UNIVERSITY OF STRATHCLYDE
DEPARTMENT OF MATHEMATICS & STATISTICS

MM104: Statistics and Data Presentation Semester 2
MM107: Statistics and Data Presentation

Project 5: Statistical Process Control

Overview

In this project you will

1. Carry out a statistical process control analysis on the data.
2. Produce control charts for the means and standard deviations of the data.
3. Comment on the stability of the means and standard deviations.
4. Interpret your results and formulate your conclusions and conclude on the research question trying to be answered.
5. Use Word and PowerPoint for reports and presentations.
6. Further develop your presentation skills.

The Data Set

Each data-set consists of measurements that have been obtained over a period of time (i.e. the study period) in order to investigate the performance and quality control of the relevant process being examined. At each time point of interest, samples of n measurements were collected and ultimately a research question is being answered.

Data Set	Variables	Description and Research Question
Yum-Yum mix data (Greggs)	**Day:** unit of time for which measurements were taken over the study period of 11 days. **Weights:** The weight measurements (kgs) of yum-yum mix that a new production machine produces for Greggs.	The weights of ten yum-yum mixes, obtained daily over an eleven day study period, are recorded by Greggs. **Question:** It is thought by the managers' of Greggs that the volume required to be produced by the new production machine that will optimise costs/profits is 12kgs. Is the new production machine able to satisfy the managers' needs?
Red Bull sales data	**Day:** unit of time for which measurements were taken over the study period of 14 days. **Energy Drinks:** the weight of caffeine in each Red Bull can	The weight of caffeine in each Red Bull from 30 international factories over a fortnightly study period are recorded. **Question:** Red Bull claim's that each can contains at least 30mg of caffeine are any batches going against this claim?
Mini-Cooper data	**Day:** unit of time for which measurements were taken over the study period of 14 days. **Minis:** The weight in kg of Mini Coopers that 10 production factories produce.	The weight in kg of Mini coopers produced are recorded 10 times a day, over a study period of a fortnight, by Mini at their production factories. **Question:** If any Mini's are less than 1300kg it can lead to failing safety tests, are there any days where the weights of the cars do not meet this threshold?
Glenfiddich Volume data	**Day:** unit of time for which measurements were taken over the study period of 14 days. **Volume:** The volume of Glenfiddich whisky (mls) being produced by a factory's production line machine.	Thirty amounts of a newly developed Glenfiddich whisky are produced by one of their distillery's new production machines, and mls have been obtained daily over a fortnight study period. **Question:** Is the distillery's new production machine able to produce 750ml volumes of whisky to fill Glenfiddich's 750ml bottles for their new brand of whisky?
Levels of Estrogen in Combined Pill	**Day:** unit of time for which measurements were taken over the study period of 14 days. **Estrogren:** Weight of estogren in a combined pill	The weight of estrogren in each combined pill are recorded daily for each of the 35 production lines, over a fortnightly study period. **Question:** The lab technicians require the production lines to be producing pills with an average of 27 mg of estrogen. Are the production lines able to satisfy this requirement?

Each group will work with one of the data sets as shown below:

Group Number	Topics
1	Yum-yum mix (Greggs)
2	Red Bull sales data
3	Mini-Cooper data
4	Glenfiddich volume data
5	Levels of Estrogen in the Combined pill

Tasks

For each pair of variables you are expected to at least:

- Conduct background research on the variables you have been assigned.
- Carry out a statistical process control analysis
- Answer your research question
- Formulate your conclusions

Report and Presentation

Your Word report should be at least 3 to 4 pages, and at least 750 words (excluding title page and references). Your report should have sections which correspond to the sections in your PowerPoint presentation as well as a references section. Your PowerPoint presentation should be 5-6 minutes.

Remember: the first or second page should contain a declaration section. This should list the names of all group members and sentence outlining each person's contribution to the project. Each person should sign this sheet electronically.