

**Final Report**

**Using Pattern Recogniton to Grade Sudoku Puzzles in Python**

**Robert Harrison Helps**

**Submitted in accordance with the requirements for the degree of  
BSc Computer Science**

**2023/24**

**COMP3931 Individual Project**

The candidate confirms that the following have been submitted*:*

*<As an example>*

|  |  |  |
| --- | --- | --- |
| **Items** | **Format** | **Recipient(s) and Date** |
| *Final Report* | *PDF file* | *Uploaded to Minerva (DD/MM/YY)* |
| *Scanned participant consent forms* | *PDF file / file archive* | *Uploaded to Minerva (DD/MM/YY)* |
| *Link to online code repository* | *URL* | *Sent to supervisor and assessor (DD/MM/YY)* |
| *User manuals* | *PDF* | *Sent to client and supervisor (DD/MM/YY)* |

The candidate confirms that the work submitted is their own and the appropriate credit has been given where reference has been made to the work of others.

I understand that failure to attribute material which is obtained from another source may be considered as plagiarism.

(Signature of student)

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**Summary**

*<Concise statement of the problem you intended to solve and main achievements (no more than one A4 page)>*

**Acknowledgements**

*<This page should contain any acknowledgements to those who have assisted with your work. Where you have worked as part of a team, you should, where appropriate, reference to any contribution made by others to the project.>*

*Note that it is not acceptable to solicit assistance on ‘proof reading’ which is defined as “the systematic checking and identification of errors in spelling, punctuation, grammar and sentence construction, formatting and layout in the text”; see*

https:://www.leeds.ac.uk/secretariat/documents/proof\_reading\_policy.pdf

**Table of Contents (example of how to format)**

**Summary iii**

**Acknowledgements iv**

**Table of Contents v**

**Chapter 1 Level 1 Heading with ‘heading 1’ Style 1**

1.1 Level 2 Heading with ‘heading 2’ Style 1

1.1.1 Level 3 Heading with ‘heading 3’ Style 1

1.1.1.1 Level 4 Heading with ‘heading 4’ Style 1

**Chapter 2 Tables and Figures 2**

2.1 Tables using the ‘table caption’ and ‘table description’ Styles 2

2.2 Figures using the ‘figure caption’ and ‘figure description’ Styles 2

**List of References 3**

**Appendix A Self-appraisal 4**

A.1 Level 2 Heading with ‘heading 2’ Style 4

A.1.1 Level 3 Heading with ‘heading 3’ Style 4

A.1.1.1 Level 4 Heading with ‘heading 4’ Style 4

**Appendix B External materials 4**

B.1 Level 2 Heading with ‘heading 2’ Style 4

**Chapter 1  
Introduction and Background Research**

<Recommend using ‘Heading 1’ for chapter titles, ‘Heading 2’ style for section headings, ‘Heading 3’ for subsection headings, and ‘Heading 4’ for sub-subsection headings, but whatever you choose you must be consistent. Don’t forget that text (other than headings) should be 11 point.>

**1.1 Introduction**

<A brief introduction suitable for a non-specialist, *i.e.* without using technical terms or jargon, as far as possible. This may be similar/the same as that in the 'Outline and Plan' document. The remainder of this chapter will normally cover everything to be assessed under the `Background Research` criterion in the mark scheme.>

**1.2 Literature Review**

<This section heading is purely a suggestion -- you should subdivide this chapter in whatever manner you think makes most sense for your project. It may also make sense to spread the `Background Research' over more than one chapter, in which case they should be named sensibly.>

**Chapter 2  
Methods**

<Everything that comes under the `Methods' criterion in the mark scheme should be described in one, or possibly more than one, chapter(s).>

**2.1 Table example**

|  |  |  |
| --- | --- | --- |
| **Heading One** | **Heading Two** | **Heading Three** |
| 1.1 | 1.2 | 1.3 |
| 1.21 | 1.22 | 12.3 |
| 12.31 | 12.32 | 12.33 |

Text before table. Text before table. Text before table. Text before table. Text before table. Text before table. Text before table. Text before table. Text before table. Text before table.

**Table 2.1** This is the table description in the ‘table description’ style.

**2.2 Figure example**

Figures can be added using the Illustrations section of the Insert tab.



**Figure 2.1** This is the figure description in the ‘figure description’ style.

**Chapter 3  
Results**

<Results, evaluation (including user evaluation) *etc*. should be described in one or more chapters. See the `Results and Discussion' criterion in the mark scheme for the sorts of material that may be included here.>

**Chapter 4  
Discussion**

<Everything that comes under the `Results and Discussion' criterion in the mark scheme that has not been addressed in an earlier chapter should be included in this final chapter. The following section headings are suggestions only.>

**4.1 Conclusions**

<Text in 11-point size and 1.5 line spacing.>

**4.2 Ideas for future work**

<Text in 11-point size and 1.5 line spacing.>

**List of References**

*<It is expected that the list would reflect the breadth and depth of scholarly research undertaken by the student during the course of the project.>*

**Appendix A  
Self-appraisal**

<This appendix must contain everything covered under the ’self-appraisal’ criterion in the mark scheme. Although there is no length limit for this section, 2-4 pages will normally be suﬃcient. The format of this section is not prescribed, but you may like to consider the following sections and subsections.>

**A.1 Critical self-evaluation**

**A.2 Personal reﬂection and lessons learned**

**A.3 Legal, social, ethical and professional issues**

<Refer to each of these issues in turn. If one or more is not relevant to your project, you should still explain *why* you think it was not relevant.>

**A.3.1 Legal issues**

<Discussion of legal issues>

**A.3.2 Social issues**

<Discussion of social issues>

**A.3.3 Ethical issues**

<Discussion of ethical issues>

**A.3.4 Professional issues**

<Discussion of professional Issues>

**Appendix B  
External Materials**

<This appendix should provide a brief record of materials used in the solution that are not the student's own work. Such materials might be pieces of codes made available from a research group/company or from the internet, datasets prepared by external users or any preliminary materials/drafts/notes provided by a supervisor. It should be clear what was used as ready-made components and what was developed as part of the project. This appendix should be included even if no external materials were used, in which case a statement to that effect is all that is required.>