# RESEARCH JOURNAL – ALGORITHMS & OPTIMISATIONS

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*"There are two ways of constructing a software design: One way is to make it so simple that there are obviously no deficiencies and the other way is to make it so complicated that there are no obvious deficiencies."*

*— C.A.R. Hoare*

*"The computing scientist's main challenge is not to get confused by the complexities of [their] own making."*

*— E. W. Dijkstra*

*"Controlling complexity is the essence of computer programming."*

*— Brian Kernighan*

## Introduction

In this assignment, you will produce a journal detailing your research on optimisation and porting techniques. In addition to your individual journal, as a group you will create a community wiki to collect and discuss your findings.

Familiarity with the academic literature is extremely helpful for the computing professional, both to understand the seminal works that lay the foundations of the field, and to keep abreast of recent developments at the cutting edge. Games technology is a fast-moving field, and keeping up is important. However scientific papers are written in a way that is sometimes daunting to newcomers, so it is essential to practice the skill of reading and comprehending such papers. Keeping a research journal is a useful way to record your thoughts (questions, hypotheses, connections, ideas, ...) as you explore the literature.

This assignment is formed of several parts:

(A)  **Write** a draft outline in the wiki, that will:
  (i)   **Identify** the key topics to be covered by the wiki
  (ii)  **Structure** these topics in a sensible way
(B)  **Populate** the wiki with content that will:
  (i)   **Share** your findings on what you have read;
  (ii)  **Debate** your findings with your peers.

## Assignment Setup

This assignment is an **academic writing task** and **wiki task**. Fork the GitHub repository at the following URL:

```
https://github.com/Falmouth-Games-Academy/comp350-research-journal
```

Use the existing directory structure and, as required, extend this structure with sub-directories.

Modify the .gitignore to the defaults for TeX. Please, also ensure that you add editor-specific files and folders to .gitignore.

## Part A

Part A consists of a **single formative submission**. This work is **collaborative**.
To complete Part A, as a class, begin populating the wiki with an outline of the topics to be covered. Discuss and iterate upon this as a class. It is expected that the edit log for the wiki will show that everyone has contributed to this process.

You will receive **immediate informal feedback** in class in week 3.



*ACM SIGGRAPH* is the premier conference on computer graphics, with contributions to it highly respected by the games industry.

## Part B

Part B consists of a **single summative submission**. This work is collaborative.

To complete Part B, populate the wiki with content. Again, this is expected to be an iterative process to which everybody contributes. Please ensure that all changes have been made to the wiki by the deadline.

To submit, clone the wiki to your local machine using Git. Compress the wiki as a .zip file and upload it to the submission area on LearningSpace. Note that although this is a collaborative assignment, **everyone must submit** individually via LearningSpace.

You will receive **formal feedback** three weeks after the deadline.

## Additional Guidance

To make the most efficient use of your time, focus your reading on papers that are relevant to the techniques you have chosen to implement in your portfolio task for this module. That said, it is also beneficial to read more widely around the subject area to better understand the context within which works are situated. As much as possible you should focus your reading on peer-reviewed scholarly sources reporting primary research: articles in scientific workshops, conferences, journals, and some books or book chapters. Other sources tend to be less rigorous, and should be used only for background information or in cases where their use can be convincingly justified.

A common pitfall is to focus too much on summarising the content of the papers you have read. For higher marks you need to demonstrate insight into what you have read: forming inferences and analyses beyond what is written in the paper. Some questions you might ask yourself are: Why is the paper significant and/or influential? Why did the researchers choose the approach that they did? Is there anything counterintuitive or surprising in the paper? Do you disagree with any of the assumptions or claims it makes? Does the paper suggest any further research questions?

A related pitfall is to structure the journal as a sequence of disconnected entries. Instead aim to synthesise multiple papers into a cohesive whole, drawing connections between works by different authors. Forming a holistic picture of a field is much more valuable than simply understanding individual works.

The wiki is primarily intended to become a useful shared resource for the cohort. As such, students are expected to direct themselves and their peers in populating, structuring and editing the wiki. If appropriate, you may copy and paste material from your individual journal into the wiki. However note that a wiki is not a piece of academic writing and thus will tend to have a less formal tone than you should be aiming for in your journal. Edits may be required to ensure a consistent tone for the wiki.

You can, and indeed should, take inspiration from others' wiki contributions when working on your own journal. However you must not copy verbatim material written by others; doing so will be considered academic misconduct.

Most researchers write scientific papers for the intended audience of their fellow researchers. Thus some papers can seem impenetrable to the novice reader. Don't lose heart! Discuss the paper with your peers. Follow up the papers it cites to find alternative explanations. If all else fails, continue reading

the paper — often a difficult paragraph is clarified by something which appears later.

## FAQ

- **What is the deadline for this assignment?**
  Falmouth University policy states that deadlines must only be specified on the MyFalmouthsystem.

- **WhatshouldIdotoseekhelp?**
  You can email your tutor for informal clarifications. For informal feedback, make a pull request on GitHub.

- **Is this a mistake?**
  If you have discovered an issue with the brief itself, the source files are available at:

  https://github.com/Falmouth-Games-Academy/bsc-assignment-briefs.

  Please raise an issue and comment accordingly.

# Marking Rubric

Criteria marked with a ‡ are shared by the group. All other criteria are individual.

| Criterion | Weight | Refer for Resubmission | Novice Competency | Novice Proficiency | Professional Competency | Professional Proficiency | Expert Competency |
|---|---|---|---|---|---|---|---|
| Basic Competency Threshold | 40% | At least one part is missing or is unsatisfactory. | Submission of all parts is timely. The student participated in the viva, with enough work available to hold a meaningful discussion. Sources have been cited in an appropriate manner, without any obvious errors. There are no breaches of academic integrity. | | | | |
| Wiki quality | 10% ‡ | There is no structure to the wiki. Substantial spelling and/or grammatical errors. Style and tone are not appropriate. | There is little structure to the wiki. Many spelling and/or grammatical errors. Style and tone are adequate. | There is some structure to the wiki. Some spelling and/or grammatical errors. Style and tone are somewhat appropriate. | The wiki is structured somewhat sensibly. Few spelling and/or grammatical errors. Style and tone are mostly appropriate. | The wiki is structured somewhat effectively. Almost no spelling and/or grammatical errors. Style and tone are appropriate. | The wiki is structured effectively. No spelling or grammatical errors. Style and tone are highly appropriate. |
| Coverage | 10% ‡ | The wiki gives almost no coverage of the topic. There is a majority of superfluous material. | The wiki gives a superficial coverage of the topic. There is much superfluous material. | The wiki gives an incomplete coverage of the topic. There is some superfluous material. | The wiki gives an adequate coverage of the topic. There is some superfluous material. | The wiki gives a somewhat comprehensive coverage of the topic. There is little superfluous material. | The wiki gives a comprehensive coverage of the topic. There is very little superfluous material. |
| Synthesis | 10% ‡ | No connections are made between different sources. | Basic connections are made between different sources. | Reasonable connections are made between different sources. Connections go beyond mere description. | Strong connections are made between different sources. Connections are analytical in nature. | Sources are synthesised into a coherent narrative. Connections are analytical and evaluative in nature. | Sources are synthesised into a highly coherent narrative. Connections are analytical and evaluative in nature. |
| Specificity, verifiability & accuracy of claims | 10% | No citations to evidence to claims. Substantial errors and/or misinterpretations. | Few claims have a clear source of evidence. Significant errors and/or misinterpretations. | Some claims have a clear source of evidence. Many errors and/or misinterpretations. | Many claims have a clear source of evidence. Some errors and/or misinterpretations. | Most claims have a clear source of evidence. Few errors and/or misinterpretations. | All claims have a clear source of evidence. Almost no errors and/or misinterpretations. |
| Depth of insight | 10% | No insight is demonstrated. A poor attempt at summary in the student's own words. | Little insight is demonstrated. Material is summarised in the student's own words. | Some insight is demonstrated. Attempts are made at discussion beyond summary. | Much insight is demonstrated. Discussion is inferential in nature. | Considerable insight is demonstrated. Discussion is analytical in nature. | Significant insight is demonstrated. Discussion is analytical and evaluative in nature. |
| Value of individual contribution | 10% | No contribution has been made to the wiki. | A few contributions have been made to the wiki. | Some contributions have been made to the wiki. The student's contributions are somewhat integrated with the contributions of others. | Many contributions have been made to the wiki. The student's contributions are reasonably integrated with the contributions of others. | A significant number of contributions have been made to the wiki. The student's contributions are well integrated with the contributions of others. | An extensive number of contributions have been made to the wiki. The student's contributions are tightly integrated with the contributions of others. |