Assignment

A pharmaceutical company manufactures 3 lines of products from its factory in Dublin. The production line is sophisticated and audited to the highest quality standards. Each production line is staffed by a production team each consisting of a number of employees. Each employee is certified to work on 1 or more lines and there are 4 production teams in total.

Working in the company's IT department, you have been given access to 4 separate lists detailing team membership and a separate list of certifications earned by each employee.
You have been asked to provide the following information :-

a) combine the team lists to produce a report of all employees in surname order
b) a list of the employees certified to work on all 3 lines
c) a routine to search for a specific worker by surname.

Your IT Department is determined to be as efficient as possible and has decided on the following standards for the project:-

1. You should use the merge sort for sorting
2. Improve the efficiency of the merge sort by using another elementary sort to decrease the number of leaves in its execution tree.
3. Explore any method to improve the execution of the elementary sort by using a searching algorithm you're familiar with.
4. You should report on the time complexity of each algorithm you use in meeting requirements (a)-(c).

Deliverables

Design a data structure for the project, creating test data for each team. e.g. >5 members per team. The team data structure will need at least the following items of data - first name, surname, line. The certification data structure will have employee id and earned certification line id.

1. A flow chart for the combine and sort process of (a)
2. pseudo-code for employees certified to work on all lines (b)
3. pseudo-code for the surname search in (c)
4. C code for (a)-(c). You will demo the project in the lab. Make sure your 4 lists are displayed separately before and combined after the sort.

Marks

Section	Mark
Part 1	40%
Part 2	15%
Part 3	15%
Part 4	20%
Demo	10%

Instructions

1. Write a project report in PDF or MS Word. The project report should contain the deliverable items, explaining your work and how you met "department standards" e.g. time complexity analysis of your algorithms.
2. Submit your report in Brightspace by Friday 22nd April
3. Your report will **only be marked** if it is a **PDF** or an **MS-Word** document
4. Submit your C code as part of your project report. ie. copy and paste it from your c source file to the word document.