

# Algorithms Assignment Report

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# Declaration

I hereby certify that all material submitted in this assignment for *Algorithm Design & Problem Solving* in the *School of Computer Science*, Technological University of Dublin is entirely my own work and has not been submitted for any academic assessment other than this submission.

**Signed:** Ruán Murgatroyd

# Introduction

As part of my CMPU1001 Assignment, I was required to create and deliver a series of tasks directly related to the Module Syllabus.

This report documents my assignment, from identification of the requirements to each element of the deliverables. Justifications and further explanations will be provided where necessary.

This report will be laid out in the following manner:

1. Identification of the Project Requirements
   1. Requirements identification
   2. Deliverables
   3. Assignment Creation Process
2. Suitable Data Types
   1. Suitability
   2. Changeability
3. List Combination
   1. Sorting Algorithm
   2. Big O
4. Full-Time Student Search
   1. Algorithm
   2. Big O
5. Searching by Surname
   1. Method
   2. Big O
6. C Implementation
   1. Differences from Designed Elements
   2. Justification
   3. Creation Process
7. Identified Problems
8. Conclusion

# Identification of Project Requirements

The assignment outlined a specific project which needed to be delivered. It was separated into a requirements specification which must be achieved in five sections.

## Requirements Identification

The assignment introduced four new courses in a university, DT265A, DT265B, DT265C, and DT8900. These courses were either Full-Time or Part-Time, and were Higher Diplomas or Master’s Qualifiers, including one International Master’s Qualifier. The requirement also listed a certain number of students, which I set as the maximum course occupancy of each course.

The brief stated that each course requires its own list of student information.

## Deliverables

Five deliverables were required in the assignment:

1. A suitable datatype for student information,
2. A flow-chart algorithm for combining the four lists into a single list,
3. A pseudo-code algorithm to search the single list for Full-Time students,
4. A pseudo-code algorithm to search the single list by surname,
5. A working implementation of Parts One – Four in the C Programming Language.

Each of these deliverables will be discussed in-depth in their relevant sections. Each deliverable was also given specific requirements and discussion points which will be discussed in their section.

## Assignment Creation Process

The assignment was created using Visual Studio Code, [yEd Live](https://www.yworks.com/yed-live/). The assignment was stored both on OneDrive and on my personal GitHub account in a [private repository](https://github.com/RJMurg/Algorithms-Assignment) (Which will be made public after my demo in the lab). The use of GitHub allowed me to version-control my assignment and have a solid and effective structure