseName FROM tblCourse WHERE DepartmentID = ' ' & DeptName & ' '"
    OutputRange = "A1"
    Call QueryData(Src, OutputRange, 0, 0)

    Range(Range("A1"), Range("B1").End(xlDown)).Name = "CourseList"
    Application.ScreenUpdating = True
    ws.Activate
End Sub

```

Figure CS15.31 (b)

Figure CS15.31 The procedures for populating the combo boxes on the choice forms.

```

Sub Department(Choice As String)
    Application.ScreenUpdating = False
    If Choice <> "Fac" Then
        Src = "SELECT DepartmentID FROM tblStudent WHERE Name = ' ' & StudName & ' '"

        Select Case Choice
            Case "Transcript"
                OutputRange = "TDepartment"
            Case "Audit"
                OutputRange = "ADepartment"
            Case "Schedule"
                OutputRange = "SDepartment"
        End Select

    Else
        Src = "SELECT DepartmentID FROM tblFaculty WHERE FacultyName = ' ' & FacName & ' '"
        OutputRange = "FacDept"
    End If

    Call QueryData(Src, OutputRange, 0, 0)
    Application.ScreenUpdating = True
End Sub

```

Figure CS15.32 The "Department" procedure.

The third student option calls the "Courses" procedure, which begins by displaying the department choice and course choice forms. (See Figure CS15.33.) The procedures for these forms are illustrated in Figures CS6.34 and CS6.35. The "CreateDeptList" and "CreateCourseList" procedures appear above in Figure CS15.31 (b). The "Courses" procedure then performs a query to find the course name and course type for the selected course. Another query is then performed to find the section numbers, faculty names, years, semesters, days, times, and room numbers for the specified course.

```

Sub Courses()
Worksheets("StudentCourses").Activate
Range(Range("CSectTBL"), Range("CSectTBL").Offset(0, 7).End(xlDown)).ClearContents
SchSub = False

If Not ChangeCourse Then
frmDepartment.Show
Range("CDepartment").Value = DeptName
Call CreateCourseList
frmCourseChoice.Show
Else: ChangeCourse = False
End If

Application.ScreenUpdating = False
Worksheets("StudentCourses").Activate
Range("Course").Value = CourseNum

Src = "SELECT CourseName, CourseType FROM tblCourse WHERE CourseID = " & CourseNum & ""
OutputRange = "Course"
Call QueryData(Src, OutputRange, 0, 1)

Range("Course").Columns(2).AutoFit
Src = "SELECT SectionNum, FacultyName, Year, Semester, Day, Time, RoomNumber, " & _
"Evaluation FROM tblSection WHERE CourseID = " & CourseNum & ""
OutputRange = "CSectTBL"
Call QueryData(Src, OutputRange, 0, 0)

Range(Range("CSectTBL"), Range("CSectTBL").End(xlDown)).Columns(6).NumberFormat = "hh:mm AM/PM"

If Range("CSectTBL").Value = "" Then
Range("CSectTBL").Value = "No records found"
End If
Application.ScreenUpdating = True
End Sub

```

Figure CS15.33 The "Courses" procedure.

```

Sub cmdCancel_Click()
Unload Me
End
End Sub

Sub cmdOK_Click()
If cmbDept.Value = "" Then
MsgBox "Please select a department."
Exit Sub
End If

DeptName = cmbDept.Value
Unload Me
End Sub

Sub UserForm_Initialize()
Call CreateDeptList
cmbDept.RowSource = "DeptList"
End Sub

```

Figure CS15.34 The procedures for the department choice form.

```

Sub cmdCancel_Click()
Unload Me
End
End Sub

Sub cmdOK_Click()
If cmbCourse.Value = "" Then
MsgBox "Please select a course."
Exit Sub
End If

CourseNum = cmbCourse.Value
Unload Me

If ChangeCourse Then
If SchSub Then
Call Schedule
Else
Call Courses
End If
End If
End Sub

Sub UserForm_Initialize()
cmbCourse.RowSource = "CourseList"
End Sub

```

Figure CS15.35 The procedures for the course choice form.

The fourth student option calls the “Schedule” procedure, which begins by displaying the department choice and course choice forms. (See Figure CS15.36.) A query is then made to find the course name and course type for the selected course. Another query then finds the section numbers, days, times, room numbers, and faculty names for the selected course. The user then uses this information to create his or her schedule.

The user can add a course to or remove a course from his or her schedule by selecting one of the section numbers from the query and pressing the “Add” or “Remove” button, respectively. The “Add” button is assigned to the “AddCourse” procedure, which copies the name of the selected course and pastes it into the weekly schedule cells, depending on the course day and time. (See Figure CS15.37.) The “Remove” button is assigned to the “RemoveCourse” procedure, which clears the selected course from the weekly schedule by searching for the day and time of the course. (See Figure CS15.38.)

```

Sub Schedule() 'create student schedule
    Range(Range("SchCourse"), Range("SchCourse").Offset(0, 2)).ClearContents
    Range(Range("SchCal").Offset(1, 1), Range("SchCal").Offset(10, 5)).ClearContents
    SchSub = True

    Range("SchYear, SchDept").ClearContents
    YearSem = "2003 Spring"
    Range("SchYear").Value = YearSem

    If Not ChangeCourse Then
        frmDepartment.Show
        Range("SchDept").Value = DeptName
        Call CreateCourseList
        frmCourseChoice.Show
    Else: ChangeCourse = False
    End If

    Application.ScreenUpdating = False
    Worksheets("StudentSchedule").Activate
    Range("SchCourse").Value = CourseNum

    Src = "SELECT CourseName, CourseType FROM tblCourse WHERE CourseID = '" & CourseNum & "'"
    OutputRange = "SchCourse"
    Call QueryData(Src, OutputRange, 0, 1)

    Range("SchCourse").Columns(2).AutoFit
    Range(Range("SchTBL"), Range("SchTBL").Offset(0, 5).End(xlDown)).ClearContents

    Src = "SELECT SectionNum, Day, Time, RoomNumber, FacultyName FROM tblSection WHERE CourseID = '" & CourseNum
    Src = Src & "' and YearSem = '" & YearSem & "'"
    OutputRange = "SchTBL"
    Call QueryData(Src, OutputRange, 0, 0)

    If Range("SchTBL").Value = "" Then
        Range("SchTBL").Offset(0, 1).Value = "No sections of this course are offered for this year and semester."
    Else
        Range(Range("SchTBL"), Range("SchTBL").Offset(0, 4).End(xlDown)).Columns(5).AutoFit
        Range(Range("SchTBL"), Range("SchTBL").Offset(0, 4).End(xlDown)).Columns(3).NumberFormat = "hh:mm AM/PM"
    End If
    Application.ScreenUpdating = True
End Sub

```

Figure CS15.36 The “Schedule” procedure.

```

Sub AddCourse()
    Application.ScreenUpdating = False
    Set SelCourse = ActiveCell
    CourseTime = SelCourse.Offset(0, 2).Value

    For i = 1 To 10
        If Range("SchCal").Offset(i, 0).Value = CourseTime Then
            CourseTime = i
            Exit For
        End If
    Next i
    CourseDay = SelCourse.Offset(0, 1).Value

    Select Case CourseDay
        Case "MWF"
            If Range("SchCal").Offset(CourseTime, 1).Value = "" Then
                Range("SchCal").Offset(CourseTime, 1).Value = Range("SchCourse").Offset(0, 1).Value & ", " & SelCourse.Offset(0, 3).Value
                Range("SchCal").Offset(CourseTime, 3).Value = Range("SchCourse").Offset(0, 1).Value & ", " & SelCourse.Offset(0, 3).Value
                Range("SchCal").Offset(CourseTime, 5).Value = Range("SchCourse").Offset(0, 1).Value & ", " & SelCourse.Offset(0, 3).Value
            Else: MsgBox "This will create a conflict in your schedule. You will have to remove current course before adding new one."
            End If
            Range(Range("SchCal").Offset(CourseTime, 1), Range("SchCal").Offset(CourseTime, 5)).Columns.AutoFit
        Case "MTWRF"
            If Range("SchCal").Offset(CourseTime, 1).Value = "" Then
                Range(Range("SchCal").Offset(CourseTime, 1), Range("SchCal").Offset(CourseTime, 5)).Value = _
                    Range("SchCourse").Offset(0, 1).Value & ", " & SelCourse.Offset(0, 3).Value
            Else: MsgBox "This will create a conflict in your schedule. You will have to remove current course before adding new one."
            End If
            Range(Range("SchCal").Offset(CourseTime, 1), Range("SchCal").Offset(CourseTime, 5)).Columns.AutoFit
        Case "T R"
            If Range("SchCal").Offset(CourseTime, 2).Value = "" Then
                Range("SchCal").Offset(CourseTime, 2).Value = Range("SchCourse").Offset(0, 1).Value & ", " & SelCourse.Offset(0, 3).Value
                Range("SchCal").Offset(CourseTime, 4).Value = Range("SchCourse").Offset(0, 1).Value & ", " & SelCourse.Offset(0, 3).Value
            Else: MsgBox "This will create a conflict in your schedule. You will have to remove current course before adding new one."
            End If
            Range(Range("SchCal").Offset(CourseTime, 1), Range("SchCal").Offset(CourseTime, 5)).Columns.AutoFit
    End Select
    Application.ScreenUpdating = True
End Sub

```

Figure CS15.37 The “AddCourse” procedure.

```

Sub RemoveCourse()
    Application.ScreenUpdating = False
    Set SelCourse = ActiveCell
    CourseTime = SelCourse.Offset(0, 2).Value

    i = 1
    Do Until Range("SchCal").Offset(i, 0).Value = CourseTime
        i = i + 1
    Loop
    CourseTime = i
    CourseDay = SelCourse.Offset(0, 1).Value

    Select Case CourseDay
        Case "MWF"
            Range("SchCal").Offset(CourseTime, 1).ClearContents
            Range("SchCal").Offset(CourseTime, 3).ClearContents
            Range("SchCal").Offset(CourseTime, 5).ClearContents
        Case "MTWRF"
            Range(Range("SchCal").Offset(CourseTime, 1), Range("SchCal").Offset(CourseTime, 5)).ClearContents
        Case "T R"
            Range("SchCal").Offset(CourseTime, 2).ClearContents
            Range("SchCal").Offset(CourseTime, 4).ClearContents
    End Select
    Application.ScreenUpdating = True
End Sub

```

Figure CS15.38 The “RemoveCourse” procedure.

Figure CS15.39 presents the procedures for the faculty menu form, which provides the user with the faculty options. Depending on the option the user selects, the corresponding sheets are made visible and the corresponding procedure is called.

```

Sub cmdCancel_Click()
    Unload Me
    Worksheets("Welcome").Activate
    Worksheets("Welcome").Visible = True
    frmMainMenu.Show
End Sub

Sub cmdGo_Click()
    If optFacCourse Then
        MsgBox "This is option is currently not available."
    ElseIf optGrades Then
        Worksheets("FacultyGrades").Activate
        Worksheets("FacultyGrades").Visible = True
        Unload Me
        Call FacGrades
    Else: MsgBox "Please select one of the options"
    End If
End Sub

```

Figure CS15.39 The procedures for the faculty menu form.

The first faculty option is left for the reader to develop. The second faculty option calls the "FacGrades" procedure, which begins by showing the user the faculty choice form. (See Figure CS15.40.) The "CreateFacList" procedure [shown in Figure CS15.31 (a)] is called to populate the combo box on the faculty choice form. The procedure for the faculty menu form records which faculty is selected by the user. (See Figure CS15.41.) The "FacGrades" procedure then creates a query to find all of the course IDs, section numbers, and years and semesters that the selected faculty has taught. For each of these courses, another query finds the course name with a loop.

```

Sub FacGrades() 'faculty enters student grades
    Range(Range("FCourse"), Range("FCourse").Offset(0, 3).End(xlDown)).ClearContents
    Range(Range("SecGrades"), Range("SecGrades").Offset(0, 1).End(xlDown)).ClearContents

    Call CreateFacList
    frmFacChoice.Show
    Range("FacName").Value = FacName
    Call Department("Fac")

    Application.ScreenUpdating = False
    Worksheets("FacultyGrades").Activate
    YearSem = "2003 Spring"

    Src = "SELECT CourseID, SectionNum, YearSem FROM tblSection WHERE FacultyName ="
    OutputRange = "FCourse"
    Call QueryData(Src, OutputRange, 0, 1)

    i = 0
    Do Until Range("FCourse").Offset(i, 1) = ""
        Src = "SELECT CourseName FROM tblCourse WHERE CourseID = '" & Range("FCourse").Offset(i, 1).Value & "'"
        OutputRange = "FCourse"
        Call QueryData(Src, OutputRange, i, 0)
        i = i + 1
    Loop

    If Range("FCourse").Offset(0, 0).Value = "" Then
        Range("FCourse").Offset(0, 0).Value = "This faculty is not teaching any courses in the current semester."
    Else
        Range(Range("FCourse"), Range("FCourse").End(xlDown)).Columns(1).AutoFit
        Range("FCourse").Offset(0, 2).Select
    End If
    Application.ScreenUpdating = True
End Sub

```

Figure CS15.40 The "FacGrades" procedure.

```

Sub cmdCancel_Click()
    Unload Me
End Sub

Sub cmdOK_Click()
    If cmbFac.Value = "" Then
        MsgBox "Please select a faculty name."
        Exit Sub
    End If

    FacName = cmbFac.Value
    Unload Me
End Sub

Sub UserForm_Initialize()
    cmbFac.RowSource = "FacList"
End Sub

```

Figure CS15.41 The procedures for the faculty choice form.

Now, the user can select either the “Modify Grades of Current Students” button to modify the course grades or the “Add New Students and Grades” button to add new student grades to a course. The first button is assigned to the “ModifyGrades” procedure, which performs a query to find all of the students and grades for the selected section of the selected course. (See Figure CS15.42.) The user can then modify these grades directly on the worksheet. The “Add New Students and Grades” button is assigned to the “AddGrades” procedure, which displays the student grades form. (See Figure CS15.42.) The procedures for this form record the selected students and paste them on the worksheet with the “Add” button until the “Done” button is pressed and the form is hidden. (See Figure CS15.43.)

```

Sub ModifyGrades()
    Application.ScreenUpdating = False
    ModGrd = True
    AddGrd = False
    Range(Range("SecGrades"), Range("SecGrades").Offset(0, 1).End(xlDown)).ClearContents

    'query list of students for selected course
    EditSec = ActiveCell.Value
    Src = "SELECT StudentName, Grade FROM tblTranscript WHERE SectionNum = " & EditSec
    OutputRange = "SecGrades"
    Call QueryData(Src, OutputRange, 0, 0)

    If Range("SecGrades") = "" Then
        Range("SecGrades").Value = "No students or grades were found for this section."
        Range("SecGrades").Offset(1, 0).Value = "Please select to Add new students and grades."
    End If
    Application.ScreenUpdating = True
End Sub

Sub AddGrades()
    Application.ScreenUpdating = False
    AddGrd = True
    ModGrd = False
    Range(Range("SecGrades"), Range("SecGrades").Offset(0, 1).End(xlDown)).ClearContents

    EditSec = ActiveCell.Value
    Application.ScreenUpdating = True
    frmStudGrade.Show
End Sub

```

Figure CS15.42 The “ModifyGrades” and “AddGrades” procedures.

```

Option Explicit
Public n As Integer

Sub cmdCancel_Click()
    Unload Me
End Sub

Sub cmdAdd_Click()
    If cmbStudGrade.Value = "" Then
        MsgBox "Please select a student."
        Exit Sub
    End If

    Range("SecGrades").Offset(n, 0).Value = cmbStudGrade.Value
    n = n + 1
End Sub

Sub cmdDone_Click()
    n = 0

    frmStudGrade.Hide
    'note that the form is not unloaded since all associated memory is lost
End Sub

Sub UserForm_Initialize()
    Call CreateStudentList
    cmbStudGrade.RowSource = "StudList"
    n = 0
End Sub

```

Figure CS15.43 The procedures for the student grades form.

The user can save changes made to the grades or the student list in this faculty option by pressing the “Save” button on the worksheet. This button is assigned to the “SaveGrades” procedure. (See Figure CS15.44.) If the user has been viewing or modifying the current list of student grades, then this procedure performs an UPDATE query to record the new grades to the current table “TblTranscript” in the database. If the user has added new students and new grades, then this procedure performs an INSERT query to insert each new student and grade into “TblTrancript” in the database.

```

Sub SaveGrades()
    Application.ScreenUpdating = False
    NoShow = True

    If ModGrd Then
        'update tblTranscript
        i = 0
        Do Until Range("SecGrades").Offset(i, 0).Value = ""
            Src = "UPDATE tblTranscript SET Grade = " & Range("SecGrades").Offset(i, 1).Value & _
                & " WHERE SectionNum = " & EditSec & " and StudentName = " & Range("SecGrades").Offset(i, 0).Value & ""
            OutputRange = "A1"
            Call QueryData(Src, OutputRange, 0, 0)
            i = i + 1
        Loop

        MsgBox "The grades have been updated."

    ElseIf AddGrd Then
        'insert new values to tblTranscript
        i = 0
        Do Until Range("SecGrades").Offset(i, 0).Value = ""
            Src = "INSERT INTO tblTranscript (SectionNum, StudentName, Grade) VALUES (" & EditSec & ", " & _
                Range("SecGrades").Offset(i, 0).Value & ", " & Range("SecGrades").Offset(i, 1).Value & ")"
            OutputRange = "A1"
            Call QueryData(Src, OutputRange, 0, 0)
            i = i + 1
        Loop
        MsgBox "The new students and grades have been entered."
    End If

    Range(Range("SecGrades"), Range("SecGrades").Offset(0, 1).End(xlDown)).ClearContents
    Range("FCourse").Offset(0, 2).Select
    Application.ScreenUpdating = True
End Sub

```

Figure CS15.44 The “SaveGrades” procedure.

The administration menu form provides the user with the administration options; Figure CS15.45 illustrates the procedures for this form.

```

Sub cmdCancel_Click()
    Unload Me
    Worksheets("Welcome").Activate
    Worksheets("Welcome").Visible = True
    frmMainMenu.Show
End Sub

Sub cmdGo_Click()
    If optStatsFac Then
        Worksheets("AdminFacStats").Activate
        Worksheets("AdminFacStats").Visible = True
        Unload Me
        Call StatsFac
    ElseIf optStatsStud Then
        MsgBox "This option is currently not available."
    Else: MsgBox "Please select one of the options"
    End If
End Sub

```

Figure CS15.45 The procedures for the administration menu form.

```

Sub StatsFac() 'administration option for faculty statistics
    Range(Range("TFacStats"), Range("TFacStats").Offset(0, 5).End(xlDown)).ClearContents
    frmDepartment.Show
    Range("FSDept").Value = DeptName
    Application.ScreenUpdating = False
    Worksheets("TempFacStats").Activate

    Src = "SELECT FacultyName, Status, Nationality, Gender FROM tblFaculty WHERE DepartmentID = " & DeptName & ""
    OutputRange = "TFacStats"
    Call QueryData(Src, OutputRange, 0, 0)

    i = 0
    Do Until Range("TFacStats").Offset(i, 0).Value = ""
        Src = "SELECT COUNT (CourseID), AVG (Evaluation) FROM tblSection WHERE FacultyName = " & Range("TFacStats").Offset(i, 0).Value & ""
        OutputRange = "TFacStats"
        Call QueryData(Src, OutputRange, i, 4)
        i = i + 1
    Loop

    Src = "SELECT COUNT (Name) FROM tblStudent WHERE DepartmentID = " & DeptName & ""
    OutputRange = "NStud"
    Call QueryData(Src, OutputRange, 0, 0)

    Src = "SELECT COUNT (FacultyName) FROM tblFaculty WHERE DepartmentID = " & DeptName & ""
    OutputRange = "NFac"
    Call QueryData(Src, OutputRange, 0, 0)
    Range("SFRatio").Value = (Range("NStud").Value) / (Range("NFac").Value)

    Range(Range("NatDist"), Range("NatDist").Offset(0, 1).End(xlDown)).ClearContents
    i = 0
    Do Until Range("TFacStats").Offset(i, 2).Value = ""
        j = 0
        NewNat = True
        Do Until Range("NatDist").Offset(j, 0).Value = ""
            If Range("TFacStats").Offset(i, 2).Value = Range("NatDist").Offset(j, 0).Value Then
                NewNat = False
                Exit Do
            End If
            j = j + 1
        Loop
        If NewNat Then
            Range("NatDist").Offset(j, 0).Value = Range("TFacStats").Offset(i, 2).Value
        End If
        i = i + 1
    Loop

```

Figure CS15.46 (a)

```

Range(Range("TFacStats").Offset(0, 2), Range("TFacStats").Offset(0, 2).End(xlDown)).Name = "NatList"
j = 0
Do Until Range("NatDist").Offset(j, 0).Value = ""
    Range("NatDist").Offset(j, 1).Formula = "=COUNTIF(NatList," & Range("NatDist").Offset(j, 0).Address & ")"
    j = j + 1
Loop

'create summary statistics
Range(Range("TFacStats").Offset(0, 3), Range("TFacStats").Offset(0, 3).End(xlDown)).Name = "GendList"
Range("GendDist").Formula = "=COUNTIF(GendList," & Range("GendDist").Offset(0, -1).Address & ")"
Range("GendDist").Offset(1, 0).Formula = "=COUNTIF(GendList," & Range("GendDist").Offset(1, -1).Address & ")"

Range(Range("TempChartData"), Range("TempChartData").Offset(0, 1).End(xlDown)).ClearContents
Range(Range("TFacStats"), Range("TFacStats").End(xlDown)).Copy
Range("TempChartData").PasteSpecial
Range(Range("TFacStats").Offset(0, 4), Range("TFacStats").Offset(0, 4).End(xlDown)).Copy
Range("TempChartData").Offset(0, 1).PasteSpecial
Range(Range("TempChartData"), Range("TempChartData").Offset(0, 1).End(xlDown)).Name = "NumCourChart"

Range(Range("TempChartData2"), Range("TempChartData2").Offset(0, 1).End(xlDown)).ClearContents
Range(Range("TFacStats"), Range("TFacStats").End(xlDown)).Copy
Range("TempChartData2").PasteSpecial
Range(Range("TFacStats").Offset(0, 5), Range("TFacStats").Offset(0, 5).End(xlDown)).Copy
Range("TempChartData2").Offset(0, 1).PasteSpecial
Range(Range("TempChartData2"), Range("TempChartData2").Offset(0, 1).End(xlDown)).Name = "AvgEvalChart"

Application.CutCopyMode = False
Worksheets("AdminFacStats").Activate
'update chart source data from admin fac stat sheet
ActiveSheet.ChartObjects("Chart 17").Activate
ActiveChart.SetSourceData Source:=Worksheets("TempFacStats").Range("NumCourChart"), PlotBy:=xlColumns
ActiveSheet.ChartObjects("Chart 20").Activate
ActiveChart.SetSourceData Source:=Worksheets("TempFacStats").Range("AvgEvalChart"), PlotBy:=xlColumns
ActiveSheet.ChartObjects("Chart 21").Activate
ActiveChart.SetSourceData Source:=Worksheets("TempFacStats").Range(Range("NatDist"), _
    Range("NatDist").Offset(0, 1).End(xlDown)), PlotBy:=xlColumns
ActiveSheet.ChartObjects("Chart 22").Activate
ActiveChart.SetSourceData Source:=Worksheets("TempFacStats").Range(Range("GendDist").Offset(0, -1), _
    Range("GendDist").Offset(0, 0).End(xlDown)), PlotBy:=xlColumns
Application.ScreenUpdating = True
End Sub

```

Figure CS15.46 (b)
Figure CS15.46 The “StatsFac” procedure.

Figure CS15.47 presents the navigational procedures.

```

Sub ExitProg()
Worksheets("Welcome").Visible = True
Call CloseCurrent
Worksheets("Welcome").Activate
End Sub

Sub ReturnToStud()
Worksheets("Welcome").Visible = True
Call CloseCurrent
Worksheets("Welcome").Activate
frmStudents.Show
End Sub

Sub ReturnToFac()
Worksheets("Welcome").Visible = True
Call CloseCurrent
Worksheets("Welcome").Activate
frmFaculty.Show
End Sub

Sub ReturnToAdmin()
Worksheets("Welcome").Visible = True
Call CloseCurrent
Worksheets("Welcome").Activate
frmAdmin.Show
End Sub

```

```

Function CloseCurrent()
Set ws = ActiveSheet
ws.Visible = False
End Function

Sub ViewSch()
Range("P1").Select
End Sub

Sub EditSch()
Range("A1").Select
End Sub

Sub ViewStatFacDetails()
Worksheets("TempFacStats").Visible = True
Worksheets("AdminFacStats").Visible = False
End Sub

Sub ViewStatFacMain()
Worksheets("AdminFacStats").Visible = True
Worksheets("TempFacStats").Visible = False
End Sub

```

Figure CS15.47 (a) Figure CS15.47 (b)
Figure CS15.47 The navigational procedures.

The first administration option calls the “StatsFac” procedure. (See Figure CS15.46.) The second administration option is left for the reader to develop. The “StatsFac” procedure begins by showing the department choice form. A query then finds the faculty names, status, nationalities, and genders for the selected department. This information is put on the statistics details sheet. Next, a COUNT query determines the number of courses taught and the average evaluations using a loop. Another COUNT query is then performed to find the number of students in the selected department. The final COUNT query finds the number of faculty in the selected department.

Next, a loop creates a unique list of the nationalities of all the faculty in the selected department. Once this list is created, another loop counts the number of faculty of each nationality. The number of males and females are also calculated. Using all of these detailed statistics, the summary statistics are then created. The application calculates the student to faculty ratio and updates charts for the number of course taught per faculty, the average evaluation per faculty, the nationality distribution of faculty in the department, and the gender distribution of faculty in the department.

 Summary	Main	Initializes the application and shows the main menu form.
	Transcript	Performs the queries for the transcript student option.
	Audit	Performs the queries for the department audit option.
	Courses	Performs the queries for the course information option.
	Schedule	Performs the queries for the create schedule option.
	AddCourse	Adds a course to the weekly schedule.
	RemoveCourse	Removes a course from the weekly schedule.
	FacGrades	Performs queries for the faculty grades option.
	ModifyGrades	Lists the current students and the grades to be modified.
	AddGrades	The user selects new students and enters new grades.
	SaveGrades	Performs the UPDATE and INSERT queries to save changes or additions to the grades.
	StatsFac	Performs COUNT queries to compile detailed statistics.
	Form procedures	The main menu, student menu, faculty menu, administration menu, student choice, department choice, faculty choice, course choice, and student grades forms.
	Procedures to update choice forms	The “CreateStudentList,” “CreateFacList,” “CreateDeptList,” and “CreateCourseList” procedures.
Navigational procedures	“Exit,” “Back to Student Menu,” “Back to Faculty Menu,” “Back to Administration Menu,” “View Details per Faculty,” and “View Summary per Department”	
QueryData	The function procedure that performs all the queries.	

CS15.5 *Re-solve Options*

The user can re-solve this application by selecting the re-solve buttons found on the main option sheets. For the student transcript option, the user can update the information for a new student by pressing the “Select New Student” button. For the department audit option, the user can also update the information for a new student by pressing the “Select New Student” button. For the course information option, the user can view information for a new course by pressing the “Select New Course” button or make a selection from a new set of courses by pressing the “Select New Department” button. For the create schedule option, the user can also view information for a new course by pressing the “Select New Course” button or make a selection from a new set of courses by pressing the “Select New Department” button. For the faculty grades option, the user can view courses for a new faculty member by pressing the “Select New Faculty” button. For the faculty statistics option, the administrative user can view new statistics for a different department by pressing the “Select New Department” button. These buttons are assigned to the main procedures, which correspond to each option on the sheet where the button is used.

 Summary	“Select New Student”	Allows the user to select a new student for the transcript and department audit options.
	“Select New Department”	Allows the user to select a new department for the course information, create schedule, and faculty statistics options.
	“Select New Course”	Allows the user to select a new course for the course information and create schedule options.
	“Select New Faculty”	Allows the user to select a new faculty member for the faculty grades option.

CS15.6 *Summary*

- This application allows the user to view information for several student, faculty, and administration options by querying a university database.
- This application requires seven main sheets: the welcome sheet, the student transcript sheet, the department audit sheet, the course information sheet, the student schedule sheet, the faculty grades sheet, and the faculty statistics sheet.
- For this application's user interface, we use navigational and functional buttons as well as nine user forms.
- Several of this application's procedures create queries for the various information options.
- The user can re-solve this application by pressing the re-solve buttons on the various option sheets to update the information for a new student, new department, new course, or new faculty member.

CS15.7 *Extensions*

- Add the following two options to the application:
- A faculty option to view course information. The faculty may want to see, for a selected course, who has taught the course in the past, how many students are usually in the course, and what the average course evaluation is.
- An administration option to view student statistics. The administration may be interested in the distribution of nationalities and genders among students. They may also want to know these distributions as they relate to GPA. Also, they may want to search for the distribution of students based on how long they have been at the university.
- For student schedule option, allow the user to enter the year and semester for which they want to create their schedule.
- Add more security to this application by creating a username and password for each student and faculty member in the database. Also, create an administrative password for all department chairs. Keep this list of passwords either in an Excel worksheet or in a new table in the database. When the user selects an option from the main menu form, ask him or her for a password and ensure that he or she has the right to access that option. Where else could this security be added?