MXB161 Computational Explorations - Original Creation Live Script description (15%)

The Original Creation Live Script forms part of your portfolio of group work. Your group will create a MATLAB Live Script in a similar spirit to the group worksheets, but on a topic of your own choice. As a group, you must decide on a topic that you will use to demonstrate your group's proficiency in applying computational techniques in MATLAB to solve a **novel (to the unit) and interesting** scientific or engineering problem.

Your group must then write a MATLAB Live Script that presents the problem using text, images, etc., includes the code to solve the problem (which may include other M-files besides the live script which you also created), illustrates the relevant aspects of the solutions and discusses their significance. In short, your Live Script will form a self-contained report on the problem, the solution methods and results. Note that you are not required to make your Live Script a "worksheet" that requires filling-in or completing. In that respect, it is different from your weekly group worksheets: it must be a fully complete Live Script upon submission.

The topic your group chooses must **synthesise** aspects from *two* of the topics studied in this unit ("What size is that?", Image Processing, Sound Processing, Random Walks, Cellular Automata), and the computational solution strategy must **extend** upon at least one of the techniques covered in the unit in some meaningful way.

For example, if your topic was to compute the area of Mt Gravatt cemetery using the same MATLAB techniques learned in What Size Is That?, this would not qualify for any of synthesis (since it uses just techniques from one topic), extension (since it uses the same techniques already learned without any extension) or new application (since it's the same application, just applied to a different area of land).

On the other hand, if your group combined techniques from What Size Is That? and Image Processing to non-interactively measure *perimeters* of land masses from satellite imagery, and applied that to measuring the coastline of Britain, that would qualify on all three counts: synthesis, extension and new application. By the way, that problem turns out to be a very difficult, and in fact doesn't really even have a satisfactory answer (read about the Coastline Paradox if you're interested). So don't choose that as your topic – it's just to give you an idea.

In summary, there are six aspects of your Live Script that will attract marks (see the full CRA sheet for details):

- **Synthesis**: Combining techniques from two different topics.
- **Extension**: Extending at least one technique from a topic.
- **Novel application**: Applying the techniques to a new scientific or engineering application (not necessarily entirely new to the world, but one that wasn't covered in the unit).
- **Clarity of code**: How you partition your code into relevant sections or functions, with clear naming and commenting.
- **Clarity of reporting**: How you describe your application, the methodology and the results.
- **Live Script experience**: The effectiveness of your Live Script at solving the problem in a timely fashion and illustrating the relevant results.

By the end of week 9, your group will be required to submit your topic on Blackboard, including a sentence each on:

- a general description of your project,
- which two topics from the unit you plan to synthesise techniques from,
- how you are going to extend at least one technique beyond what was covered in the unit, and
- a brief overview of how you plan to solve the problem and present the results (audio/visual aspects of solution).

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These four sentences will score your group 1%. The project in total is worth 15%, with the remaining 14 marks to be determined according to the criteria on the next **two** pages. The final weeks of the group practicals will be devoted to work on your Live Script. Of course, you can and should work on it in your own time too. The Live Script is due on **Sunday 28 October, 11:59pm** (end of week 13), as part of your group's Portfolio of worksheets.

Note: Although the main file must be a Live Script, you are encouraged to offload some of the heavier work to functions written in plain M-files (see IW9). This code will also be marked for clarity and correctness according to the same criteria as for the Live Script itself.