APPLY YOUR KNOWLEDGE

Apply Your Knowledge Project Overview

Project Number	Project Name	Project Type	Plug-In	Focus Area	Project Level	Skill Set	Page Number
1	Financial Destiny	Excel	T2	Personal Budget	Introductory	Formulas	AYK.4
2	Cash Flow	Excel	T2	Cash Flow	Introductory	Formulas	AYK.4
3	Technology Budget	Excel	T1, T2	Hardware and Software	Introductory	Formulas	AYK.4
4	Tracking Donations	Excel	T2	Employee Relationships	Introductory	Formulas	AYK.4
5	Convert Currency	Excel	T2	Global Commerce	Introductory	Formulas	AYK.5
6	Cost Comparison	Excel	T2	Total Cost of Ownership	Introductory	Formulas	AYK.5
7	Time Management	Excel or Project	T12	Project Management	Introductory	Gantt Charts	AYK.6
8	Maximize Profit	Excel	T2, T4	Strategic Analysis	Intermediate	Formulas or Solver	AYK.6
9	Security Analysis	Excel	T3	Filtering Data	Intermediate	Conditional Formatting, Autofilter, Subtotal	AYK.7
10	Gathering Data	Excel	T3	Data Analysis	Intermediate	Conditional Formatting	AYK.8
11	Scanner System	Excel	T2	Strategic Analysis	Intermediate	Formulas	AYK.8
12	Competitive Pricing	Excel	T2	Profit Maximization	Intermediate	Formulas	AYK.9
13	Adequate Acquisitions	Excel	T2	Break-Even Analysis	Intermediate	Formulas	AYK.9
14	Customer Relations	Excel	T3	CRM	Intermediate	PivotTable	AYK.9
15	Assessing the Value of Information	Excel	T3	Data Analysis	Intermediate	PivotTable	AYK.10
16	Growth, Trends, and Forecasts	Excel	T2, T3	Data Forecasting	Advanced	Average, Trend, Growth	AYK.11
17	Shipping Costs	Excel	T4	SCM	Advanced	Solver	AYK.12
18	Formatting Grades	Excel	T3	Data Analysis	Advanced	If, LookUp	AYK.12

(*Continued*)

Project Number	Project Name	Project Type	Plug-In	Focus Area	Project Level	Skill Set	Page Number
19	Moving Dilemma	Excel	T2, T3	SCM	Advanced	Absolute vs. Relative Values	AYK.13
20	Operational Efficiencies	Excel	T3	SCM	Advanced	PivotTable	AYK.14
21	Too Much Information	Excel	T3	CRM	Advanced	PivotTable	AYK.14
22	Turnover Rates	Excel	T3	Data Mining	Advanced	PivotTable	AYK.15
23	Vital Information	Excel	T3	Data Mining	Advanced	PivotTable	AYK.15
24	Breaking Even	Excel	T4	Business Analysis	Advanced	Goal Seek	AYK.16
25	Profit Scenario	Excel	T4	Sales Analysis	Advanced	Scenario Manager	AYK.16
26	Electronic Résumés	HTML	T9, T10, T11	Electronic Personal Marketing	Introductory	Structural Tags	AYK.17
27	Gathering Feedback	Dreamweaver	T9, T10, T11	Data Collection	Intermediate	Organization of Information	AYK.17
28	Daily Invoice	Access	T5, T6, T7, T8	Business Analysis	Introductory	Entities, Relationships, and Databases	AYK.17
29	Billing Data	Access	T5, T6, T7, T8	Business Intelligence	Introductory	Entities, Relationships, and Databases	AYK.19
30	Inventory Data	Access	T5, T6, T7, T8	SCM	Intermediate	Entities, Relationships, and Databases	AYK.20
31	Call Center	Access	T5, T6, T7, T8	CRM	Intermediate Entities, Relationships, and	Databases	AYK.21
32	Sales Pipeline	Access	T5, T6, T7, T8	Business Intelligence	Advanced	Entities, Relationships, and Databases	AYK.23
33	Online Classified Ads	Access	T5, T6, T7, T8	Ecommerce	Advanced	Entities, Relationships, and Databases	AYK.23

NOTE: Many of the Excel projects support multiple data files. Therefore the naming convention that you see in the text may not be the same as what you see in a data folder. As an example, in the text we reference data files as AYK1_Data.xlsx; however, you may see a file named AYK1_Data_Version_1.xlsx, or AYK1_Data_Version_2.xlsx.

Project 1:

Financial Destiny

You have been introduced to Microsoft Excel and are ready to begin using it to help track your monthly expenses and take charge of your financial destiny. The first step is to create a personal budget so you can see where you are spending money and if you need to decrease your monthly expenses or increase your monthly income.

Project Focus

Create a template for a monthly budget of your income and expenditures, with some money set aside for savings (or you can use the data file, AYK1_Data.xlsx, we created). Create variations of this budget to show how much you could save if you cut back on certain expenses, found a roommate, or got a part-time job. Compare the costs of a meal plan to costs of groceries. Consider how much interest would be earned if you saved $100 a month, or how much debt paid on student loans or credit card bills. To expand your data set, make a fantasy budget for 10 years from now, when you might own a home, have student loan payments, and have a good salary.

Data File: AYK1_Data.xlsx

Project 2:

Cash Flow

Gears is a five-year-old company that specializes in bike components. The company is having trouble paying for its monthly supplies and would like to perform a cash flow analysis so it can understand its financial position. Cash flow represents the money an investment produces after subtracting cash expenses from income. The statement of cash flows summarizes sources and uses of cash, indicates whether enough cash is available to carry on routine operations, and offers an analysis of all business transactions, reporting where the firm obtained its cash and how it chose to allocate the cash. The cash flow statement shows where money comes from, how the company is going to spend it, and when the company will require additional cash. Gears would like to project a cash flow statement for the next month.

Project Focus

Using the data file AYK2_Data.xlsx complete the cash flow statement for Gears using Excel. Be sure to create formulas so the company can simply input numbers in the future to determine cash flow.

Data File: AYK2_Data.xlsx

Project 3:

Technology Budget

Tally is a start-up website development company located in Seattle, Washington. The company currently has seven employees and is looking to hire six new employees in the next month.

Project Focus

You are in charge of purchasing for Tally. Your first task is to purchase computers for the new employees. Your budget is $250,000 to buy the best computer systems with a scanner, three color printers, and business software. Use the Web to research various products and calculate the costs of different systems using Excel. Use a variety of Excel formulas as you analyze costs and compare prices. Use the data file AYK3_Data.xlsx as a template.

Data File: AYK3_Data.xlsx

Project 4:

Tracking Donations

Lazarus Consulting is a large computer consulting company in New York. Pete Lazarus, the CEO and founder, is well known for his philanthropic efforts. Pete knows that most of his

employees contribute to nonprofit organizations and wants to reward them for their efforts while encouraging others to contribute to charities. Pete began a program that matches 50 percent of each employee donation. The only stipulations are that the charity must be a nonprofit organization and the company will match only up to $2,000 per year per employee.

Project Focus

Open the data file AYK4_Data.xlsx and determine the following:

- What was the total donation amount per organization?
- What were the average donations per organization?

Data File: AYK4_Data.xlsx

Project 5:
Convert Currency

You have decided to spend the summer traveling abroad with your friends. Your trip is going to take you to France, England, Italy, Switzerland, Germany, Norway, and Ireland. You want to use Excel to convert currencies as you travel around the world.

Project Focus

Locate one of the exchange rate calculators on the Internet (www.xe.com or www.x-rates.com). Find the exchange rates for each of the countries listed above and create formulas in Excel to convert $100, $500, and $1,000. Use the data file AYK5_Data.xlsx as a template.

Data File: AYK5_Data.xls

Project 6:
Cost Comparison

You are thinking about purchasing a new computer since the machine you are using now is four years old, slow, not always reliable, and does not support the latest operating system. Your needs for the new computer are simple: anti-virus software, email, Web browsing, word processing, spreadsheet, database, iTunes, and some lightweight graphical tools. Your concern is what the total cost of ownership will be for the next three years. You have to factor in a few added costs beyond just the initial purchase price for the computer itself, such as: added hardware (this could include a new printer, docking station, or scanner), software (purchase of a new operating system), training (you're thinking about pursuing Web training to get an internship next term), subsequent software upgrades, and maintenance.

Project Focus

- It is useful to think about costs over time—both direct as well as indirect costs. Part of the reason this distinction is important is that a decision should rest not on the nominal sum of the purchase, but rather on the present value of the purchase.

	A	B	C	D	E	F
1	COST OF NEW COMPUTER					
2	Discount Rate	1	0.9325	0.9109	0.7051	
3		Time 0	Year 1	Year 2	Year 3	Present Value Costs
4	Computer					
5	Software					
6	Additional Hardware					
7	Training					
8	Software upgrades					
9	Maintenance					
10						
11	Total Costs					
12						

FIGURE AYK.1
Sample Layout of New Computer Spreadsheet

- A dollar today is worth more than a dollar one year from now.
- The relevant discount rate (interest rate) is your marginal cost of capital corresponding to a level of risk equal with the purchase.
- Use the data file AYK6_Data.xlsx as a template.

Data File: AYK6_Data.xlsx

Project 7:
Time Management

You have just been hired as a business analyst by a new start-up company called Multi-Media. Multi-Media is an interactive agency that constructs phased and affordable web-site marketing, providing its clients with real and measurable solutions that are supported by easy-to-use tools. Since the company is very new to the business arena, it needs help in creating a project management plan for developing its own website. The major tasks for the development team have been identified but you need to create the timeline.

Project Focus

1. The task names, durations, and any prerequisites are:
   - Analyze and plan—two weeks. Cannot start anything else until done.
   - Create and organize content—four weeks. Can start to develop "look and feel" before this is done.
   - Develop the "look and feel"—four weeks. Start working on graphics and HTML at the same time.
   - Produce graphics and HTML documents—two weeks. Create working prototype after the first week.
   - Create a working prototype—two weeks. Give to test team when complete.
   - Test, test, test—four weeks.
   - Upload to a Web server and test again—one week.
   - Maintain.
2. Using Microsoft Excel or Microsoft Project, create a Gantt chart using the information provided above.

Project 8:
Maximize Profit

Books, Books, Books is a wholesale distributor of popular books. The business buys overstocked books and sells them for a discount of more than 50 percent to local area bookstores. The owner of the company, BK Kane, would like to determine the best approach to boxing books so he can make the most profit possible. The local bookstores accept all shipments from Books, Books, Books because of BK's incredibly low prices. BK can order as many overstocked books as he requires, and this week's options include:

Title	Weight	Cost	Sale Price
Harry Potter and the Deathly Hallows, J. K. Rowling	5 lb	$9	$17
The Children of Húrin, J. R. R. Tolkien	4 lb	$8	$13
The Time Traveler's Wife, Audrey Niffenegger	3.5 lb	$7	$11
The Dark River, John Twelve Hawks	3 lb	$6	$ 9
The Road, Cormac McCarthy	2.5 lb	$5	$ 7
Slaughterhouse-Five, Kurt Vonnegut	1 lb	$4	$ 5

Project Focus

When packing a single box, BK must adhere to the following:

- 20 books or less.
- Books by three different authors.
- Between four and eight books from each author.
- Weight equal to or less than 50 pounds.

BK has come to you to help him determine which books he should order to maximize his profit based on the above information. Using the data file AYK8_Data.xlsx, determine the optimal book order for a single box of books.

Data File: AYK8_Data.xlsx

Project 9: Security Analysis

SecureWorks, Inc., is a small computer security contractor that provides computer security analysis, design, and software implementation for the U.S. government and commercial clients. SecureWorks competes for both private and U.S. government computer security contract work by submitting detailed bids outlining the work the company will perform if awarded the contracts. Because all of the work involves computer security, a highly sensitive area, almost all of SecureWorks tasks require access to classified material or company confidential documents. Consequently, all of the security engineers (simply known as "engineers" within the company) have U.S. government clearances of either Secret or Top Secret. Some have even higher clearances for the 2 percent of SecureWorks work that involves so-called "black box" security work. Most of the employees also hold clearances because they must handle classified documents.

Leslie Mamalis is SecureWorks' human resources (HR) manager. She maintains all employee records and is responsible for semiannual review reports, payroll processing, personnel records, recruiting data, employee training, and pension option information. At the heart of an HR system are personnel records. Personnel record maintenance includes activities such as maintaining employee records, tracking cost center data, recording and maintaining pension information, and absence and sick leave record keeping. While most of this information resides in sophisticated database systems, Leslie maintains a basic employee worksheet for quick calculations and ad hoc report generation. Because SecureWorks is a small company, Leslie can take advantage of Excel's excellent list management capabilities to satisfy many of her personnel information management needs.

Project Focus

Leslie has asked you to assist with a number of functions (she has provided you with a copy of her "trusted" personnel data file, AYK9_Data.xlsx):

1. Copy the worksheet Data to a new worksheet called Sort. Sort the employee list in ascending order by department, then by last name, then by first name.
2. Copy the worksheet Data to a new worksheet called Autofilter. Using the Autofilter feature, create a custom filter that will display employees whose birth date is greater than or equal to 1/1/1965 and less than or equal to 12/31/1975.
3. Copy the worksheet Data to a new worksheet called Subtotal. Using the subtotal feature create a sum of the salary for each department.
4. Copy the worksheet Data to a new worksheet called Formatting. Using the salary column, change the font color to red if the cell value is greater than or equal to 55000. You must use the conditional formatting feature to complete this step.

Data File: AYK9_Data.xlsx

Project 10:

Gathering Data

You have just accepted a new job offer from a firm that has offices in San Diego, Los Angeles, and San Francisco. You need to decide which location to move to. Because you have not visited any of these three cities and want to get in a lot of golf time, you determine that the main factor that will affect your decision is weather.

Go to www.weather.com and locate the box in which you can enter the city or zip code for which you want information. Enter San Diego, CA, and when the data appear, click the Averages and Records tab. Print this page and repeat this for Los Angeles and San Francisco. You will want to focus on the Monthly Average and Records section on the top of the page.

Project Focus

1. Create a spreadsheet to summarize the information you find.
2. Record the temperature and rainfall in columns, and group the cities into four groups of rows labeled Average High, Average Low, Mean, and Average Precipitation.
3. Fill in the appropriate data for each city and month.
4. Because rain is your greatest concern, use conditional formatting to display the months with an average precipitation below 2.5 inches in blue and apply boldface.
5. You also want to be in the warmest weather possible while in California. Use conditional formatting to display the months with average high temperatures above 65 degrees in green and apply an italic font face.
6. Looking at the average high temperatures above 65 degrees and average precipitation below two inches, to which city do you think you should relocate? Explain your answer.

Project 11:

Scanner System

FunTown is a popular amusement park filled with roller coasters, games, and water features. Boasting 24 roller coasters, 10 of which exceed 200 feet and 70 miles per hour, and five water parks, the park's attendance remains steady throughout the season. Due to the park's popularity, it is not uncommon for entrance lines to exceed one hour on busy days. FunTown would like your help to find a solution to decrease park entrance lines.

Project Focus

FunTown would like to implement a handheld scanner system that can allow employees to walk around the front gates and accept credit card purchases and print tickets on the spot. The park anticipates an overall increase in sales of 4 percent per year with online ticketing, with an expense of 6 percent of total sales for the scanning equipment. FunTown has created a data file for you to use, AYK11_Data.xlsx, that compares scanning sales and traditional sales. You will need to create the necessary formulas to calculate all the assumptions including:

- Tickets sold at the booth.
- Tickets sold by the scanner.
- Revenues generated by booth sales.
- Revenues generated by scanner sales.
- Scanner ticket expense.
- Revenue with and without scanner sales.
- Three year row totals.

Data File: AYK11_Data.xlsx

Project 12:

Competitive Pricing

Bill Schultz is thinking of starting a store that specializes in handmade cowboy boots. Bill is a longtime rancher in the town of Taos, New Mexico. Bill's reputation for honesty and integrity is well-known around town, and he is positive that his new store will be highly successful.

Project Focus

Before opening his store, Bill is curious about how his profit, revenue, and variable costs will change depending on the amount he charges for his boots. Bill would like you to perform the work required for this analysis and has given you the data file AYK12_Data.xlsx. Here are a few things to consider while you perform your analysis:

- Current competitive prices for custom cowboy boots are between $225 and $275 a pair.
- Variable costs will be either $100 or $150 a pair depending on the types of material Bill chooses to use.
- Fixed costs are $10,000 a month.

Data File: AYK12_Data.xlsx

Project 13:

Adequate Acquisitions

XMark.com is a major Internet company specializing in organic food. XMark.com is thinking of purchasing GoodGrow, another organic food Internet company. GoodGrow has current revenues of $100 million, with expenses of $150 million. Current projections indicate that GoodGrow's revenues are increasing at 35 percent per year and its expenses are increasing by 10 percent per year. XMark.com understands that projections can be erroneous, however; the company must determine the number of years before GoodGrow will return a profit.

Project Focus

You need to help XMark.com determine the number of years required to break even, using annual growth rates in revenue between 20 percent and 60 percent and annual expense growth rates between 10 percent and 30 percent. You have been provided with a template, AYK13_Data.xlsx, to assist with your analysis.

Data File: AYK13_Data.xlsx

Project 14:

Customer Relations

Schweizer Distribution specializes in distributing fresh produce to local restaurants in the Chicago area. The company currently sells 12 different products through the efforts of three sales representatives to 10 restaurants. The company, like all small businesses, is always interested in finding ways to increase revenues and decrease expenses.

The company's founder, Bob Schweizer, has recently hired you as a new business analyst. You have just graduated from college with a degree in marketing and a specialization in customer relationship management. Bob is eager to hear your thoughts and ideas on how to improve the business and help the company build strong lasting relationships with its customers.

Project Focus

Bob has provided you with last year's sales information in the data file AYK14_Data.xlsx. Help Bob analyze his distribution company by using a PivotTable to determine the following:

1. Who is Bob's best customer by total sales?
2. Who is Bob's worst customer by total sales?

3. Who is Bob's best customer by total profit?
4. Who is Bob's worst customer by total profit?
5. What is Bob's best-selling product by total sales?
6. What is Bob's worst-selling product by total sales?
7. What is Bob's best-selling product by total profit?
8. What is Bob's worst-selling product by total profit?
9. Who is Bob's best sales representative by total profit?
10. Who is Bob's worst sales representative by total profit?
11. What is the best sales representative's best-selling product (by total profit)?
12. Who is the best sales representative's best customer (by total profit)?
13. What is the best sales representative's worst-selling product (by total profit)?
14. Who is the best sales representative's worst customer (by total profit)?

Data File: AYK14_Data.xlsx

Project 15:

Assessing the Value of Information

Recently Santa Fe, New Mexico, was named one of the safest places to live in the United States. Since then housing development projects have been springing up all around Santa Fe. Six housing development projects are currently dominating the local market—Pinon Pine, Rancho Hondo, Creek Side, Vista Del Monte, Forest View, and Santa Fe South. These six projects each started with 100 homes, have sold all of them, and are currently developing phase two.

As one of the three partners and real estate agents of Affordable Homes Real Estate, it is your responsibility to analyze the information concerning the past 600 home sales and choose which development project to focus on for selling homes in phase two. Because your real estate firm is so small, you and your partners have decided that the firm should focus on selling homes in only one of the development projects.

From the New Mexico Real Estate Association you have obtained a spreadsheet file that contains information concerning each of the sales for the first 600 homes. It contains the following fields:

Column	Name	Description
A	LOT #	The number assigned to a specific home within each project.
B	PROJECT #	A unique number assigned to each of the six housing development projects (see table on the next page).
C	ASK PRICE	The initial posted asking price for the home.
D	SELL PRICE	The actual price for which the home was sold.
E	LIST DATE	The date the home was listed for sale.
F	SALE DATE	The date on which the final contract closed and the home was sold.
G	SQ. FT.	The total square footage for the home.
H	# BATH.	The number of bathrooms in the home.
I	# BDRMS	The numb er of bedrooms in the home.

The following numbers have been assigned to each of the housing development projects:

Project Number	Project Name
23	Pinon Pine
47	Rancho Hondo
61	Creek Side
78	Vista Del Monte
92	Forest View
97	Santa Fe South

It is your responsibility to analyze the sales list and prepare a report that details which housing development project your real estate firm should focus on. Your analysis should be from as many angles as possible.

Project Focus

1. You do not know how many other real estate firms will also be competing for sales in each of the housing development projects.
2. Phase two for each housing development project will develop homes similar in style, price, and square footage to their respective first phases.
3. As you consider the information provided to you, think in terms of what information is important and what information is not important. Be prepared to justify how you went about your analysis.
4. Upon completing your analysis, please provide concise, yet detailed and thorough, documentation (in narrative, numeric, and graphic forms) that justifies your decision.

Data file: AYK15_Data.xlsx

Project 16:
Growth, Trends, and Forecasts

Founded in 2002, Analytics Software provides innovative search software, website accessibility testing software, and usability testing software. All serve as part of its desktop and enterprise content management solutions for government, corporate, educational, and consumer markets. The company's solutions are used by website publishers, digital media publishers, content managers, document managers, business users, consumers, software companies, and consulting services companies. Analytics Software solutions help organizations develop long-term strategies to achieve Web content accessibility, enhance usability, and comply with U.S. and international accessibility and search standards.

You manage the customer service group for the company and have just received an email from CIO Sue Downs that the number of phone calls from customers having problems with one of your newer applications is on the increase. This company has a 10-year history of approximately 1 percent in turnover a year, and its focus had always been on customer service. With the informal motto of "Grow big, but stay small," it takes pride in 100 percent callbacks in customer care, knowing that its personal service was one thing that made it outstanding.

The rapid growth to six times its original customer-base size has forced the company to deal with difficult questions for the first time, such as, "How do we serve this many customers?"

One option might be for the company to outsource its customer service department. Before deciding to do that, Analytics Software needs to create a growth, trend, forecast analysis for future predictions.

Project Focus

1. Create a weekly analysis from the data provided in AYK16_Data.xlsx.
2. The price of the products, the actual product type, and any warrantee information is irrelevant.
3. Develop a growth, trend, and forecast analysis. You should use a three-day moving average; a shorter moving average might not display the trend well, and a much longer moving average would shorten the trend too much.
4. Upon completing your analysis, please provide concise yet detailed and thorough documentation (in narrative, numeric, and graphic forms) that justifies your recommendations.

Data File: AYK16_Data.xlsx

Project 17: Shipping Costs

One of the main products of the Fairway Woods Company is custom-made golf clubs. The clubs are manufactured at three plants (Denver, Colorado; Phoenix, Arizona; and Dallas, Texas) and are then shipped by truck to five distribution warehouses in Sacramento, California; Salt Lake City, Utah; Chicago, Illinois; Albuquerque, New Mexico; and New York City, New York. Since shipping costs are a major expense, management has begun an analysis to determine ways to reduce them. For the upcoming golf season, the output from each manufacturing plant and how much each warehouse will require to satisfy its customers have been estimated.

The CIO from Fairway Woods Company has created a data file for you, AYK17_Data.xlsx, of the shipping costs from each manufacturing plant to each warehouse as a baseline analysis. Some business rules and requirements you should be aware of include:

- The problem presented involves the shipment of goods from three plants to five regional warehouses.
- Goods can be shipped from any plant to any warehouse, but it costs more to ship goods over long distances than over short distances.

Project Focus

1. Your goal is to minimize the costs of shipping goods from production plants to warehouses, thereby meeting the demand from each metropolitan area while not exceeding the supply available from each plant. To complete this project it is recommended that you use the Solver function in Excel to assist with the analysis.
2. Specifically you want to focus on:
   - Minimizing the total shipping costs.
   - Total shipped must be less than or equal to supply at a plant.
   - Total shipped to warehouses must be greater than or equal to the warehouse demand.
   - Number to ship must be greater than or equal to 0.

Data File: AYK17_Data.xlsx

Project 18: Formatting Grades

Professor Streterstein is a bit absentminded. His instructor's grade book is a mess, and he would like your help cleaning it up and making it easier to use. In Professor Streterstein's

course, the maximum possible points a student can earn is 750. The following table displays the grade equivalent to total points for the course.

Total Points	Calculated Grade
675	A
635	A–
600	B
560	B–
535	C
490	C–
450	D
0	F

Project Focus

Help Professor Streterstein rework his grade book. Open the data file AYK18_Data.xlsx and perform the following:

1. Reformat the workbook so it is readable, understandable, and consistent. Replace column labels, format and align the headings, add borders and shading as appropriate.
2. Add a column in the grade book for final grade next to the total points earned column.
3. Use the VLookup Function to automatically assess final grades based on the total points column.
4. Using the If Function, format the workbook so each student's grade shows a pass or fail—P for pass, F for fail—based on the total points.

Data File: AYK18_Data.xlsx

Project 19: Moving Dilemma

Pony Espresso is a small business that sells specialty coffee drinks at office buildings. Each morning and afternoon, trucks arrive at offices' front entrances, and the office employees purchase various beverages such as Java du Jour and Café de Colombia. The business is profitable. Pony Espresso offices, however, are located north of town, where lease rates are less expensive, and the principal sales area is south of town. This means the trucks must drive across town four times each day.

The cost of transportation to and from the sales area plus the power demands of the trucks' coffee brewing equipment are a significant portion of variable costs. Pony Espresso could reduce the amount of driving and, therefore, the variable costs, if it moved the offices closer to the sales area.

Pony Espresso presently has fixed costs of $10,000 per month. The lease of a new office, closer to the sales area, would cost an additional $2,200 per month. This would increase the fixed costs to $12,200 per month.

Although the lease of new offices would increase the fixed costs, a careful estimate of the potential savings in gasoline and vehicle maintenance indicates that Pony Espresso could reduce the variable costs from $0.60 per unit to $0.35 per unit. Total sales are unlikely to increase as a result of the move, but the savings in variable costs should increase the annual profit.

Project Focus

Consider the information provided to you from the owner in the data file AYK19_Data.xlsx. Especially look at the change in the variability of the profit from month to month. From

November through January, when it is much more difficult to lure office workers out into the cold to purchase coffee, Pony Espresso barely breaks even. In fact, in December, the business lost money.

1. Develop the cost analysis on the existing lease information using the monthly sales figures provided to you in the data file.
2. Develop the cost analysis from the new lease information provided above.
3. Calculate the variability that is reflected in the month-to-month standard deviation of earnings for the current cost structure and the projected cost structure.
4. Do not consider any association with downsizing such as overhead—simply focus on the information provided to you.
5. You will need to calculate the EBIT (earnings before interest and taxes).

Data File: AYK19_Data.xlsx

Project 20:
Operational Efficiencies

Hoover Transportation, Inc., is a large distribution company located in Denver, Colorado. The company is currently seeking to gain operational efficiencies in its supply chain by reducing the number of transportation carriers that it is using to outsource. Operational efficiencies for Hoover Transportation, Inc., suggest that reducing the number of carriers from the Denver distribution center to warehouses in the selected states will lead to reduced costs. Brian Hoover, the CEO of Hoover Transportation, requests that the number of carriers transporting products from its Denver distribution center to wholesalers in Arizona, Arkansas, Iowa, Missouri, Montana, Oklahoma, Oregon, and Washington be reduced from the current five carriers to two carriers.

Project Focus

Carrier selection should be based on the assumptions that all environmental factors are equal and historical cost trends will continue. Review the historical data from the past several years to determine your recommendation for the top two carriers that Hoover Transportation should continue to use.

1. Analyze the last 24 months of Hoover's Transportation carrier transactions found in the data file AYK20_Data.xlsx.
2. Create a report detailing your recommendation for the top two carriers with which Hoover Transportation should continue to do business. Be sure to use PivotTables and PivotCharts in your report. A few questions to get you started include:
   - Calculate the average cost per carrier.
   - Calculate the total shipping costs per state.
   - Calculate the total shipping weights per state.
   - Calculate the average shipping costs per pound.
   - Calculate the average cost per carrier.

Data File: AYK20_Data.xlsx

Project 21:
Too Much Information

You have just landed the job of vice president of operations for The Pitt Stop Restaurants, a national chain of full-service, casual-themed restaurants. During your first week on the job, Suzanne Graham, your boss and CEO of the company, has asked you to provide an analysis of how well the company's restaurants are performing. Specifically, she would like to know which units and regions are performing extremely well, which are performing moderately

well, and which are underperforming. Her goal is to identify where to spend time and focus efforts to improve the overall health of the company.

Project Focus

Review the data file AYK21_Data.xlsx and determine how best to analyze and interpret the data. Create a formal presentation of your findings. A few things to consider include:

- Should underperforming restaurants be closed or sold?
- Should high-performing restaurants be expanded to accommodate more seats?
- Should the company spend more or less on advertising?
- In which markets should the advertising budget be adjusted?
- How are The Pitt Stop Restaurants performing compared to the competition?
- How are units of like size performing relative to each other?

Data File: AYK21_Data.xlsx

Project 22:
Turnover Rates

Employee turnover rates are at an all-time high at Gizmo's Manufacturing plants. The company is experiencing severe worker retention issues, which are leading to productivity and quality control problems. The majority of the company's workers perform a variety of tasks and are paid by the hour. The company currently tests potential applicants to ensure they have the skills necessary for the intense mental concentration and dexterity required to fill the positions. Since significant costs are associated with employee turnover, Gizmo Manufacturing wants to find a way to predict which applicants have the characteristics of being a short-term versus a long-term employee.

Project Focus

1. Review the information that Gizmo Manufacturing has collected from two of its different data sources. The first data file, AYK22_Data_A.xlsx, contains information regarding employee wages. The second data file, AYK22_Data_B.xlsx, contains information regarding employee retention.
2. Using Excel analysis functions, determine the employee characteristics that you would recommend Gizmo Manufacturing look for when hiring new personnel. It is highly recommended that you use PivotTables as part of your analysis.
3. Prepare a report based on your findings (which should include several forms of graphical representation) for your recommendations.

Data Files: AYK22_Data_A.xlsx and AYK22_Data_B.xlsx

Project 23:
Vital Information

Martin Resorts, Inc., owns and operates four Spa and Golf resorts in Colorado. The company has five traditional lines of business: (1) golf sales; (2) golf lessons; (3) restaurants; (4) retail and rentals; and (5) hotels. David Logan, director of marketing technology at Martin Resorts, Inc., and Donald Mayer, the lead strategic analyst for Martin Resorts, are soliciting your input for their CRM strategic initiative.

Martin Resorts' IT infrastructure is pieced together with various systems and applications. Currently, the company has a difficult time with CRM because its systems are not integrated. The company cannot determine vital information such as which customers are golfing and staying at the hotel or which customers are staying at the hotel and not golfing.

For example, the three details that the customer Diego Titus (1) stayed four nights at a Martin Resorts' managed hotel, (2) golfed three days, and (3) took an all-day spa treatment

the first day are discrete facts housed in separate systems. Martin Resorts hopes that by using data warehousing technology to integrate its data, the next time Diego reserves lodging for another trip, sales associates may ask him if he would like to book a spa treatment as well, and even if he would like the same masseuse that he had on his prior trip.

Martin Resorts is excited about the possibility of taking advantage of customer segmentation and CRM strategies to help increase its business.

Project Focus

The company wants to use CRM and data warehouse technologies to improve service and personalization at each customer touch point. Using a data warehousing tool, important customer information can be accessed from all of its systems either daily, weekly, monthly, or once or twice per year. Analyze the sample data in AYK23_Data.xlsx for the following:

1. Currently, the quality of the data within the above disparate systems is low. Develop a report for David and Donald discussing the importance of high-quality information and how low-quality information can affect Martin Resorts' business.
2. Review the data that David and Donald are working with from the data warehouse in the data file AYK23_Data.xlsx.
   a. Give examples from the data showing the kind of information Martin Resorts might be able to use to gain a better understanding of its customers. Include the types of data quality issues the company can anticipate and the strategies it can use to help avoid such issues.
   b. Determine who are Martin Resorts' best customers, and provide examples of the types of marketing campaigns the company should offer these valuable customers.
   c. Prepare a report that summarizes the benefits Martin Resorts can receive from using business intelligence to mine the data warehouse. Include a financial analysis of the costs and benefits.

Data File: AYK23_Data.xlsx

Project 24:
Breaking Even

Mountain Cycle specializes in making custom mountain bikes. The company founder, PJ Steffan, is having a hard time making the business profitable. Knowing that you have great business knowledge and solid financial sense, PJ has come to you for advice.

Project Focus

PJ would like you to determine how many bikes Mountain Cycle needs to sell per year to break even. Using Goal Seek in Excel solve using the following:

- Fixed cost equals $65,000
- Variable cost equals $1,575
- Bike price equals $2,500

Project 25:
Profit Scenario

Murry Lutz owns a small shop, Lutz Motors, that sells and services vintage motorcycles. Murry is curious how his profit will be affected by his sales over the next year.

Project Focus

Murry would like your help creating best, worst, and most-likely scenarios for his motorcycle sales over the next year. Using Scenario Manager, help Murry analyze the information in the data file AYK25_Data.xlsx.

Data File: AYK25_Data.xlsx

Project 26:
Electronic Résumés

Résumés are the currency of the recruitment industry. They are the cornerstone of communication between candidates, recruiters, and employers. Technology is automating elements of the recruitment process, but a complete solution requires proper handling of the actual development of all the pieces and parts that comprise not just a résumé, but also an erésumé. Electronic résumés, or erésumés, have moved into the mainstream of today's job market at lightning speed. Erésumés have stepped up the efficiency of job placement to such a point that you could get a call from a recruiter just hours after submitting your erésumé. With this kind of opportunity, you cannot afford to be left in the dark ages of using only a paper résumé.

Project Focus

In the text or HTML editor of your choice, write your erésumé as though you were really putting it online and inviting prospective employers to see it. We recommend typing in all the text and then later adding the HTML tags (rather than trying to type in the tags as you go).

Use the following checklist to make sure you're covering the basics. You do not need to match it exactly; it just shows what can be done.

- Add structural tags.
- Add paragraphs and headings.
- Find an opportunity to include a list.
- Add inline styles.
- Play with the alignment of elements.
- Add appropriate font selection, font size, and color.

Project 27:
Gathering Feedback

Gathering feedback from website's visitors can be a valuable way of assessing a site's success, and it can help build a customer or subscriber database. For example, a business could collect the addresses of people who are interested in receiving product samples, email newsletters, or notifications of special offers.

Project Focus

Adding form elements to a Web page is simple: They are created using a set of HTML form tags that define menus, text fields, buttons, and so on. Form elements are generally used to collect information from a Web page.

In the text or HTML editor of your choice, create a Web page form that would collect information for a customer ordering a customized bicycle. Use proper Web page design and HTML tools to understand the process and function of form elements. Be sure to pay attention to:

- Form layout and design.
- Visual elements, including labels, alignment, font selection, font size, color.
- Required versus nonrequired fields.
- Drop-down boxes, text fields, and radio buttons.

Project 28:
Daily Invoice

Foothills Animal Hospital is a full-service small animal veterinary hospital located in Morrison, Colorado, specializing in routine medical care, vaccinations, laboratory testing, and surgery. The hospital has experienced tremendous growth over the past six months due to customer referrals. While Foothills Animal Hospital has typically kept its daily service records in a workbook format, it feels the need to expand its reporting capabilities to develop a relational database as a more functional structure.

Foothills Animal Hospital needs help developing a database, specifically:

- Create a customer table—name, address, phone, and date of entrance.
- Create a pet table—pet name, type of animal, breed, gender, color, neutered/spayed, weight, and comments.
- Create a medications table—medication code, name of medication, and cost of medication.
- Create a visit table—details of treatments performed, medications dispensed, and date of the visit.
- Produce a daily invoice report.

Figure AYK.2 displays a sample daily invoice report that the Foothills Animal Hospital accountants have requested. Foothills Animal Hospital organizes its treatments using the codes displayed in Figure AYK.3. The entities and primary keys for the database have been identified in Figure AYK.4.

The following business rules have been identified:

1. A customer can have many pets but must have at least one.
2. A pet must be assigned to one and only one customer.
3. A pet can have one or more treatments per visit but must have at least one.
4. A pet can have one or more medications but need not have any.

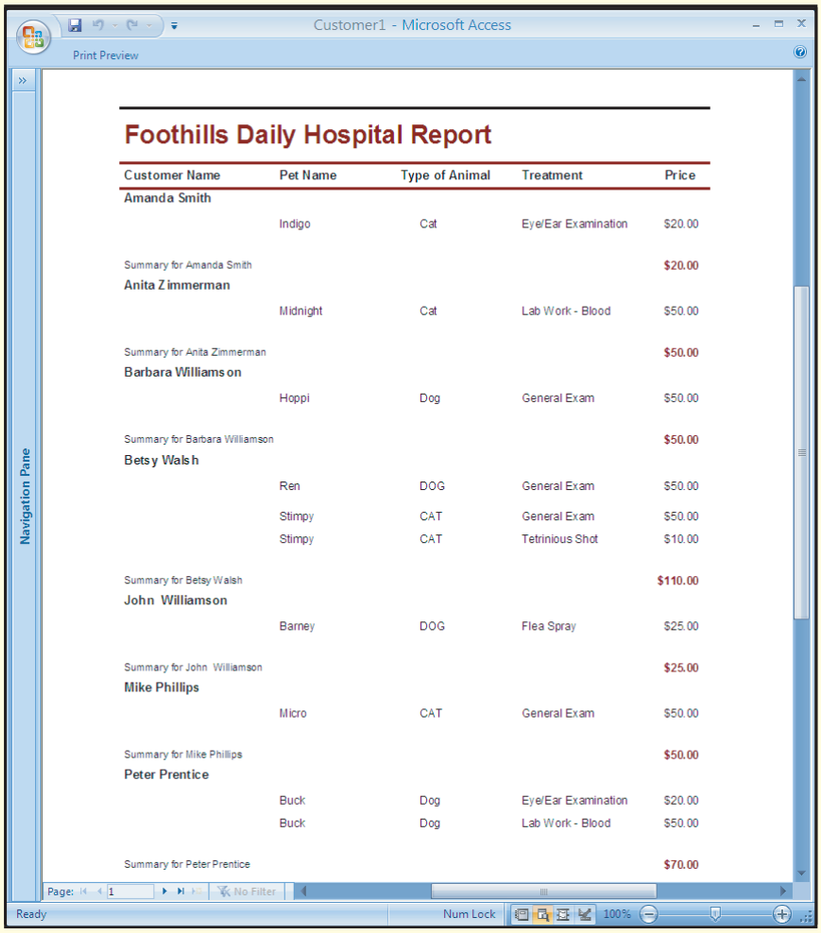
Project Focus

Your job is to complete the following tasks:

1. Develop and describe the entity-relationship diagram.
2. Use normalization to assure the correctness of the tables (relations).

FIGURE AYK.2

Foothills Animal Hospital Daily Invoice Report



Customer Name	Pet Name	Type of Animal	Treatment	Price
Amanda Smith				
	Indigo	Cat	Eye/Ear Examination	$20.00
Summary for Amanda Smith				$20.00
Anita Zimmerman				
	Midnight	Cat	Lab Work - Blood	$50.00
Summary for Anita Zimmerman				$50.00
Barbara Williamson				
	Hoppi	Dog	General Exam	$50.00
Summary for Barbara Williamson				$50.00
Betsy Walsh				
	Ren	DOG	General Exam	$50.00
	Stimpy	CAT	General Exam	$50.00
	Stimpy	CAT	Tetrinious Shot	$10.00
Summary for Betsy Walsh				$110.00
John Williamson				
	Barney	DOG	Flea Spray	$25.00
Summary for John Williamson				$25.00
Mike Phillips				
	Micro	CAT	General Exam	$50.00
Summary for Mike Phillips				$50.00
Peter Prentice				
	Buck	Dog	Eye/Ear Examination	$20.00
	Buck	Dog	Lab Work - Blood	$50.00
Summary for Peter Prentice				$70.00

Treatment Code	Treatment	Price
0100	Tetrinious Shot	$10.00
0201	Rabonius Shot	$20.00
0300	General Exam	$50.00
0303	Eye/Ear Examination	$20.00
0400	Spay/Neuter	$225.00
0405	Reset Dislocation	$165.00
0406	Amputation of Limb	$450.00
0407	Wrap Affected Area	$15.00
0408	Cast Affected Area	$120.00
1000	Lab Work—Blood	$50.00
1003	Lab Work—Misc	$35.00
2003	Flea Spray	$25.00
9999	Other Not Listed	$10.00

FIGURE AYK.3

Treatment Codes, Treatments, and Price Descriptions

FIGURE AYK.4

Entity Names and Primary Keys Foothills Animal Hospital

Entity	Primary Key
CUSTOMER	Customer Number
PET	Pet Number
VISIT	Visit Number
VISIT DETAIL	Visit Number and Line Number (a composite key)
TREATMENT	Treatment Code
MEDICATION	Medication Code

3. Create the database using a personal DBMS package (preferably Microsoft Access).
4. Use the data in Figure AYK.3 to populate your tables. Feel free to enter your own personal information.
5. Use the DBMS package to create the basic report in Figure AYK.2.

Project 29:
Billing Data

On-The-Level Construction Company is a Denver-based construction company that specializes in subcontracting the development of single-family homes. In business since 1998, On-The-Level Construction has maintained a talented pool of certified staff and independent consultants providing the flexibility and combined experience required to meet the needs of its nearly 300 completed projects in the Denver metropolitan area. The field of operation methods that On-The-Level Construction is responsible for includes structural development, heating and cooling, plumbing, and electricity.

The company charges its clients by billing the hours spent on each contract. The hourly billing rate is dependent on the employee's position according to the field of operations (as noted above). Figure AYK.5 shows a basic report that On-The-Level Construction foremen would like to see every week concerning what projects are being assigned, the overall assignment hours, and the charges for the assignment. On-The-Level Construction organizes its internal structure in four different operations—Structure (500), Plumbing (501), Electrical (502), and Heating and Ventilation (503). Each of these operational departments can and should have many subcontractors who specialize in that area. On-The-Level Construction has decided to implement a relational database model to track project details according to project name, hours assigned, and charges per hour for each job description. Originally, On-The-Level Construction decided to let one of its employees handle the construction of the database. However, that employee has not had the time to completely implement the project. On-The-Level Construction has asked you to take over and complete the development of the database.

The entities and primary keys for the database have been identified in Figure AYK.6.

The following business rules have been identified:

1. A job can have many employees assigned but must have at least one.
2. An employee must be assigned to one and only one job number.

FIGURE AYK.5

On-The-Level-Construction Detail Report

ON-THE-LEVEL CONSTRUCTION PROJECT DETAIL

PROJECT NAME	ASSIGN DATE	EMPLOYEE LAST NAME	EMPLOYEE FIRST NAME	JOB DESCRIPTION	ASSIGN HOUR	CHARGE/HOUR
Chatfield						
	6/10/2011	Olenkoski	Glenn	Structure	2.1	$35.75
	6/10/2011	Sullivan	David	Electrical	1.2	$105.00
	6/10/2011	Ramora	Anne	Plumbing	2.6	$96.75
	6/11/2011	Frommer	Matt	Plumbing	1.4	$96.75
Summary of Assignment Hours and Charges					7.30	$588.08
Evergreen						
	6/10/2011	Sullivan	David	Electrical	1.8	$105.00
	6/10/2011	Jones	Anne	Heating and Ventalation	3.4	$84.50
	6/11/2011	Frommer	Matt	Plumbing	4.1	$96.75
	6/16/2011	Bawangi	Terry	Plumbing	4.1	$96.75
	6/16/2011	Newman	John	Electrical	1.7	$105.00
Summary of Assignment Hours and Charges					15.10	$1,448.15
Roxborough						
	6/10/2011	Washberg	Jeff	Plumbing	3.9	$96.75
	6/10/2011	Ramora	Anne	Plumbing	2.6	$96.75
	6/11/2011	Smithfield	William	Structure	2.4	$35.75
	6/11/2011	Bawangi	Terry	Plumbing	2.7	$96.75
	6/16/2011	Johnson	Peter	Electrical	5.2	$105.00
	6/16/2011	Joen	Denise	Plumbing	2.5	$96.75
Summary of Assignment Hours and Charges					19.30	$1,763.78

FIGURE AYK.6

Entity Classes and Primary Keys for On-The-Level Construction

Entity	Primary Key
PROJECT	Project Number
EMPLOYEE	Employee Number
JOB	Job Number
ASSIGNMENT	Assignment Number

3. An employee can be assigned to work on one or more projects.
4. A project can be assigned to only one employee but need not be assigned to any employee.

Project Focus

Your job is to complete the following tasks:

1. Develop and describe the entity relationship diagram.
2. Use normalization to assure the correctness of the tables (relations).
3. Create the database using a personal DBMS package (preferably Microsoft Access).
4. Use the DBMS package to create the basic report in Figure AYK.5.
5. You may not be able to develop a report that looks exactly like the one in Figure AYK.5. However, your report should include the same information.
6. Complete personnel information is tracked by another database. For this application, include only the minimum: employee number, last name, and first name.
7. Information concerning all projects, employees, and jobs is not readily available. You should create information for several fictitious projects, employees, and jobs to include in your database.

Project 30:

Inventory Data

An independent retailer of mobile entertainment and wireless phones, iToys.com has built its business on offering the widest selection, expert advice, and outstanding customer service. However, iToys.com does not use a formal, consistent inventory tracking system. Periodically, an iToys.com employee visually checks to see what items are in stock. Although iToys.com does try to keep a certain level of each "top seller" in stock, the lack of a formal inventory tracking system has led to the overstocking of some items and understocking of other items. On occasion, a customer will request a hot item, and it is only then that iToys.com realizes that the item is out of stock. If an item is not available, iToys.com risks losing a customer to a competitor.

Lately, iToys.com has become concerned with its inventory management methods. The owner of iToys.com, Dan Connolly, wants to better manage his inventory. The company receives orders by mail, by telephone, or through its website. Regardless of how

the orders are received, Dan needs a database to automate the inventory checking and ordering process.

Project Focus

Dan has provided you with a simplified version of the company's current system (an Excel workbook) for recording inventory and orders in an Excel spreadsheet data file AYK30_Data.xlsx.

1. Develop an ERD diagram before you begin to create the database. You will need to use the information provided here as well as the data given in the Excel workbook.
2. Create the database using a personal DBMS package (preferably Microsoft Access) that will track items (i.e., products), orders, order details, categories, suppliers, and shipping methods.
3. In addition to what is mentioned above, the database needs to track the inventory levels for each product, according to a reorder level and lead time.
4. At this time, Dan does not need information stored about the customer; he simply needs you to focus on the inventory structure.
5. Develop a query that will display the products that need to be ordered from their supplier. To complete this, you will want to compare a reorder level with how many units are in stock.
6. Develop several reports that display:
   a. Each product ordered by its supplier. The report should include the product name, quantity on hand, and reorder level.
   b. Each supplier ordered by shipping method.
   c. Each product that requires more than five days lead time. (Hint: You will want to create a query for this first).
   d. Each product ordered by category.
7. Here are some additional business rules to assist you in completing this task:
   a. An order must have at least one product, but can contain more than one product.
   b. A product can have one or more orders, but need not have any orders.
   c. A product must belong to one and only one category, but a category may contain many different products.
   d. A product can only be stocked by one supplier, but a supplier can provide more than one product.
   e. A supplier will use one type of shipping method, but shipping methods can be used by more than one supplier.

Data File: AYK30_Data.xlsx

Project 31:
Call Center

A manufacturing company, Teleworks, has been a market leader in the wireless telephone business for the past 10 years. Other firms have imitated its product with some degree of success, but Teleworks occupies a dominant position in the marketplace because it has a first-mover advantage with a quality product.

Recently Teleworks began selling a new, enhanced wireless phone. This new phone does not replace its current product, but offers additional features, greater durability, and better performance for a somewhat higher price. Offering this enhanced phone has established a new revenue stream for the company.

Many sales executives at Teleworks seem to subscribe to the-more-you-have, the-more-you-want theory of managing customer data. That is, they believe they can never accumulate too much information about their customers, and that they can do their jobs more effectively by collecting infinite amounts of customer details. Having a firm grasp on a wide range of customer-focused details—specifically reports summarizing call center

information—can be critical in enabling your company to successfully manage a customer relationship management (CRM) solution that creates a positive impact.

To continue to provide excellent customer support, and in anticipation of increased calls due to the release of its new product, Teleworks needs a database that it can use to record, track, and query call center information. Teleworks CIO KED Davisson has hired you to develop this database.

Project Focus

1. Teleworks has provided you with a data file AYK31_Data.xlsx; its current approach for recording cell center information is a spreadsheet file.
2. Develop an ERD diagram before you begin to create the database.
3. Create the database using a personal DBMS package (preferably Microsoft Access) that will allow data analysts to enter call center data according to the type of issue and the customer, assign each call to a consultant, and prioritize the call.
4. Develop a query that will display all issues that are "open."
5. Develop a screen form to browse all issues.
6. Develop several reports that display:
   a. All closed issues.
   b. Each issue in detail ordered by issue ID.
   c. Each issue in detail ordered by consultant.
   d. Each issue in detail ordered by category.
   e. Each issue in detail ordered by status.
7. Here are some additional business rules to assist you in completing this task:
   a. An issue must have at least one customer.
   b. A customer can have more than one issue.
   c. Each issue must be assigned to one consultant.
   d. Each consultant can be assigned to more than one issue.
   e. An issue can only belong to one category.
   f. An issue must be assigned only one status code.
   g. An issue must be assigned a priority code.
8. Priorities are assigned accordingly:

Priority Level
Critical
High
Moderate
Standard
Low

9. Status is recorded as either open or closed.
10. The categories of each issue need to be recorded as:

Category
Hardware/Phone
Software/Voice mail
Internet/Web

Data File: AYK31_Data.xlsx

Project 32:
Sales Pipeline

Sales drive any organization. This is true for every for-profit business irrespective of size or industry type. If customers are not buying your goods or services, you run the risk of not having a business. This is when tough decisions have to be made like whether to slash budgets, lay off staff, or seek additional financing.

Unfortunately, you do not wield ultimate power over your customers' buying habits. While you can attempt to influence buying behavior through strategic marketing, smart businesses remain one step ahead by collecting and analyzing historical and current customer information from a range of internal and external sources to forecast future sales. In other words, managing the sales pipeline is an essential ingredient to business success.

You have recently been hired by RealTime Solutions, a new company that collects information to understand, manage, and predict specific sales cycle (including the supply chain and lead times) in the automobile business. Having an accurate forecast of future sales will allow the company to increase or decrease the production cycle as required and manage personnel levels, inventory, and cash flow.

Project Focus

Using a personal DBMS package (preferably Microsoft Access) create a sales pipeline database that will:

1. Track opportunities from employees to customers.
   - Opportunities should have a ranking, category, source of opportunity, open date, closed date, description.
2. Create a form for inputting customer, employee, and opportunity data.
3. Create a few reports that display:
   - All open opportunities, including relevant customer and employee information.
   - Closed opportunities, including relevant customer and employee information.
   - All customers.
4. Create your own data to test the integrity of the relationships. Use approximately 10 records per table.

Project 33:
Online Classified Ads

With the emergence of the Internet as a worldwide standard for communicating information, *The Morrison Post,* a medium-size community newspaper in central Colorado, is creating an electronic version of its paper-based classified ads.

Advertisers can place a small ad that lists items that they wish to sell and provide a means (e.g., telephone number and email) by which prospective buyers can contact them.

The nature of a sale via the newspaper's classified system goes as follows:

- During the course of the sale, the information flows in different directions at different stages.
- First, there is a downstream flow of information (from seller to buyer): the listing in print in the newspaper. (Thus, the classified ad listing is just a way of bringing a buyer and seller together.)
- When a potential purchaser's interest has been raised, then that interest must be relayed upstream, usually by telephone or by email.
- Finally, a meeting should result that uses face-to-face negotiation to finalize the sale, if the sale can be agreed.

By placing the entire system on the Internet, the upstream and downstream communications are accomplished using a Web browser. The sale becomes more of an auction,

because many potential buyers, all with equal status, can bid for the same item. So it is fairer for all purchasers and gets a better deal for the seller.

Any user who is trying to buy an item can:

- View items for sale.
- Bid on an item they wish to purchase.

Any user who is trying to sell an item can:

- Place a new item for sale.
- Browse a list of the items that he or she is trying to sell, and examine the bids that have been made on each of those items.
- Accept a bid on an item that he or she is selling.

Your job is to complete the following:

1. Develop and describe the entity-relationship diagram for the database that will support the listed activities.
2. Use normalization to ensure the correctness of the tables.
3. Create the database using a personal DBMS package.
4. Use Figure AYK.7 as a baseline for your database design.

Data File: AYK33_Data.xlsx

FIGURE AYK.7