Report-IMAT5234\_Mini-Project

# Document to outline the report headings

* Ref: IMAT5234\_CEM coursework markingScheme.pdf
* Ref: L1-Intro\_mini-project.pdf
* Ref: IMAT5234\_CEM coursework brief 2018-19.pdf
* Report: 18-24 pages using the IEEE template
* Report: 2x main sections:  
  1. Individually written parts on individual tasks  
  2. Team written parts: showing team work, professionalism, consideration of ethics and collaboration

(Need a well-structured and flowing document; can re-order topics and update as we go along)

# Introduction:

* The team
* The research tasks
* Problem definition
* Aims
* **Topic**: computing science
* Modelling of an application and implementation of CI algorithms to solve it
* $1 million prize for n-Queen solution – fun fact

# Collaboration Tools

* Collaboration tools:  
  Mendeley, TeamGantt, shared OneDrive Folder, email, Skype, PowerPoint, Word, LaTeX, Python DEAP, Git, GitHub, etc.  
  (Might be worth creating a table for these: software, description, etc.)
* How they were selected: e.g. cloud as we’re distance learners
* This report structure document
* Need to show collaboration and use of tools
* Need to agree on dataset as benchmark for group members

# Gantt Chart

(Need to demonstrate collaboration, organisation and preparation)

* How tasks were planned, defined
* How work was distributed
* How priorities were decided upon
* Description of planned research, methodology and evaluation methods

# Literature Review

(Must be shown to be thorough)

* How documents/books were selected
* Overview to narrowing down on the detail
* A lot documentation on the n-Queens problem  
  Good in that there is plenty of material to read; bad in that most avenues have already been explored  
  Opportunities and Limitations – new ideas
* Supporting material – need to understand
* Coverage – need to show good coverage
* Summary of existing literature

# n-Queens

(Need to show a good understanding of the problem)

* History
* Solutions
* P vs NP
* GA vs GP: advantages, disadvantages, what exists already  
  GAs are limited to single solutions per run; GPs can evolve a polynomial.
* ~~Mathematical Series~~ ***Integer Sequence*** – fundamental and total solutions for n  
  (**Integer Sequences** are a whole topic on their own)  
  (WARNING: NOT ALL INTEGER SEQUENCES ARE COMPUTABLE!)

# Integer Sequences

* History
* n-Queens Integer Sequences  
  fundamental solution and ‘all’ solutions

# Proposed solution(s)

* Proposed solutions
* Methodology
* Experimental design

## Genetic Algorithm Solutions

* Overview of GAs
* Cover significant GA n-Queen solutions  
  pros / cons
* Steps taken to model and implement

## Genetic Programming Solutions

* Overview of GPs
* Cover significant GP n-Queen solutions  
  pros / cons
* Evolve either mathematical equation or a computer program  
  Which and why – new ideas
* Mathematical series equations / theory  
  Can these be used as the basis to narrow down the problem
* Steps taken to model and implement

## ~~ACO Solutions~~

* ~~Overview of ACOs~~
* ~~Cover significant ACO n-Queen solutions  
  pros / cons~~
* ~~Steps taken to model and implement~~

## GA/GP Implementation

* How the solutions were implemented
* Describe process
* Difficulties
* Tuning
* Testing

## ~~ACO Implementation~~

(Have issue with ACO as it is used to calculate a single solution, while the GP can produce polynomials, maybe we can remove and simple just explain this?)

* ~~How the solutions were implemented~~
* ~~Describe process~~
* ~~Difficulties~~
* ~~Tuning~~
* ~~Testing~~

# Testing

* Data collection
* Experimental results
* Test process
* Pass criteria
* Test hardware
* Results table
* Test Coverage

# Conclusion

(Does the conclusion follow logically from the previous sections?)

* Thoughts on results
* Implications of results
* Did we achieve what we set out to do
* Did we use the appropriate tools, platforms, programming language?
* Possible future work
* Critical evaluation
* New ideas
* Need to show:  
  AI techniques applied to practical problems  
  Recognise multi-disciplinary nature of AI and potential application areas  
  Synthesised a solution to the problem

# References

(I’ve been marking up my PDFs with the yellow highlighter, so I can go back and extract the interesting bits)

* Need a well sized reference list
* Lots of citations

# Appendix

* Anything we deem worthy of a place in the appendix