MATH36031 Project 3 - deadline 14th December 2023, time 1100hrs.

For this project you will need to download the *fruitandvegprices.csv* file on Blackboard, and it will located in the Projects folder in the Project 3 section. This is a very large datafile with almost 10000 entries, so do not try print the file! The first few lines of the file are as shown in figure 1. The *category* denotes the different categories of products listed. The

	category	item	variety	date	price	unit
1	'fruit'	'apples'	'bramleys_seedling'	2023-10-13	1.1400	'kg'
2	'fruit'	'apples'	'coxs_orange_group'	2023-10-13	1.2100	'kg'
3	'fruit'	'apples'	'egremont_russet'	2023-10-13	1.4400	'kg'
4	'fruit'	'apples'	'gala'	2023-10-13	1.2100	'kg'
5	'fruit'	'apples'	'other_early_season'	2023-10-13	1.0700	'kg'

Figure 1: The first few lines of the *fruitandveg.csv* file.

item header shows the type of product. For instance in figure 1 the item is apples. The *variety* header shows the particular varieties of the *item* product (for example in figure 1 the different varieties of apples are shown). The *date* shows the date, the *price* column shows the cost in pounds sterling for a unit of the product recorded on that date. The *unit* header indicates the precise unit (such as kilograms in the above sample).

You need to process the file using MATLAB to answer the following questions:

1. From the data produce a list of all the distinct entries under the *item* header and the all the distinct varieties for the items *tomatoes*, *beans*, *lettuce* and *carrots*.
2. The price of the products fluctuate a lot during the year. For each variety of the item *tomatoes* find the mean of that variety.
3. Produce a box plot comparing the variation of the prices of the different varieties of *tomatoes* and comment on your results.
4. Taking the time series for the *tomatoes*, *round* variety, analyze the time series and comment on any seasonal trends.
5. Use the corrcoef function to calculate the correlation coefficients between the fluctuation of *carrrot* prices and *tomatoes, round* prices.

Outputs required You are required to submit a report (maximum 8 pages including any appendices) in pdf form via the Turnitin submission box on Blackboard. Additionally you need to submit your m-files used for the MATLAB codes via the Blackboard Submission Box also on Blackboard.

Additional information and guidelines

1. All coding must be done in MATLAB.
2. Keep to the page length not exceeding eight A4 pages, and there is no need for a title page or abstract for a relative short report like this. Font sizes should be no smaller than 11 point, and page margins no smaller than 2cm.
3. List the complete code of the whole function at the end of each question, or in an appendix. Make your source code more readable, by keeping the indentation and stylistic features, and it can be copied from your submitted work. Codes submitted should be the same as those in the report. Your published results should be reproducible from the code attached.
4. Have a look at the generic rubric about how your report will be marked, and also the intended learning outcomes about what you are expected to achieve in the end.
5. Avoid copying (too many) sentences directly from the project description, and try to restate the problem with your own words or examples if possible.
6. You may use your report in the future as evidences of written work, so take it seriously.
7. Your target audience is a fellow student on your course: explain the questions so that the report can be understood without this project description and your approach could be implemented in another computer language like Python. The report should indicate to the reader how well you understand the problem and the approach you took. Your goal will be to communicate your solutions to another person rather than to show you've completed the assignment.
8. Balance the explanation of the approach and the comments in the code. Avoid under-commenting and over-commenting.
9. Aim for precision and clarity of writing.
10. Since there is no final exam, you are advised to spend at least 15 hours on each project, with additional self-study if you are less experience with computer programming. Remember for a 10 credit module like this one, you are expect to spend $100 = 10 \times 10$ hours in total (including lectures, labs, self-study and coursework).
11. Please do not put any personal information on the report, only your student ID number.
12. The submission for each project will be open two weeks before the deadline. Only your last submission will be marked, and anything submitted after the deadline will be treated late and any penalty will be applied by the Teaching and Learning Office in June according to the Undergraduate Student Handbook.

13. Whilst this project can be done without the use of any artificial intelligence (AI) software tools, **if you use any AI tools or software to help you with your project, you must mention this in the report. Please study the guidelines at**

    https://manchester-uk.libanswers.com/teaching-and-learning/faq/264824

    on how to do this correctly.

    The content and accuracy of the report will be your responsibility alone, and any factually incorrect statements or mathematically incorrect content will be penalised.

14. Your attention is also drawn to to the University's Academic Malpractice Policy, see

    https://documents.manchester.ac.uk/display.aspx?DocID=639. See also the guidelines on the use of AI at:

    https://studentnews.manchester.ac.uk/2023/10/30/4-things-you-need-to-know-about-our-universitys-new-ai-guidance/

15. We are obliged to report cases of suspected academic malpractice, and people may be subject to an additional oral assessment on the content of the report and codes submitted.