Math 113 - Computer Price Project

This is a semester long project involving many of the aspects of Statistics. It can also serve as an example for the project that students will have to perform during the second half of the semester.

The class will be divided into groups of 2-3 students each. Each group will be assigned one computer manufacturer / dealer.

Periodically, information will be turned in for a grade. All assignments submitted for a grade should have the brand name of the name of all the students in the group at the top of the document.

All information submitted to the instructor is to be printed or typed.

Parts of the project will be due at different times. Due dates and point values are contained in this document.

Phase 1 - Organization into Groups

This will take place very early in the semester, either the first or second class period.

Exchange names, phone numbers, email addresses, and schedules with the other people in your group.

Phase 2 - Data Collection / Entry (20 points)

Because computer prices and system configurations change over time, we will sample computer prices every month. To insure that the comparisons between brands are relatively fair, we will collect prices between the 25th and end of the month. Since there are four months of data, five (5) points will be given for each month's data collection.

Take the list of minimum specifications for each type of computer and find the most inexpensive computer at each dealer that satisfies those minimum requirements that are listed at the end of this document.

The data is to be entered into SPSS (see notes at end) for later analysis by the class.

Phase 3 - Descriptive Statistics (20 points)

The output from SPSS should be cleaned up and annotated. After the entire group has checked the results, print and submit the report.

August data: (5 points)

Give a complete summary of the features for each computer from your manufacturer for August. Often, you can just take the list of features from the web page and put it into your document.

Describe the mean and standard deviation for the price of each type* of computer. (* split the file and compare groups by type).

September data: (5 points)

Give a complete summary of the features for each computer from your manufacturer for September.

Use the August and September data and describe the mean and standard deviation for the cpu speed, hard drive size, and CD-ROM speed.

October data: (5 points)

Give a complete summary of the features for each computer from your manufacturer for October.

Use the August, September, and October and create a boxplot for the prices of each type of computer.

November data: (5 points)

Give a complete summary of the features for each computer from your manufacturer for November.

Create a plot of the mean price of each type of computer over time.

Describe the mean price of each computer type and brand and rank them in order from cheapest to most expensive by computer type.

Phase 4 - Inferential Statistics (40 points)

The number in parentheses after each question is the section number the material covers.

Q1: Does the mean price for your brand differ significantly from the mean of all the brands? (7.4) (10 points)

Use the data for August and September.

Find the overall mean price of all computer brands. Then select cases so that just your brand is selected and compare the mean of your brand against the test value, which is the grand mean of all brands. (Analyze / Compare Means / One Sample t-test).

Q2: Is the mean price of your brand significantly different from each of the other brands? (8.5) (10 points)

Use the data for August, September, and October.

If there are N brands, then there will be N-1 comparisons here. For example, if you are the Compaq group, then you will compare Compaq to Dell, Compaq to Gateway, Compaq to Hewlett Packard, etc.

Compare the prices of the brands (Analyze / Compare Means / Independent Samples T-Test).

Q3: Is there any correlation between price and other variables? (9.3) (10 points).

Use the August, September, and October data.

Test the CPU speed (cpu), Hard drive size (hd), and type of computer (type) against the price to see if there is any correlation.

Produce a scatter plot of each pair of variables (cpu vs price, hd vs price, and type against price).

Q4: Is there a significant difference in the mean prices of the brands? (11.2) (10 points)

Use the data from all four months.

Split the file according to computer type and the compare the means, grouping by the computer brand.

Compare the computer prices using the ANOVA procedure (Analyze / Compare Means / One Way ANOVA).

If there are significant differences in the mean prices, which brands are different?

Phase 5 - Project Evaluations (20 points)

Project (10 points)

As a group, comment on the entire project. Address questions like

- Was there any data that was collected that wasn't needed?
- Was there data that wasn't collected, but it would have been nice to know?
- What changes would you make the next time this project is done?
- Was the project relevant?
- Are there topics that you would like to see investigated?

Individual (10 points)

As an individual, evaluate each member of your group including yourself. Comment on how much they contributed to the group. Did they show up for all the meetings, did they participate when they showed up, did they pull their weight or did they not do anything.

In addition to a paragraph describing each person, assign them a score between 0 and 10 points for their effort in the group. Remember you are evaluating yourself, also.

* The score that you receive for this part of the project will be the mean scores given to you by each person in your group.

Fall 2000 Deadlines

Date	Description
Tue, Aug 22	Groups assigned
Fri, Sep 1	August data collected and entered into SPSS (5 points)
Fri, Sep 15	August Descriptive Statistics Due (5 points)
Mon, Oct 2	September data collected and entered into SPSS (5 points)
Mon, Oct 16	September Descriptive Statistics Due (5 points)
Fri, Oct 27	Inferential Statistics Question 1 Due (10 points)
Thu, Nov 2	October data collected and entered into SPSS (5 points)
Thu, Nov 9	Inferential Statistics Question 2 Due (10 points)
Thu, Nov 16	October Descriptive Statistics Due (5 points)
Tue, Nov 28	Inferential Statistics Question 3 Due (10 points)
Fri, Dec 1	November data collected and entered into SPSS (5 points)
Tue, Dec 5	Project Evaluations Due (20 points)
Fri, Dec 8	November Descriptive Statistics Due (5 points)
Mon, Dec 11	Inferential Statistics Question 4 Due (10 points)

Computer Manufacturers

These computer manufacturers were chosen because they had the largest ads in the Sept 2000, *Computer Shopper* magazine and offer all four types of computers.

1. Compaq, http://www.compaq.com/
2. Dell, http://www.dell.com/
3. Gateway, http://www.gateway.com/
4. Hewlett Packard, http://www.hp.com/
5. IBM, http://www.ibm.com/
6. Micron, http://www.micronpc.com/
7. Quantex, http://www.quantex.com/

Data Structure

The following variables will be collected for each computer.

BRAND
> The computer manufacturer. Use the code from the table above.

TYPE
> The type of computer. 1 = Business Computer, 2 = Home Computer, 3 = High End Home Computer, 4 = Notebook / Laptop Computer

PRICE
> The price of the computer in dollars.

CPU
> The speed of the CPU in Megahertz (MHz)

SCREEN
> Monitor size or LCD panel size. Use the monitor size, not the viewable screen size

RAM
> Amount of memory in Megabytes (MB)

HD
> Hard disk size in Gigabytes (GB)

CD
> Speed of CDROM or DVD player

OS
> Operating System. 1 = Windows 98, 2 = Windows 2000

MONTH
> Month of data collection. 8=August, 9=September, 10=October, 11= December

WARRANTY
> Warranty on computer in years.

ONSITE
> Onsite / At home warranty on computer in years.

MISC
> Any additional features or software you would like to note above the minimum specifications.

Minimum Specifications

Your goal is to find the cheapest computer that satisfies the following minimum requirements. It is okay to exceed the minimum specifications as it is unlikely that a manufacturer will have exactly this computer.

If you can't find a computer that matches or exceeds the minimum specifications, please let the instructor know as soon as possible so he can revise the specifications.

In each case, you should be looking at new computers only, not used or refurbished computers.

1. Business Computer

- 600 MHz processor
- 15" Monitor
- 64 MB RAM
- 6 GB Hard Drive
- 10/100 Network Card (NIC)
- CDROM, Sound System, Windows 98

2. Home Computer

- 600 MHz processor
- 17" Monitor
- 64 MB RAM
- 10 GB Hard Drive
- 56K Modem
- CDROM, Sound System, Windows 98

3. High End Home Computer

- 700 MHz processor
- 17" Monitor
- 128 MB RAM
- 15 GB Hard Drive
- 56K Modem
- DVD, Sound System, Windows 98

4. Notebook / Laptop Computer

- 400 MHz processor
- 14" Display
- 32 MB RAM
- 4 GB Hard Drive
- Modem
- CDROM, Sound System, Windows 98

SPSS Notes

We will be using SPSS to do the statistical work with this project. SPSS is available in S137 and the outside machines C239. SPSS is commercially licensed software and you are not permitted to take a copy home, so plan on allowing some time at Richland to work on this project. We will, as time permits, take time in class to work on this, but you should plan on some time outside of class as well.

It is highly recommended that you go through the tutorial to become familiar with SPSS software.

You will open and save files from the academic file server. By doing this, the data and output that you create will be available anywhere in the College and not just on the machine where you work. You may wish to have a floppy disk to make a backup copy.

When you turn on machines, it will ask for a password for Microsoft Networking. This is so that you can get access to the file and print servers. The login is "**guest**" and the password is "**richland**".

The path that you will enter when you open or save files will be: **\\acad2\stats\01**

The name of the blank template that you will use to enter your data is "**computer_template.sav**". Be sure to name the files you save as something distinct. Use your name or the name of your brand. For example, call your data file "compaq" if you are the Compaq brand.

I will go through and merge the data files together after the due date for the information. The main file that you should be using for all of your analysis will be "**computer.sav**"

There are two types of files that we will be working with. Data files have a .SAV extension and the output Viewer Documents have a .SPO extension. If you have trouble finding the file you're looking for, make sure the document type is set correctly.

If your print upstairs in C239, make sure you select the "Postcript" printer (the one with PS at the end of the name) or SPSS will crash and you will lose what you have saved.   For this reason, as well as others, it is highly recommended that you save your files before printing.

When the instructions ask you to filter or select cases, go into Data / Select Cases. Choose IF, and then specify a condition like "brand=1". In some cases, you may need to limit your data to certain months if the other months have already been entered. You can do this by specifying a condition of "month=8 or month=9" to specify just August and September data.

To generate output for each type of computer, use the Data / Split File command. Split the file by the "type" variable.