PERGAMON

J. of Acc. Ed. 20 (2002) 307–329

Journal of Accounting Education

www.elsevier.com/locate/jaccedu

Teaching and educational note

Auditing with technology: using generalized audit software in the classroom

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Received 1 June 2001; received in revised form 1 November 2001; accepted 1 February 2002

Abstract

Over the past decade, improvements in generalized audit software have created a situation in which auditing "through" the computer may be both more effective and more efficient than in the past. This paper describes a series of assignments that allow an instructor to bring a meaningful application of generalized audit software to the undergraduate auditing classroom. The assignments we have developed are meant to supplement traditional audit coursework by providing students an experience of applying audit procedures electronically.

Keywords: Generalized audit software; Technology; IDEA

Advances in information technology have drastically changed the manner in which information is recorded, processed, and reported. Concurrent with those changes have been improvements in generalized audit software programs that have created a situation in which auditing through the computer has become much easier. For example, auditors may now access a variety of types of data through use of various commercial generalized audit software applications such as IDEA (Interactive Data & Extraction & Analysis) and ACL (Audit Command Language). As indicated by authors such as Lanza (1998) and Warner (1998), these approaches allow auditors to be more efficient and often more effective as electronic environments are becoming standard among clients. As the profession continues to respond

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0748-5751/02/$ - see front matter
PII: S0748-5751(02)00011-8

to—and in some cases even lead—advances in technology, we believe that it is important to incorporate this technology into the audit classroom. This approach can reinforce students' understanding of basic audit concepts and prepare them for using technology in the workplace.

Our approach is consistent with a case presented by Gelinas, Levy, and Thibodeu (2001) that uses ACL as an audit tool for the classroom. Our approach differs in that we provide six relatively structured assignments that are designed to integrate more directly with the revenue and conversion cycles in the basic auditing course, followed by an unstructured assignment that requires detection of fraud. While our assignments become increasingly complex, an instructor may choose to use one or more of them, although solution of the final assignment by itself is difficult for most without having worked at least some of the other exercises.[1] Students may work the assignments either on their own computer or on the university's system. In this paper, we describe the nature of various assignments we have created to help beginning auditing students to understand electronic audit procedures and to gain some proficiency in using generalized audit software. These assignments allow students to perform the procedures with a minimum of classroom introductory material (ordinarily about 10–20 min per assignment). The assignments range from simple extraction of data from a single file to analysis of multiple files of a relational database.

As noted, two available audit software packages are IDEA and ACL.[2] While we have used and are familiar with both packages, the intent of this article is to present information on assignments that we developed using as a base the *IDEA Getting Started Guide* originally prepared by the Canadian Institute of Chartered Accountants and the *IDEA For Windows Case Study*, developed by BDO Seidman, LLP and Dr. Jerry L. Turner. Although our emphasis is upon IDEA, the focus of instructor presentations should be upon the functionality of the software, making the learning experience applicable to any package students may encounter in their professional careers.

In the remainder of the paper we summarize a series of assignments that we have used at Arizona State University and at the University of Colorado at Denver. We will make these assignments available, without charge, to interested readers.[3] Table 1 provides an overview of the topical coverage of the assignments. The data used in these assignments are either provided by IDEA or adapted from other sources. The instructor wishing to incorporate IDEA into the classroom should first contact Audimation Services, Inc.[4] for information on obtaining the software, and then, if so desired, obtain the assignments from us.

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[1] For example, an instructor may wish to move into this area gradually by using only the first assignment which relies heavily on the simple IDEA *Getting Started Guide*.

[2] In addition to these packages, many larger firms have developed proprietary software that performs similar functions.

[3] Several of the assignments are included in the Appendix. However, all of the assignments include accessing data in an electronic format. The authors should be contacted for current versions of assignments and data files.

[4] The address of Audimation Services, Inc. is: 16151 Cairnway, Suite 100, Houston, Texas 77084, USA; Phone: +1-888-641-2800; fax: +1-281-345-2399; Web site: www.audimation.com.

Table 1
IDEA assignment overview

Assignment	Revenue cycle		Conversion cycle	Sampling		Summary of assignment
	Sales	Accounts receivable	Inventory	Attributes	Variables	
1	X	X	X	X	X	Getting acquainted with IDEA. (Estimated student completion time = 2–3 h)
2	X			X		Various tests performed on invoices; attributes sampling planning and evaluation. (Estimated student completion time = 1–2 h)
3		X				Prepare aged trial balance, assess adequacy of allowance for doubtful accounts. (Estimated student completion time = 1 h)
4		X	X		X	Select and evaluate a sample of receivables using monetary unit sampling. (Estimated student completion time = 1 h)
5			X			Perform valuation tests. (Estimated student completion time = 1–1.5 h)
6	X	X	X			Analyze relational database tables to determine sales. (Estimated student completion time = 2 h)
7	X	X				Apply techniques of preceding assignments to identify fraud. (Estimated student [team] completion time = 2–4 h)

1. Assignment 1—getting familiar with IDEA

Given that most students will not have used generalized audit software prior to the auditing course, the first assignment (included in the Appendix) simply walks them through IDEA's *Getting Started Guide*. This tutorial, less than 100 pages in total, provides detailed instructions related to a variety of the basic functions[5] in IDEA. Examples of exercises in the tutorial include establishing a directory and file structure for a client, importing data, extracting data, sampling, joining data files,[6]

[5] IDEA uses the term "function" to present some form of logical or mathematical function. Throughout this paper we use the term more generally to also include the various types of "tests" performed by IDEA.

[6] Both IDEA and ACL use the term "database" to include a data file. To eliminate confusion between our first assignments that deal with a single, or possibly two data files, and our final assignments that use an integrated relational database, we will use the term "data file".

and preparing reports. Working through the *Guide* ordinarily takes students approximately 2–3 hours. Once done, they should have a cursory knowledge of how IDEA works along with a solid foundation to base future assignments. Because the guide presents information in a very "cookbook", detailed style, students are ordinarily able to complete it with minimal, if any, instructor assistance.

Our classroom introduction of the material involves making students familiar with any nuances of our university's computer system,[7] motivating the use of generalized audit software, and quickly performing some of the procedures presented in the *Getting Started Guide*. For instance, one of the procedures included in the tutorial is to extract transactions occurring on a particular day of the week. We quickly perform this procedure and then, to give this function practicality, frame it in the context of a business that is only open certain days of the week. By examining if any sales occurred on non-business days, the procedure is testing the existence assertion for sales transactions recorded in the revenue cycle. In summary, the goal of this first assignment is to provide the student with information on a number of the procedures and functions performed by IDEA. To the extent possible, we additionally try to motivate the logic for the functions performed.

2. Assignment 2—attributes sampling for the revenue cycle

The second assignment (included in the Appendix) focuses on attributes sampling and tests of controls commonly performed in the revenue cycle. This assignment demonstrates how to electronically apply the attribute sampling methods students have discussed in class. In doing so, students learn how to calculate, test, and evaluate the sample results using IDEA. Also, since each student is assigned a different random seed for their sample, the results vary among students, helping them gain a more thorough understanding of sampling risk. Students use a population of 900 sales transactions to complete three basic tests:

1. Search for duplicate invoices.
2. Search for gaps in the sequence of invoices.
3. Verify the clerical accuracy of invoices.

As searching for duplicate invoices is a function included in the first assignment, detailed instructions are not necessary for the first test. The second test is to search for gaps in the sequence of invoices. This would ordinarily also be a very simple procedure as IDEA includes a function to test the sequence. Yet, the population we

[7] At Arizona State University, IDEA is installed on the university computer system. In addition, the software is made available to students who wish to install it on their own computers. Audimation Services (see note 4) makes the software available at a token cost (currently less than $5) and allows multiple use of the software. For example, we acquired eight copies of the software and placed them on reserve at the library where they were available to students for overnight checkout and installation on their computers.

use tends to make this a bit more difficult as the field has been established in the file as character (text) and *not* numeric, thus making the concept of a "sequence" inapplicable. The character field must first be converted from character to numeric format and students must then use IDEA's "gap" function to identify gaps in the sequence of invoices.

The final test in this second assignment is to verify the clerical accuracy of the extensions of sales transactions. This test provides professors an excellent opportunity to (1) compare electronic results to those obtained using the course's text, and (2) compare the characteristics of a sample with those of the entire underlying population.

Students first use IDEA to select and evaluate the extensions for a statistical sample of invoices. We then ask students to reperform the analysis using the tables included in their text and compare IDEA results with those using the text.[8] Operationally, each student bases sample selection on a random seed derived from his or her student ID's last four digits. This makes each student's sample unique and allows one to illustrate concepts such as the normal distribution of sample means, the risk of incorrect acceptance, and the (generally uncontrolled) risk of incorrect rejection.

Having completed the sample evaluation, students then test the extensions of the entire data file. As part of this task, students are asked to compare their results with those from the sample they have previously taken. In particular, the elimination of sampling risk through "file sweeping" to include every population item is stressed, along with the related efficiencies of doing so in an electronic environment. Since the assumption of audit sampling is that a sample can allow auditors to make accurate inference about the whole population, by comparing the upper deviation rate in the random sample and the actual error rate by "file sweeping," students will have a hands-on experience with sampling risk.

3. Assignments 3 and 4—substantive tests and sampling for the revenue cycle

Assignments 3 and 4 require the use of audit software to help students review all the steps of a substantive test:

1. Determine the test objective.
2. Define the population and sampling unit.
3. Choose the audit sampling technique.
4. Determine the sample size.
5. Select the sample.
6. Test the sample items.

[8] The results are very similar, or identical. The manner in which the particular text being used handles a finite and not an infinite population may differ from that of IDEA, thus resulting in very small differences in sample size. Also, due to space limitations in texts, the tables are more summarized than those used in IDEA, thus creating small differences.

7. Evaluate the sample results.
8. Document the sampling procedure.

3.1. Assignment 3—substantive testing for the revenue cycle

Assignment 3 begins by having students prepare an aged trial balance and a detailed report of accounts over a specific age. Students are then required to calculate an estimate of the client's allowance for doubtful accounts and determine if it is adequate based on the current balance. We supplement the mathematical results here with a discussion of difficulties with estimates. For example, a straight aging of accounts receivable may reveal a particular amount is 120 days and older, which seems questionable. Yet for a number of the customers with accounts over 120 days old the client may be continuing to sell to them—accordingly greater portions of the "younger" accounts than might normally be encountered may also be particularly questionable.

Assignment 3 fits either with a discussion of substantive testing for the revenue cycle or with an accounts receivable chapter, depending on the structure of the text. Because of the subjectivity involved with the allowance for doubtful accounts, one should expect differing answers from students. Also, slight modifications to the aging classes (e.g. adding a 120–150 day category or changing intervals such as 0–40 days) is a simple way to modify the assignment from one semester to the next.

3.2. Assignment 4—substantive sampling of the revenue cycle

Assignment 4 uses the same data file as Assignment 3 and requires students to perform monetary unit sampling (also known as probability-proportionality-to-size sampling).[9] Once again, each student selects a sample based on student ID. In addition to making each student's solution unique, this procedure allows the instructor to provide an illustration of sampling risk and the conservative nature of PPS sampling. This is demonstrated since some samples lead students to "accept" the population as being materially correct, while others lead to "reject" decisions.

Assignments 3 and 4 provide a realistic view of substantive testing procedures and the relative importance of judgment when examining the valuation assertion. We have created a subpopulation of accounts with misstatements. Students compare their samples to a listing of all errors in the population to determine which, if any, of the accounts in their sample are misstated. They then are asked to compare the upper limit on mis-statements with the tolerable misstatement for the account to decide whether any adjustment is needed. Assignments 3 and 4 also fit well with a discussion of the revenue cycle and/or accounts receivable. In addition, Assignment

[9] This procedure can easily be complemented or substituted using other available sampling applications, such as stratified random sampling. This procedure is illustrated in the IDEA for Windows Case Study developed by BDO Seidman, LLP and Dr. Jerry Turner. The case study also demonstrates how to merge a sample with a template to create confirmations.

4 provides an electronic application of the monetary unit sampling technique presented in virtually all auditing textbooks.

4. Assignment 5—substantive testing for inventory

Inventory is often the largest current asset on a company's balance sheet and the lower of cost or market valuation method often provides difficult valuation issues. Therefore, Assignment 5 provides students with experience in testing the valuation assertion for inventory. Also, to provide an example of how the analytic functions of audit software can be used throughout the audit, this assignment focuses on several functions of the software including field statistics, field manipulations, and extraction. The *field statistics* function provides statistical information on the values of numeric fields within the data file such as net, maximum, minimum, and average values as well as numbers of debit, credit, and zero value items. The *field manipulation* function allows for creation of virtual fields. While the initial columns of data cannot be altered, virtual fields can be used to manipulate data as needed. For example, in Assignment 2, a virtual field was used to create a numeric field from a character field so that the gap detection function could be utilized. *Extraction* or *exception testing*, described by IDEA as the most frequently used audit test of users of the software, involves selecting certain items which satisfy a specific characteristic, for example payments of more than $100,000 or transactions before a particular date.

In Assignment 5, students are first required to calculate field statistics on the inventory balance to gain a broad view of the characteristics of the population. This allows them to gain descriptive data relative to the size, variability, and nature of the inventory items. Following this analysis, students then use the field manipulation and extraction functions to perform various valuation tests such as lower of cost or market and slow moving inventory (both in terms of recent sales and turnover). Based on these tests, students then propose an adjusting entry.

Following this adjustment, students are asked to differentiate the relative informational value between the lower of cost or market value test and other analytical procedures. For example, the lower of cost or market value test may lead more directly to a proposed adjusting entry than many analytical procedures that only provide the auditor a hint on suspicious items and will lead to further investigation that should be performed in order to identify obsolete items. As students' proficiency with the software should be increasing, they are then required to propose and design their own test of inventory and relate it back to specific financial statement assertions. This stresses the design of substantive procedures to test specific assertions.

5. Assignments 6 and 7—relational database analysis

Assignments 6 and 7 move away from using a single data file (or possibly two) to providing students an experience in applying auditing concepts to a relational

database. As accounting software continues to utilize relational databases to store data, it is important for auditors to be able to access data in this form. The data we use is a modified version of the Northwind Database that is provided with the Microsoft Access database system.

5.1. Assignment 6—overall relational database analysis

This assignment allows students to "get acquainted" with the manner in which database tables may be used with IDEA. Once students format the database in the correct manner using the join function, they are required to calculate a variety of balances including gross sales, sales by product, sales by salesperson, top suppliers, and sales per year. Students are provided with eight tables and an Access "relationship diagram". Before performing each step, students are required to consider which of the tables they need for a particular part of the assignment, as well as which fields to include and/or summarize. The last step requires students to compare the sales amount per auditor and the sales amount per client, which is reported on tax returns filed with the Internal Revenue Service, and to identify any auditor professional and ethical responsibilities relating to any discrepancy found.

Our goal with this sixth assignment is to help students integrate computer information systems knowledge with the IDEA software they have been using throughout the semester. While historically a number of our students have taken a formal relational database course, many have not. For those who have taken a database course, we suggest that they not only use IDEA, but also consider using their SQL programming knowledge to obtain the information and to then compare the relative advantages of each approach. In this manner, students are able to integrate knowledge from the two areas. For students who have not taken a relational database class, the assignment somewhat allays their fears of such a system as they are able to directly use IDEA, despite their very limited relational database knowledge. In summary, this assignment is meant to serve as a structured introduction to the manner in which generalized audit software may be used to analyze a relational database.

5.2. Assignment 7—test for fraud

While Assignment 6 is fairly structured, Assignment 7, which also uses the Northwind Database, is intentionally vague to encourage thought among the students. Students are given a message that there is "a crook within the company" along with a few very general hints and are asked to devise, execute, and interpret several tests for fraud. Each semester we "embed" some form of fraud within the database. For example, we have eliminated certain orders from the database to simulate an employee shipping goods to his/her own address and then "destroying the evidence". Or, we have included extremely large sales prior to year-end.

The purpose is not only to illustrate the complex nature of detecting fraud, but also to allow students to apply the techniques of analysis that they have learned in the first six assignments. Students are encouraged to think about where fraud can

occur, what procedures are needed to catch it, and how to evaluate the test result. Assignment 7 serves as a good capstone in that it requires the application of techniques learned earlier to a very unstructured area.

6. Concluding remarks

While these assignments cover many of the basic areas involved in an audit, they can easily be expanded or contracted to suit an individual instructor's needs. The only constraint is on coordinating the assignments so that they coincide with the topics in the course and the time required to complete them. Additionally, the procedures can be easily altered so that they vary across semesters.

Appendix

Assignment 1
Getting familiar with IDEA
Estimated time: 2–3 hours

Congratulations! The partners at Kaplan and Tiffany, L.L.P. believe you are ready to use IDEA, a "real world" generalized audit software package. As part of your first engagement, you will be using IDEA 2001 to complete various tests of controls along with substantive tests. Before going out to the client, you have been advised to familiarize yourself with the software.

The software comes equipped with a tutorial that demonstrates some of the basic functions of the package. Once completed, you will have the knowledge base necessary to begin and complete the more complex tasks required while at the client.

Prior to Starting IDEA: Prior to starting the assignment, you will need a copy of "IDEA 2001 Getting Started Guide" and prepare a diskette that will be used to store your client information. Those wishing to work at home may store client information on the hard drive.

Preparing a Diskette The software prepares and saves files created during the various functions that you will be performing in a separate client file. If you are not working on a home computer, it will be necessary for you to maintain these files on a diskette. Therefore, prior to starting the assignment, create a folder (directory) on your diskette called **Tutorial**. Also, you will need to copy the files **MASTER.XLS**, **SALES.TXT,** and **INVEST.PRN** to your diskette.

Be aware that when the guide refers to these files, they will now be located on the A:\ drive (such as Step 2 on pp. 4). Also, on Step 4, pp. 5 of the guide, make the following modifications:

Client name: (your last name, Tutorial)

For future assignments, you must also copy additional files to your diskette as well. These files will be needed for Assignments 2–7. You should create separate folders (and client names) for each of the assignments. Use the same format as above (your last name, assignment name).

These changes will allow you to maintain your work on your diskette rather than the hard drive. If you do not make these changes, your files cannot be retrieved upon returning to the campus computers and you will have to start over.

Completing the Assignment: All of the procedures you have been asked to complete are explained in the getting started guide. Take your time, as it will benefit you later. Below are additional suggestions:

(1) In certain sections, you may need to switch from portrait to landscape settings before printing. This can easily be done by going to File, and then to Print Setup. Also, if you wish to shorten the columns, just click on the column dividers and move them in a manner similar to the same function in Excel.
(2) If you do not finish the tutorial or any of the assignments, the next time you come back to a computer site, you will have to reload IDEA. Afterwards, create a new client using the same client name and directory as before. The files you created are on your diskette and you will be able to continue where you left off.

Concluding Remarks: This first assignment is intended to teach you the basics of IDEA. Future assignments will make reference to this tutorial; therefore, it is imperative that you understand the key objectives in the Getting Started Tutorial. The tutorial typically takes between 2 and 3 hours to complete.

Required: Work through the Getting Started Tutorial. These sections are relatively well laid out and will provide you with most of the guidance needed to work assignments 2–7. Print and turn in the following for Assignment 1:

1.	Field Statistics:	Page 20
2.	Sample of Customers:	Page 22
3.	Large Credit Limits:	Page 26
4.	Stratification Report:	Page 49
5.	Exceeded Credit Limits:	Page 78
6.	Duplicate Invoices:	Page 82
7.	Gap Detection:	Page 84
8.	Sunday Transactions:	Page 88
9.	Sales Report (first 2 pages):	Page 104
10.	Investments Database	Page 118

This is an individual assignment; please do your own work.

INSTRUCTOR NOTES: This is the longest of the assignments due to the student's lack of familiarity with the software. However, the Getting Started Guide provided by IDEA provides detailed instructions, including screen shots, to help students learn the software. Once students master the basic mechanics of the software, the remaining assignments can begin to focus on the functional aspects of the software, rather than mechanical. Encourage students to take their time as this tutorial makes an excellent reference point for various tasks in future assignments.

Assignment 2
Attributes Sampling for the Revenue Cycle
Estimated time: 1–2 hours

Kaplan has informed you that he has other auditors performing a number of tests of controls relating to the revenue cycle and that you will perform ***three*** (3) basic control tests. The first two are included in ***STEP 1***; search for duplicate invoice numbers (existence) and gaps in the sequence of invoices (completeness). The third test relies on a sample from the population of 900 items and starts at ***STEP 2*** and goes through to ***STEP 7*** (valuation).

The client has provided you with a listing of sales transactions (***invoices.dbf***), which lists all transactions for the period in question. There are 900 records in total. When using the Import Assistant, IDEA will automatically define column widths and field names. The field names are self-explanatory and listed below. Import the ***invoices.dbf***, select generate Field Statistics, and name the database INVOICES.

Field Name	Type	From	Length	Dec	Description
CUSTNO	Character	1	5		Account Number
INV_NO	Character	6	9		Invoice Number
INV_DATE	Character	15	8		Date of Sale
PROD_CODE	Character	23	2		Product Code
UNIT_PRICE	Numeric	26	10	2	Unit Price
QTY	Numeric	35	5		Quantity Sold
AMOUNT	Numeric	40	10	2	Sales in Dollars

You will perform the following steps for this assignment:

STEP 1: Use the population of 900 items (***invoices.dbf***). Test the entire population to identify duplicated invoices and gaps.

a. Duplicate invoices (if any), that is invoices with the same number. Use the top menu as:
Data→Duplicate Key Detection

b. Gaps (if any) in the sequence of invoice numbers:
Data→Gap Detection
Print and turn in 'a' and 'b'.

HINT: When you use the "Import Assistant" to open the file 'c' it recognizes the file as a dBase file and opens it. The columns are already defined (that is, you don't have to give them names and separate them). This is because IDEA imports the dBase file "as is". This is all OK in your search for duplicate invoices. Ignore the first column entitled "Deleted".

A problem occurs when searching for "gaps" since IDEA does not offer INV_NO as a column for which you can search for gaps. This is because IDEA has read the INV_NO column as a character and not a numeric field. To overcome this problem, you need to create a numeric field using the INV_NO data. There is a function available in the equation editor that easily can accomplish this task (@VAL). You might accomplish all this by using @VAL to add a new virtual column that duplicates the existing character field as numeric.

Once converted, one last small problem to overcome is that all invoices have two zeros at the end of them. Eliminate the last two zeros and you are ready to test for gaps.

INSTRUCTOR NOTES: This first step is relative straightforward. Students should have a basic understanding of how to import data from the Getting Started Guide. They should be reminded to verify that they have all 900 items. Additionally, a control total can be added (this total may vary each semester as the data is manipulated). Duplicate Key Detection is one of the procedures in the Getting Started Guide, so Part A should be relatively easy. In Part B, while the procedure is not complicated, the column must first be translated from character (text) to numeric data for the Gap Detection function to work properly. This is done by creating a virtual field, using the @VAL function, and dividing by 100 to remove the last two zero's in the INV_NO field. One final point of interest is that the gaps and duplicate invoices have been set so that they correspond with one another. This presents the opportunity for a discussion of qualitative vs. quantitative errors.

STEP 2: Calculate required sample size.
a. Use the text to calculate the required sample size using the following:

Expected Population Deviation Rate: 1%
Tolerable Rate: 6%
Risk of assessing control risk too low: 5%

Turn in your sample size.

b. Now use IDEA to generate the required sample size (that is, do ***STEP 2a*** over using IDEA). You should use ***invoice.dbf*** or the derivation of that file you created

earlier (with the virtual column(s)). If you don't have one of these open you will have to open it.

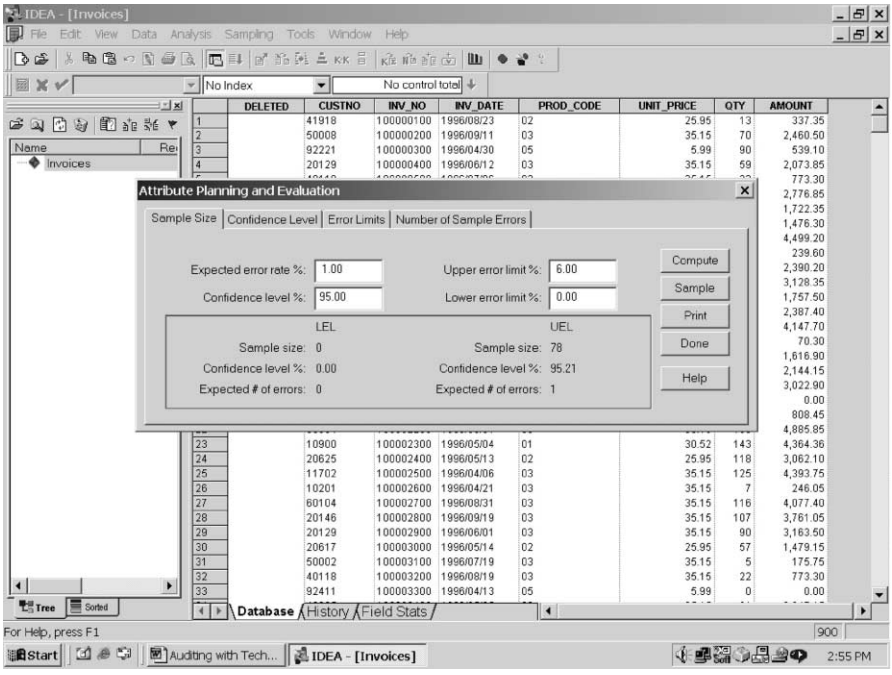
Use **Sampling → Attribute Planning and Evaluation→Sample Size** from the menus at the top of the screen. Enter the same Expected Population Deviation Rate, Tolerable Rate, and Risk of assessing control risk too low as was stated above. The Tolerable Rate is now called the Upper Error Limit. Enter 0.00% for the Lower Error Limit. IDEA also asks for a Confidence Level, that number is the complement of our "risk of assessing control risk too low".

Confidence Level = 1 – (risk of assessing control risk too low)
= 1–5%
= 95%

When all the information is entered, click the Compute button. **Print and turn in sample size page.**

INSTRUCTOR NOTES: This step illustrates the sampling procedure used from the text is identical (or at least very close) to the one used by IDEA.

Step 2: Sample Size Calculation



STEP 3: Use IDEA to select the sample. Use **Sampling→ Random** from the top menus (or just hit the sample button)

Click on the Sample button. Use the following:

- Starting Record: 1 *(this should be the default)*
- Ending Record: 900 *(this should be the default)*
- Number of records to select: *Enter the sample size from your printout*
- Random number seed: *Enter the last four digits of your student ID*
- Do***not*** check "Allow duplicate records"
- File Description: Attribute Sample

NOTE: Make sure you enter the last four digits of your Student ID as your random seed. If the first digit begins with a zero (0) then use the next digit for the first number (i.e., 0123 should be entered as 123).

Click on the OK button. Turn in your sample.

INSTRUCTOR NOTES: The purpose of having students use their Student ID for the random seed is to create a distribution of results. Also, by using their ID versus having IDEA generate a random seed, it is easy to verify they worked independently.

STEP 4: Test the extensions by cross-footing. This will determine if any of the amounts in your sample are miscalculated.

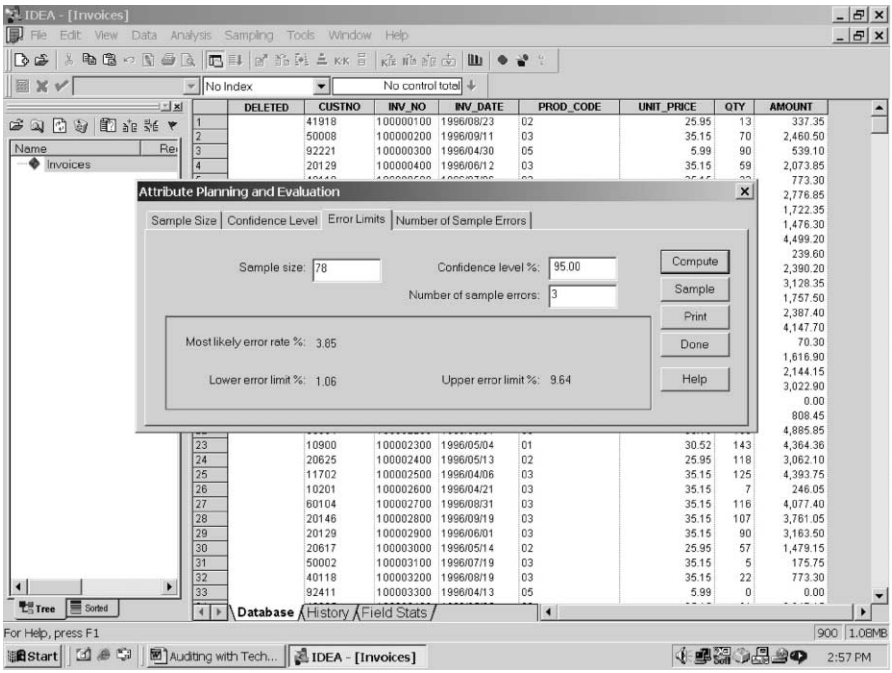
HINT: While there are several ways this test can be performed, it is suggested that the number of errors be determined using the extraction function. The following formula, **AMOUNT <> (UNIT_PRICE * QTY)**, results in a new database consisting of incorrect invoices.

How many misstatements (if any) did you find? What invoice number(s) is in error? Turn in the page that includes your sampled items and the page with the misstatements (if any). **NOTE**: If you have no misstatements in your sample the misstatements page will be blank.

INSTRUCTOR NOTES: While this step could be performed manually or with IDEA, IDEA is much more efficient. There are a number of ways the test could be performed, any of which are acceptable. Students should be careful so that they test their sample population, not the entire population in this step.

STEP 5: Use the text to evaluate your results. What are your statistical results? (e.g. no exceptions were noted, therefore we may conclude that there is less than a 5% risk that the population deviation rate is greater than 6%; or since one deviation was found, etc. (your textbook should help here).

Step 6: Sample Evaluation



STEP 6: Use IDEA to evaluate your results. Go to **Sampling→Attribute Planning & Evaluation→and use Error Limits** to evaluate your results.

Print and turn in page and discuss what these results mean.

INSTRUCTOR NOTES: Once again, STEPS 5 & 6 illustrate the compatibility of the text with what IDEA is doing. IDEA will be a bit more precise in determining the upper deviation limit since it can adjust for varying sample sizes whereas the text will present a range of values.

STEP 7: Redo ***STEP 4***, but this time on the entire population of 900 invoices. Turn in the following: How many misstatements (if any) did you find? What invoice number(s) is in error? Evaluate your results. Discuss the advantages/disadvantages of testing an entire database versus conducting a sample of items. How does this effect detection risk (AR = IR * CR * DR) and the substantive tests performed?

INSTRUCTOR NOTES: This is perhaps the most important step of the assignment. Since the entire population is tested, there is no need to adjust the deviation rate for sampling risk. This is relevant since if the population had a deviation rate of 4%, the upper deviation limited would be 4% (4% + 0% = 4%). Based on the inputs used, if the sample had a deviation rate of 4%, the upper deviation limit would be 9.64% (this is based on a sample size of 78 with 3 errors). The upper deviation limit consists of the deviation rate of 3.85% plus the allowance for sampling risk of 5.79%. Thus, the

sample would not be able to support a planned level of control risk of low, but the 'file sweeping' would. This illustrates the risk of incorrect rejection that results in a lack of efficiency. Of course, only students who found 2 or more errors would reject a planned level of low, illustrating the distribution of results when utilizing sampling.

REQUIRED

Complete Steps 1–7 (***Test of controls***) and summarize your results in a memo to the audit workpapers. Include all supporting printouts.

INSTRUCTOR NOTES: This assignment can be altered in a number of ways across semesters. First, the number and correlation of gaps and duplicate invoices can easily be adjusted. Second, the number of errors in the population can be manipulated. And last, the expected population deviation rate, the tolerable rate, and risk of assessing control risk too low can be modified to change the sample size.

Assignment #3
Substantive Testing for the Revenue Cycle
Estimated time: 1 hour

Kaplan and Tiffany want you to use a client file (***arfile.asc***) to prepare an aged trial balance and a list of accounts over 180 days past due. You will also use the aged trial balance to derive an estimate of the proper allowance for doubtful accounts.

The ***arfile.asc*** is the Accounts Receivable file of balance due as of 2001/12/31. You may download it from the course home page. You will be auditing the 2001 year-end numbers. When you import ***arfile.asc*** you need to input the proper field names for the various fields. In other words, you will adjust the field names and size. The field names and sizes are:

Field Name	Type	From	Length	Dec	Description
ACCOUNT	Character	1	11		Account Number
DIVISION	Character	12	4		
STORE	Character	16	4		
BALANCE	Numeric	20	13	2	
DUEDATE	Date	33	6		MMDDYY (mask)

Note: Account, division, and store are ordinarily treated as character because, even though the fields include numbers, adding up those numbers doesn't ordinarily make much sense. When setting up the columns, note and fix the fact that the import assistant thinks the first ***S*** is its own field, when in fact it is a part of the account number. When you import the database, save the definition as **arfile.rdf**.

As the file is imported it should contain 993 records and the control total should be $10,468,506.88. To verify the total, set the control total.

STEP 1: Aging Trial Balance Report for Accounts Receivables

Age the accounts receivable into the following six groups:

0	days
0–15	days
15–30	days
30–60	days
60–90	days
90–120	days
120–180	days
180 plus	days

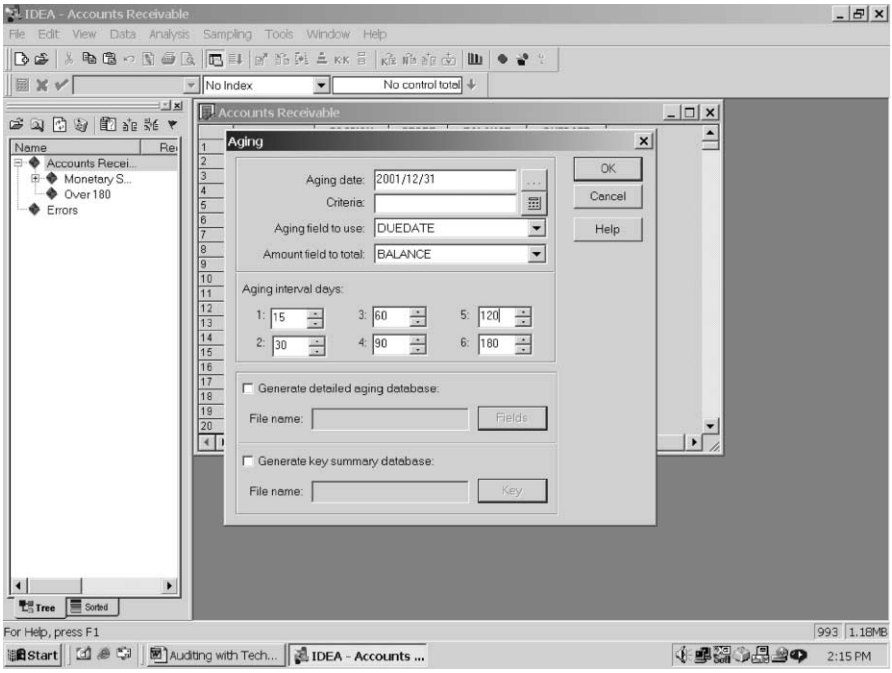
Hints: Aging is on the top menu as follows **Analysis→ Aging.**

1. Change the **Aging Date**: to **2001/12/31**
2. For **Aging Field** to use: select **DUEDATE**
3. For **Amount Field**: select **BALANCE**
4. Do not click Generate detailed aging database
5. Do not click Generate key summary database

Print the Aged Accounts Receivable Report.

INSTRUCTOR NOTES: While this first step is basic, it quickly prepares an aged accounts receivable report for use in the rest of the assignment. To vary the assignment across semesters, the aging intervals can easily be altered. Students should be reminded to verify the total of the report agrees to the control total and to modify the intervals based on the criteria given.

Step 1: Aging Report



STEP 2: Prepare Report of accounts that are over 180 days old.

Print the Aged report of accounts greater than 180 days and use IDEA to total the columns on your report. Use **File→Create Report** to prepare this report.

Turn in your report.

INSTRUCTOR NOTES: The report of the accounts over 180 days is useful in determining which accounts, if any, should be written off. While the total can be seen through the control total, to print it out students must create a report added the total. This procedure is easily run using the extractions function. However, a common mistake is to base the report on 07/01/2001. The correct date to examine accounts over 180 days is 07/05/2001. Also, when entering the function in the equation editor, it is necessary to put the date in quotes (DUEDATE < "20010705").

STEP 3: Prepare adjusting entry for the Allowance of Doubtful Accounts

In the past, the auditors have found that the following percentages approximate the eventual write-offs of doubtful accounts:

0 days	0.03%
0–15 days	0.20%
15–30 days	0.50%
30–60 days	1.00%
60–90 days	5.00%
90–120 days	10.00%
120–180 days	25.00%
180 plus days	50.00%

The allowance for doubtful accounts currently has a balance of $100,200. Prepare a proposed adjusting entry pertaining to the allowance for doubtful accounts. You may calculate these percentages with or without IDEA.

INSTRUCTOR NOTES: The final step is to prepare an adjusting entry based on the write-off percentages given. These can easily be altered across semesters. While there are multiple ways of calculating the allowance both within and outside of IDEA, one method is to export the aged report to excel and enter the write-off percentages there. To export, with the aging report open, go to FILE > SAVE AS. Afterward, the file can be opened with Excel.

Turn In	(1)	The Age Analysis Report
	(2)	The listing of all accounts over 180 days
	(3)	The calculation of the allowance for doubtful accounts with the proposed JE

Assignment 4
Substantive Sampling of the Revenue Cycle
Estimated time: 1 hour

Kaplan and Tiffany want you to continue to use information from the same receivable file (***arfile.asc***). This assignment requires you to use PPS sampling to (1) plan a sample (calculate sample size and select a sample), and (2) evaluate results (you will be given a couple of misstatements to use to evaluate the results).

Because you have already imported and used the ***arfile.asc*** file in Assignment #3, you may use the same client and files. One additional file, ***errors.xls***, will need to be imported to help determine the errors in your sample.

In this assignment you will have calculated a required sample size for the confirming of receivables, selected the sample, mailed the confirmations (pretend), audited the sample (pretend) and calculated results. In general you should be able to do this assignment using information from the User Guide.

STEP 1: Planning the Sample

In planning you will derive a PPS ("monetary unit" per the Canadians). As we have discussed in class, there are a number of ways to perform PPS, and IDEA works just a little different than that of the text that follows the AICPA approach.

- Open the Accounts Receivable file (**arfile.asc**).

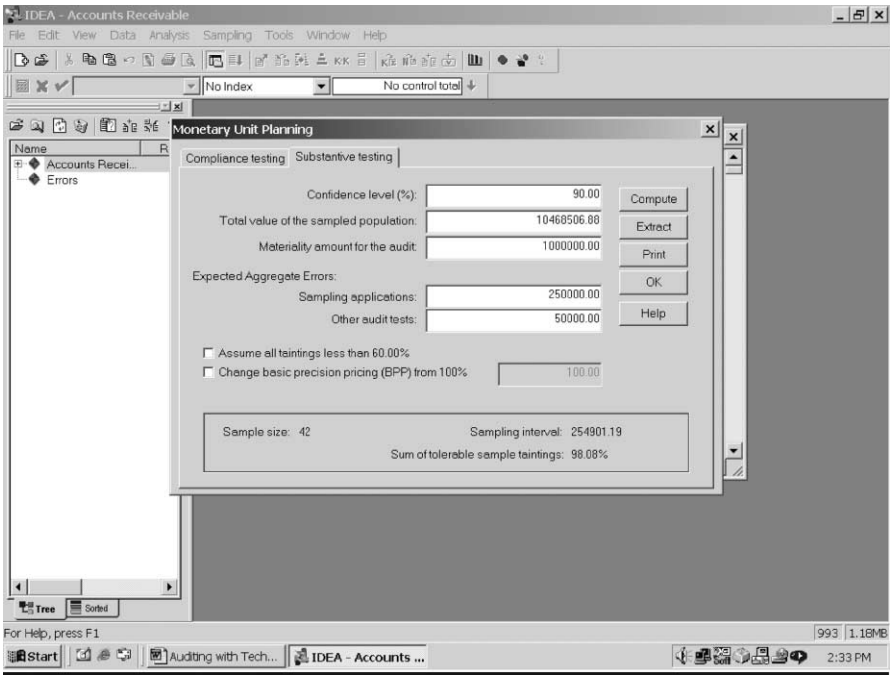
Select **Sampling→Monetary Unit→Planning→Substantive Testing**.
Use the following:

- Confidence Level 90% (1 – risk of incorrect acceptance)
- Total Value of Population $10,468,506.88
- Materiality for the Audit $1,000,000.00
- *Assume this the materiality for the audit for Accounts Receivables*
- Expected Aggregate Error, Sampling $250,000.00
- Expected Aggregate Error, Other $50,000
- Do ***not*** check "Assume all taintings less than 60%"
- Do ***not*** check "Change Basic Precision Pricing (BPP) from 100%"

Compute the Sample, print, and submit your results.

INSTRUCTOR NOTES: This first step is similar to the method used in the text. However, differences that should be noted are the Expected Aggregate Error for Sampling and Other. Use of such information is dependent on the operationalization of the sample method, and should not be cause for students to be alarmed.

Step 1: Monetary Unit Sample Calculation



STEP 2: Select the Sample

While still on the sample size screen, click on the **Extract** button. This will bring you to the Sampling screen. Make sure the **"Fixed Interval Extraction"** tab is selected.

Enter the following:

- Numeric Field to Sample: BALANCE
- Sampling Interval: *enter the interval computed in Planning*
- Random Starting Point *(25 × the last four digits of your student ID)*
- Description: PPS Sample
- Do ***not*** check "Allow multiple hits on high value items"
- Check "Use absolute values for credit (negative) items" if necessary

Click OK to extract your sample from the database.

Note: The random starting point should be 25 times the last four digits of your social security number, supplemented automatically by the ".00″ For example, if your last four digits are 8042 then the Random Starting Point becomes 201,050.00 (25 * 8042). Click on "OK". You should now have your sample.

INSTRUCTOR NOTES: Having students start at different starting points will result in variety of results which helps illustrate concepts of sampling risk and the conservative nature of PPS Sampling.

STEP 3: Print your Sample

Print and submit your sample.

STEP 4: Evaluate your results

Here we pretend that you used the above to print confirmations and that they have all come back (or alternative procedures have been applied). Use the errors.xls file to determine which of your sample items had errors. Once the file has been imported, join the errors database to the sample database based on account number (uses matches only). Please note the spreadsheet contains errors from the entire population, not just your sample. Knowing the true population will allow us to determine how accurate your sample actually performed.

Modify the "audited amount" (*AUDIT_AMT*) in your file from ***STEPS 2 & 3*** above by selecting the corresponding cell within the PPS Sample database. Only modify those items appearing on both your sample on the error listing as shown in the joined file.

Print and submit your sample with any errors discovered reflected in the audited value. Highlight (manually) these accounts so they are easily visible.

INSTRUCTOR NOTES: This is one of the more difficult steps in the assignment. It must be explained that while you would not every know the true value of a given population, in this illustration we do. Once the accounts in error are determined through the join process, the audit amount must be manually entered on the sample database.

STEP 5: Evaluate results continues;

Select **Sampling→Monetary Unit→Evaluation**. Use the following:

- Audit value field: AUDIT_AMT
- Book value field: BALANCE
- Confidence level: 90%
- Sampling interval: *enter your interval from STEP 1*
- Sample size: *enter your sample size*
- High value cut-off amount: *enter the sampling interval from STEP 1*
- Do ***not*** check "Change basis precision pricing from 100%"

Click OK. **Print your results.**

STEP 6: Assume the following:

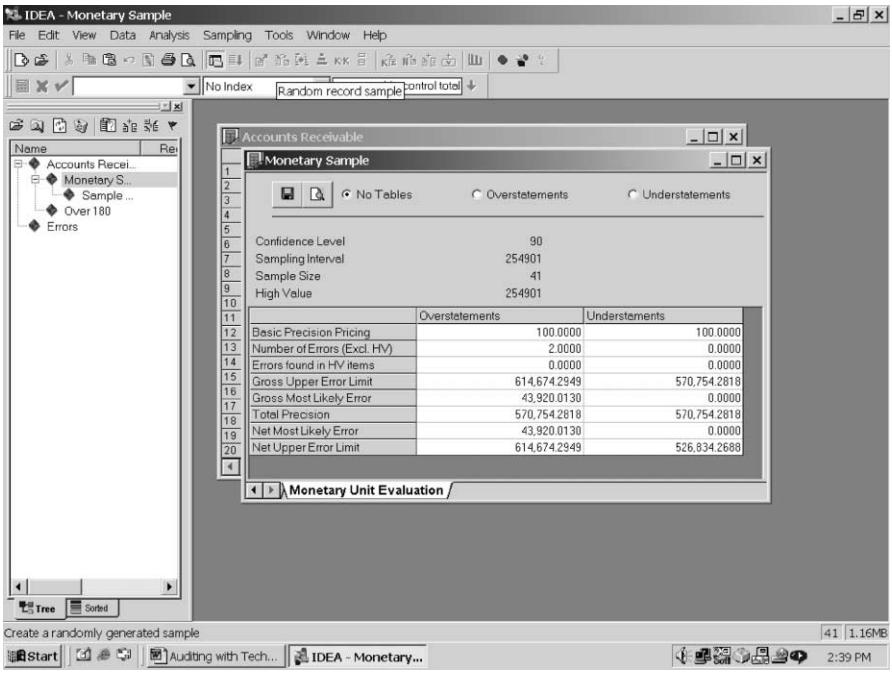
From your Print out		Text
"Gross Most Likely Error"	=	Projected misstatement.
"Total Precision"	=	Allowance for sampling risk*
"Net Upper Error Limit"	=	Upper Limit on Misstatement

*Basic precision + Incremental Allowance

What statistical conclusion do you arrive at given the output? **Report your answer** on the ***STEP 5*** printout.

INSTRUCTOR NOTES: To evaluate the results, students should compare the net upper error limit to the materiality for the audit of accounts receivable of $1,000,000. Also, when entering the sampling size for evaluation, it may be slightly lower than that calculated in Step 1 due to multiple hits on large items and/or the random starting point.

Step 5: Monetary Unit Evaluation



References

Audimation Services, Inc. (undated).*IDEA for Windows case study—Version 2.0.*
Audimation Services, Inc. (1995). *IDEA getting started guide: IDEA for Windows Version 3.*

Gelinas, U. J., Levy, E. S., & Thibodeau, J. C. (2001). Norwood Office Supplies, Inc: a teaching case to integrate computer-assisted auditing techniques into the auditing course. *Issues in Accounting Education, November*, 603–635.

Lanza, R. B. (1998). Take my manual audit, please. *Journal of Accountancy, June*, 33–36.

Warner, P. D. (1998). ACL for Windows. *The CPA Journal, November*, 40–44.