**Part 1: Sorting and Searching: Algorithm Analysis (70 marks)**

1. Write a Bubble Sort algorithm that sorts the data using a column based on your student number. If two items have the same value sort based on column 1.

You will receive higher marks for optimal (low run-time) solutions. **Highlight in the submission the reason why you chose your sorting algorithm with reference to the run-time complexity.** The sorting algorithm must be your own implementation. You will receive 0 marks for using an imported library to complete this task.

1. Experimentally analyse the time complexity of your sorting algorithm that you wrote for question 1 above. **Show your results by taking the average elapsed time for 10, 100, 1000, 5000 and 10000 records.**
2. Write a Quick Sort algorithm that sorts the data using a column based on your student number. If two items have the same value sort based on column 1.

You will receive higher marks for optimal (low run-time) solutions. **Highlight in the submission the reason why you chose your sorting algorithm with reference to the run-time complexity.** The sorting algorithm must be your own implementation. You will receive 0 marks for using an imported library to complete this task.