MAS1403

Quantitative Methods for Business Management

Assignment 2

Deadline

4pm (surnames A→M) or **1pm (surnames N→Z)**, **Friday 27th April 2012**. Work not handed in by this deadline **will not be marked**.

Presentation

Your work for questions 1 and 3 can be hand–written, but must be neat and clearly legible. Marks will be awarded for presentation. `Minitab` should be used to answer question 2; your work for this question should be word–processed and must include all relevant `Minitab` output. You can, if you wish, word–process your solutions to *all* questions, although you must clearly show all your working , where appropriate.

Submission procedure

Take your solutions to the Maths & Stats General Office, on the 3rd floor of the Herschel Building. Make sure you attach a cover sheet to your work, and fill out this cover sheet (see course website). Go to the window of the General Office and tell the secretaries that you want to hand in a project for MAS1403. **You will then be asked to sign for your project as proof that you have handed in this work**.

1. In the U.K., legislation dictates that "standard" bottles of wine should contain an average of exactly 750 ml. A sample of a dozen bottles of wine from an Italian wine importer gives the following results:

745 752 754 745 748 753 746 742 745 748 741 746

(a) Construct a 95% confidence interval for the population mean volume of wine for this importer.

(b) Perform a hypothesis test to see if the wine imported by this company meets U.K. legislation.

(c) Does your confidence interval in part (a) support the outcome of your test in part (b)? Explain.

[Please turn over for questions 2 and 3]

2. "Athenia" and "Olympic Villas" are rival hotel companies offering luxury apartments for rental in Cyprus. Both companies claim to offer the cheapest luxury accommodation on the island. To determine whether or not there is any difference in price between the two companies, the Association of British Travel Agents (ABTA) takes a random sample of customers with both Athenia and Olympic and asks them how much they paid for their two–week stay in a one–bedroom luxury apartment in September 2007. ABTA then pass this data on to you for analysis.

The results (to the nearest £) are given in the first two columns of the `Minitab` Worksheet `Cyprus.MTW`; to access this file, go to the course website:

`www.mas.ncl.ac.uk/~nlf8/Teaching/MAS1403/home.html`

Scroll down and click on Cyprus data for question 2; then click on your name (if your name does not appear on this list then you should contact me asap!). The file containing the random sample of rental prices for the two companies should open in `Minitab` automatically. Don't forget, everyone has a unique Worksheet for this question; **you will not get any marks for analysing the wrong dataset! You must use your own personal dataset!**

(a) Produce some summary statistics for both samples by clicking on `Stat–Basic Statistics–Display Descriptive Statistics`. Enter `C1` and `C2` in the `Variables` box and click `OK`. Copy and complete the table below:

	Mean	St. dev.	Median	Min	Max
Athenia					
Olympic					

(b) Use `Minitab` to produce appropriate graphical summaries for the two samples; you should copy–and–paste these into your solutions for this question.

(c) Using your graphical and numerical summaries in parts (a) and (b), compare and contrast the cost of renting a luxury apartment with these two companies. Would you say there was any real difference in price?

(d) You should now compare the costs between the two companies more formally by using `Minitab` to perform an appropriate hypothesis test. Remember to state your null and alternative hypotheses, and include any relevant `Minitab` output in you solutions. Write a few sentences explaining your findings to ABTA.

[Please turn over for question 3]

3. You are a business analyst working at the *Cayo Coco Tropical Resort and Theme Park* in Southern California. You would like to be able to predict daily attendance in order to develop more accurate plans about how much food to order and how many ride operators to hire.

After some consideration, you decide that the best predictor of attendance might be how many people attended on the same day last week. To investigate, for fourteen randomly chosen days in 2011 you obtain the number of visitors (y) from the park's records; for each of these days, you also obtain the number of visitors on the same day in the previous week. These data are shown in the table below.

x	7882	6115	5351	8546	6022	7367	7871	5377	5259	4915	6538	6507	5118	6077
y	8876	7203	4370	7192	6835	5469	8207	7026	7592	3190	7012	5517	3764	7575

(a) Produce a scatterplot of these data, and comment. *[You may use* `Minitab` *for your plot, if you wish]*

(b) Calculate the sample correlation coefficient; does this confirm what you see in your plot in part (a)?

(c) Estimate the simple linear regression equation

$$Y = \alpha + \beta X + \epsilon,$$

where α and β are to be found. Superimpose your regression line on the scatterplot in part (a).

(d) Suppose there are 5520 visitors to the theme park on the day this assignment is due in. Use your estimated regression equation from part (c) to predict the number of visitors to the theme park on May 4th 2012.