This the second part of the project and involves analysis of data, to be attempted individually. Your solutions to this part are to be submitted as a report. A session on report writing will be conducted in the lectures to indicate to you what is required.

Due Date for Project Report: Lecture at 11 am on Thursday 22 October

Marks for the project are as follows.

1. Group presentation — 25%.
2. Summary notes — 25%.
3. Project report — 50%.

The data for the project is available in the Excel Workbook ProjectData from the 3S5 folder in Maths Lab and also from the unit website http://www.maths.uwa.edu.au/ nazim/3S5/Project/ProjectData.xlsx

You may perform the analysis of this data in any package.

1. Write a report on the blood glucose levels in the worksheet Diabetes. Analyse the morning, lunch, dinner and evening readings separately as well as together. The levels are for a diabetic and are taken four times a day, twice a week. Note that some days have fewer than four readings. Diabetes is a disease in which, in the case of this patient, insulin is not being produced in sufficient quantities by the pancreas. The result is that sugar, which is the end product of most food, is not delivered to the cells of the body. As a result, without treatment, the sugar levels in the blood increase but the body does not get any nutrition. The treatment which the diabetic gets is regular injections of insulin. The desired result is that the blood sugar levels should keep below 8, which is the top end of normal. This is very difficult to achieve because insulin in a normal person is produced as required by the body, rather than in discrete doses as for a diabetic. An additional complication is that too low a blood sugar level is very dangerous and lead to unconsciousness and even death. Too low is below 3. Thus the target for a diabetic is to keep the blood sugar level as close to the range 3 to 8, and for fluctuations in the range to be random. This is achieved by a combination of diet, exercise and adjusting the insulin dose.

Analyse the data with these points in mind. Special cause points should be highlighted and trends detected (moving average charts should be examined). Note that the data can either be viewed as samples of size 4 for each day or as 4 separate individual charts. You should produce several charts and perform a complete analysis of the data. Identified any problems with the patient’s sugar level and make recommendations accordingly.

2. A maintenance group attempts to improve the effectiveness of its repair work by monitoring the number of maintenance requests that require a second call to complete. Twenty weeks of data are available in the worksheet Work.

Analyse the data and determine if the process is in control. Produce both p and c charts, and compare any differences in the results.

3. A car manufacturer wants to control the number of non-conformities in a sub-assembly area producing manual transmissions. The inspection unit is defined as four transmissions, and the data from 16 samples (each of size 4) are available in the worksheet Cars.

Analyse the data and report your findings.
Report
Write a separate report for each project. The reports should be as follows.

1. A full report for the diabetes data, not more than 3 pages not including graphs and tables.
2. Mini reports of a page each, not including graphs and tables, for each of the other two data sets.

In the as part of an appendix in each report, give details of how the control lines were calculated in any charts that you have produced. Classify the calculations by explicit reference to the charts (by figure numbers).

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