1. Basic Requirements

(a) Only upload source codes in .cpp/.c/.h/.hpp with comments that can be successfully compiled, the file name should be "DS2ex3_*team-id_student-id1_student-id2*". Deduct 5 points immediately for any violation!

(b) Upload only one copy for each team and there must be the name and student id of each member at the first few lines in your codes. Deduct 5 points for duplicate or any missing information!

(c) Codes that are non-C/C++ or unable to be successfully executed will be treated as "Unfinished" and get no point.

2. Goal

Accomplish two missions and integrate them into one. Deduct 5 points for unfriendly interface!

(Preprocessing) Read the data file with 5 fields

Input: Read a data file with five fields, i.e., "college name", "department name", "day or night", type of degree", and "number of graduates".

Result: The data are attached serial numbers called "record ID", starting at 1, and displayed one by one on screen. Each of them has six fields.

(Mission One) Build a 2-3 tree

Input: the results received from preprocessing in ascending order.

Steps: Use "college name" to build a 2-3 tree, where each node keeps "record ID" and "college name" of the records. Always put the records with the same "college name" into the same entry on a node; namely, every "college name" occurs exactly once on 2-3 tree.

Output: Display in ascending order of "record ID" on screen one by one the records stored in the root of 2-3 tree. Each of them has six fields.

(Mission Two) …

3. Example as a reference

```
**************************
 On-machine Exercise      *
 Mission 1: Build a 2-3 tree  *
 Mission 2: …             *
**************************
```

(Preprocessing) Read the data file with 5 fields

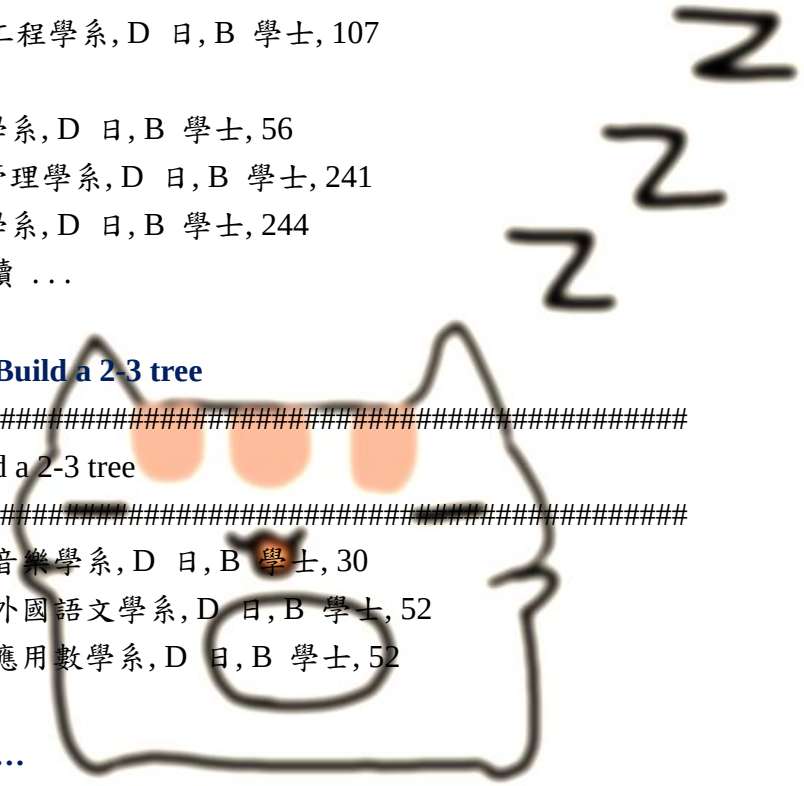
Input the file name (e.g., 301, 302): [0]Quit

301

[1] AA, 數學系, D 日, B 學士, 53

[2] AB, 資訊工程學系, D 日, B 學士, 117

[3] AC, 化學工程學系, D 日, B 學士, 57
...
[18] DA, 應用數學系, D 日, B 學士, 52
[19] XX, 資訊工程學系, D 日, B 學士, 106
[20] XY, 輪機工程學系, D 日, B 學士, 107
...
[38] SS, 音樂學系, D 日, B 學士, 56
[39] SS, 企業管理學系, D 日, B 學士, 241
[40] SS, 法律學系, D 日, B 學士, 244
請按任意鍵繼續 . . .



(Mission One) Build a 2-3 tree

##
Mission 1: Build a 2-3 tree
##
1: [16] DA, 音樂學系, D 日, B 學士, 30
2: [17] DA, 外國語文學系, D 日, B 學士, 52
3: [18] DA, 應用數學系, D 日, B 學士, 52

(Mission Two) …

[0]Quit or [Any other key]continue?

4. Procedure to hand in the result

step 1. Complete two flowcharts before the end of each on-machine exercise. Only one team member needs to post it on the designated board.

step 2. Upload the source codes before the submission deadline. Only one team member needs to upload it and to confirm its successfulness.

step 3. Add a report about your codes into your post of flowcharts before the deadline and then pay attention to the time period for DEMO announced by TA.

step 4. Arrive at the computer room on time as announced by TA. Each team member must be responsible for the DEMO of one mission.

step 5. After the DEMO, TA starts the procedure of copy detection and cancel the score if it or only a part of your codes are considered suspected plagiarism.

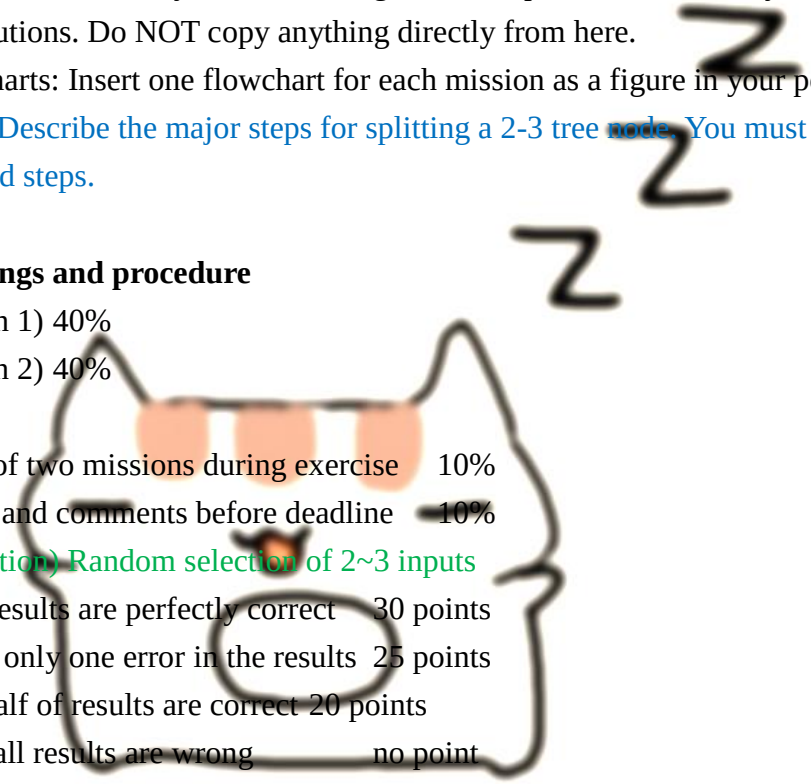
5. Flowcharts of two missions & Documentation

(a) It consists of two stages: two flowcharts during on-machine exercise, and a report for codes before the DEMO.

(b) Before the discussion board is closed, each team MUST have had a post in order to be arranged for the DEMO.

(c) The content must include but not limited to the following:

1. Introduction: Brief by text the main goal, assumptions, difficulties you encountered and the solutions. Do NOT copy anything directly from here.
2. Flowcharts: Insert one flowchart for each mission as a figure in your post.
3. Q&A: Describe the major steps for splitting a 2-3 tree node. You must point out all the required steps.



6. Scoring settings and procedure

Item 1. (Mission 1) 40%

Item 2. (Mission 2) 40%

Item 3.

(1) Flowcharts of two missions during exercise 10%

(2) Code report and comments before deadline 10%

(Stage 1: Execution) Random selection of 2~3 inputs

1. All the results are perfectly correct 30 points
2. There is only one error in the results 25 points
3. About half of results are correct 20 points
4. Almost all results are wrong no point

(Stage 2: Q&A) Random selection of 2~3 question about your codes

1. All the answers are correct and clear 10 points
2. Only one answer is wrong or unclear 5 points
3. More than one are wrong or unclear no point

After the announcement of all scores: The copy detection procedure begins and both copies get no point if the software, TA and Teacher all confirm that.

一、基本需求

(a) 只上傳可成功編譯的原始碼(.cpp/.c/.h/.hpp)含註解、檔名請用「DS2ex3_*分組編號_學號1_學號2*」，違反任何一項先扣 5 分！

(b) 以組為單位只上傳一份，程式碼開頭幾行註解必須要有整組每位同學的中文姓名和學號，多傳一份或資訊不完整就扣 5 分！

(c) 非 C/C++程式 或 無法成功執行 一律視為「未完成」並以零分計！

二、題目

完成兩項任務，將二者整合在一個簡易選單下，未整合或介面無法連續執行先扣 5 分。

（前置作業）讀取資料檔的指定 5 個欄位

輸入：讀入一個資料檔的 5 個欄位。包括【學校名稱】、【科系名稱】、【日夜別】、【等級別】和【上學年度畢業生數】。

結果：逐筆加上從 1 開始的流水編號稱為【序號】，並依序輸出到螢幕上，每筆資料共 6 個欄位。

（任務一）建立 2-3 樹

輸入：依【序號】由小到大擷取前置作業的結果。

步驟：以【學校名稱】建立一棵 2-3 樹，節點內只記載每筆資料的【序號】和【學校名稱】，【學校名稱】名稱相同的資料都儲存在同一節點位置，換言之，每個【學校名稱】在 2-3 樹上只出現一次。

輸出：將樹根內的每筆資料依【序號】由小到大逐一顯示於螢幕上，必須包含 6 個欄位。

（任務二）…

三、參考範例

```
**************************
 On-machine Exercise      *
 Mission 1: Build a 2-3 tree  *
 Mission 2: …             *
**************************
```

（前置作業）讀取資料檔的指定 5 個欄位

```
Input the file name (e.g., 301, 302): [0]Quit
302
[1] 國立清華大學, 數學系, D 日, B 學士, 53
[2] 國立清華大學, 資訊工程學系, D 日, B 學士, 117
[3] 國立清華大學, 化學工程學系, D 日, B 學士, 57
...
[33] 東海大學, 生命科學系, D 日, B 學士, 79
```

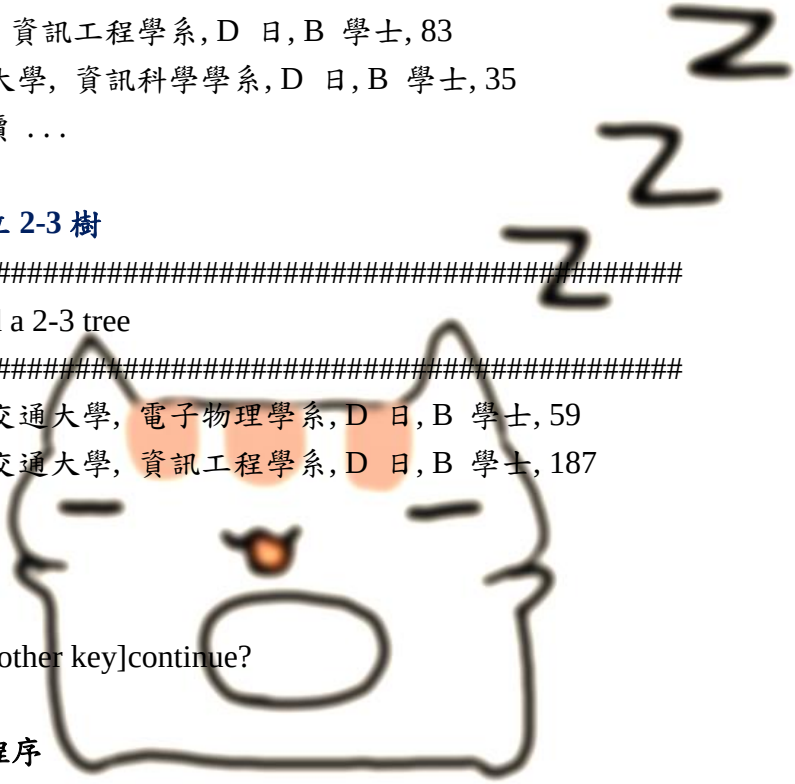
[34] 東海大學, 化學系, D 日, B 學士, 96
[35] 東海大學, 資訊工程學系, D 日, B 學士, 107
...
[66] 中山醫學大學, 醫學系, D 日, B 學士, 136
[67] 亞洲大學, 資訊工程學系, D 日, B 學士, 83
[68] 臺北市立大學, 資訊科學學系, D 日, B 學士, 35
請按任意鍵繼續 . . .

（任務一）建立 2-3 樹

##
Mission 1: Build a 2-3 tree
##
1: [13] 國立交通大學, 電子物理學系, D 日, B 學士, 59
2: [14] 國立交通大學, 資訊工程學系, D 日, B 學士, 187

（任務二）...

[0]Quit or [Any other key]continue?



四、結果繳交程序

步驟 1. 每次上機練習結束前完成兩張流程圖，同組由一位同學代表貼文於指定看板。
步驟 2. 在截止期限以前上傳程式原始碼，同組由一位同學代表繳交及確認無誤。
步驟 3. 在關閉期限以前加入程式說明文件於流程圖的貼文，並關注助教公告的機測時段。
步驟 4. 在助教分配的機測時段到電腦教室，每一位組員負責一項任務的機測。
步驟 5. 機測之後助教將檢查是否疑似抄襲，循三階段從嚴認定，一旦被認定有部分抄襲就取消得分。

五、流程圖和程式說明文件

(a) 分為兩個階段，上機練習時要繳交兩張流程圖，機測前要繳交程式說明文件。
(b) 各組必須在看板關閉期限以前完成貼文，才會被排入機測。
(c) 貼文內容必須包含但不限於以下幾項：
1. 簡介：以文字簡述程式主旨，假設，遇到的困難和解法，勿直接剪貼題目字句！
2. 流程圖：每項任務各一張流程圖，以插圖放入貼文之中！
3. 答問：詳述分裂 2-3 樹節點的主要步驟，必須清楚指出哪些是不可或缺的步驟！

六、分數配置和評分程序

項目 1.（任務一） 40%
項目 2.（任務二） 40%

項目 3.

(1) 兩項任務的流程圖（上機練習時）　10%

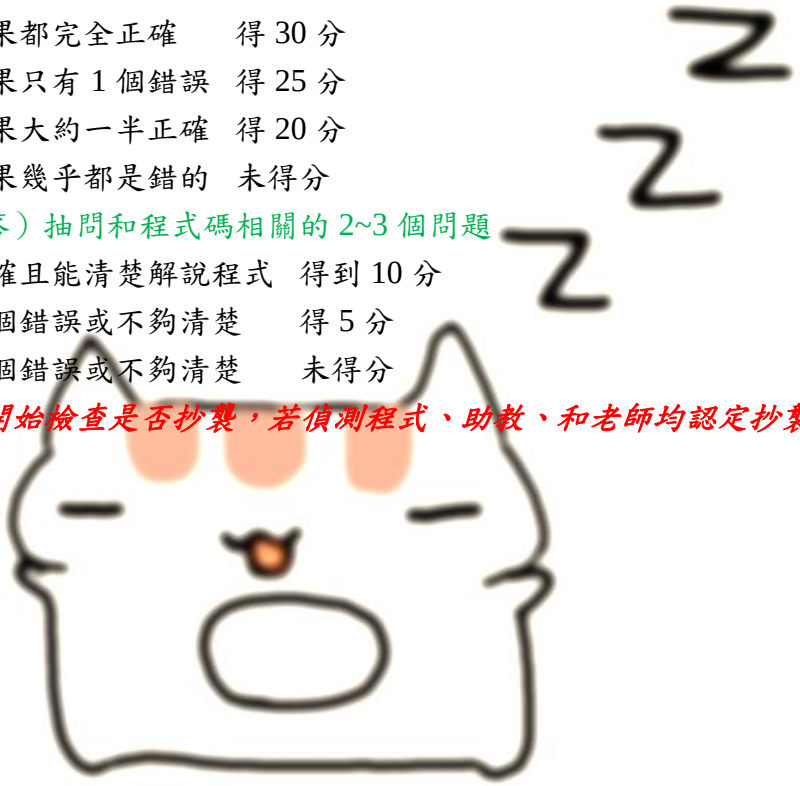
(2) 程式說明文件及和註解 （期限前）　10%

（階段一：執行）隨機施測 2~3 個不同輸入：

1. 輸出結果都完全正確　　得 30 分
2. 輸出結果只有 1 個錯誤　得 25 分
3. 輸出結果大約一半正確　得 20 分
4. 輸出結果幾乎都是錯的　未得分

（階段二：問答）抽問和程式碼相關的 2~3 個問題

1. 回答正確且能清楚解說程式　得到 10 分
2. 回答 1 個錯誤或不夠清楚　　得 5 分
3. 多於 1 個錯誤或不夠清楚　　未得分



成績公佈後：開始檢查是否抄襲，若偵測程式、助教、和老師均認定抄襲，雙方一律以零分計。