

PW n°1 : LLL - Case study: "Regional university games ("Matrix of linked lists")

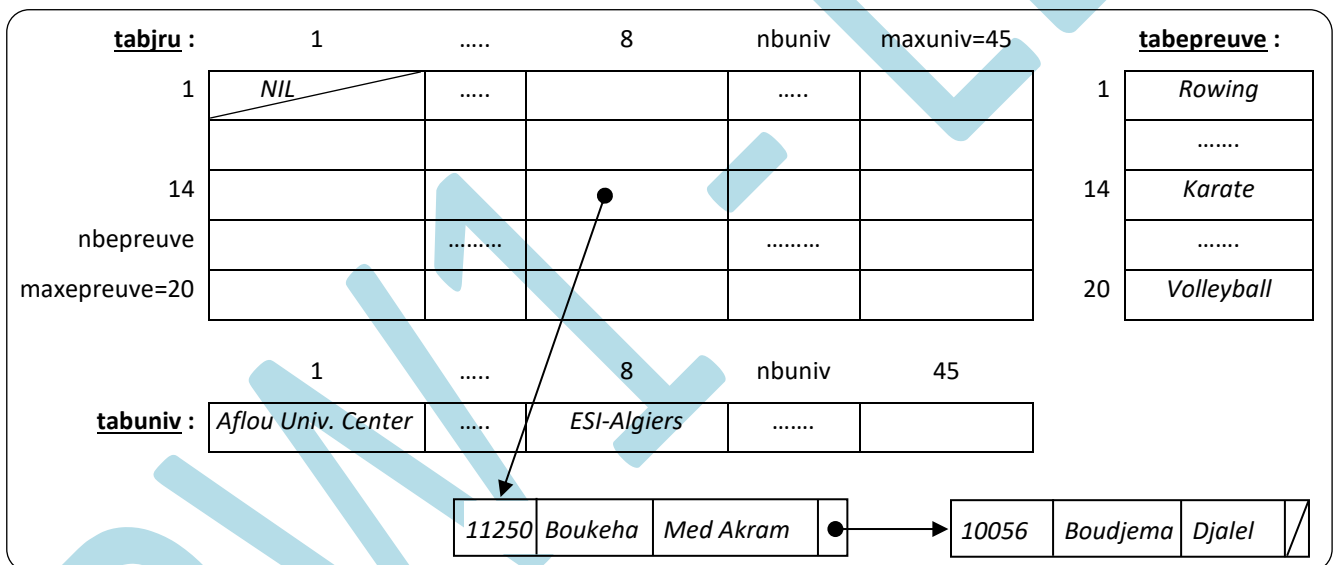
ALSDD – 1th year CPI, S2 – G11 et G12, (2023/2024)

Enoncé : In this work, we want to organize and represent, in a matrix structure of linked linear lists, the registrations of the students-athletes for the regional university games of the central region, corresponding to the 45 university institutions: 17 universities, 3 university centers, 22 higher national schools and 3 normal higher schools (<https://www.mesrs.dz/index.php/fr/reseau-universitaire>). It is assumed that there will be a maximum of 20 sports events.

In alphabetical order, the **nbuniv** universities are listed in a **tabuniv** table. Similarly, the names of the **nbepreuve** sports events are listed, in alphabetical order, in a **tabepreuve** table.

It is assumed that each university can present 0 to 15 athletes in each event (**maxathletes=15**). The athletes' numbers, surnames and first names are contained in LLLs whose heads are included in the elements of a **tabjru** matrix, whose row indices are the event numbers, whose column indices are the university institution numbers, and each element of **tabjru** is a concurrent-type structure, containing a pointer to an unsorted LLC of athlete records <number, surname and first name> participating in an event for a university institution (or NULL if there is none).

i.e. the following structure representing student athlete registrations for the Regional University Games:



Example: The ESI-Algiers, university establishment no. 8, has two athletes (Boukeha Mohamed Akram no. 11250 and Boudjema Djalel no. 10056) in event no. 14, karate (see figure). The Aflou University Center, institution no. 1, did not present any athletes in event no. 1, rowing.

Required work : First, program the LLL model you've seen in the courses. Then write and program the following modules :

- 1) A **create_tabju procedure**; which creates **tabuniv** and **tabepreuve**, as well as the **tabjru** LLC matrix containing the records of all athletes from all universities in all events. To quickly fill this structure, you can randomly generate, for each institution, a number between 0 and 15 corresponding to the number of athletes registered for a given event. For each tabjru element, you can also randomly generate unique numbers ranging from 1 to 13500, and athlete first and last names of up to 25 characters each.
- 2) An **addath procedure (numath: integer; nomath, prenomath: char; numet, numep: integer)**; which inserts a new athlete, defined by his **numath** number, **nomath**, **prenomath**, institution number **numet** and event number **numep**. Insertion should only be carried out if the following two conditions are met for this institution and event: there are fewer **maxathletes** already registered, and **numath** is not included.

- 3) A procedure for displaying the numbers, surnames and first names of all athletes from a given institution, sorted by event: **procedure listathet (institution: char)**; You'll need to display the name of each event for which at least one athlete from the institution is entered, followed by the (unsorted) list of athletes' numbers, surnames and first names. If the institution is not known, an error message will be displayed.
- 4) A **function withoutath (ne : integer) : Boolean** ; which returns **TRUE** only if no athlete is entered in event number ne, i.e. if the line contains only **NULLs**.
- 5) A **listju procedure**, which displays the complete contents of the **tabjru** matrix, event by event: for each event in which at least one athlete is entered, the name of the event is displayed, then, for each institution that has entered athletes in this event, the name of the institution and the records of the entered athletes.
- 6) A **delet procedure (etablissement : chaine)**; which deletes an etablissement from the **tabjru** and **tabuniv** structures following the announcement by this etablissement that it has decided, for budgetary reasons, to no longer participate in the regional university games. You should also remember to free up the memory space occupied by the lists.
- 7) A **delath procedure (numath : integer ; numet, numep : integer)**; to delete a disqualified or injured athlete, defined by his **numath** number, his etablissement number **numet** and his event number **numep**.
- 8) A **deleptylines procedure**, which deletes all events for which no entries have been registered.

Points importants :

- Programming must be performed in C language only.
- You must submit your source codes by uploading them to my Drive via an online form that will be communicated to you in the next few days.
- You must respect the following format for the identifier of your files: **NOM1_NOM2_TP1_Gi.zip** where i is the number of your group (zipped file containing only your source codes).
- The deadline for submitting your practical work is Saturday, March 30, 2024, before 11:30 pm.
- Several aspects will be taken into consideration when evaluating your PW: the demonstration, the source code (data structures, comments, etc.) and the human-machine interface (HMI).

Good luck! بالتوفيق

Appendices: List of university institutions in the Centre region and list of sports events

University institutions in the centre region
Centre universitaire d'Aflou
Centre Universitaire d'Ilizi-Cheikh Amoud ben Mokhtar
Centre universitaire de Tipaza – Abdallah Morsli
Ecole des hautes études commerciales
Ecole Nationale Polytechnique
Ecole nationale supérieure agronomique- Khalef Abdellah alias Kasdi Merbah
Ecole nationale supérieure d'hydraulique – Arbaoui Abdellah
Ecole nationale supérieure d'informatique
Ecole nationale supérieure de journalisme et des sciences de l'information
Ecole nationale supérieure de management
Ecole Nationale Supérieure de Technologie
Ecole nationale supérieure des sciences de la mer et de l'aménagement du littoral
Ecole Nationale Supérieure des sciences politiques
Ecole Nationale Supérieure des Technologies Avancées
Ecole nationale supérieure des travaux publics – Francis Jeanson
École Nationale Supérieure en Mathématique
Ecole nationale supérieure en statistique et en économie appliquée
École Nationale Supérieure en Intelligence Artificielle
Ecole nationale supérieure vétérinaire – Rabie Bouchama
Ecole normale supérieure de Bouzaréah – Cheikh Mubarak Ben Mohamed Brahimi El Mili
Ecole normale supérieure de Kouba – Mohamed Bachir El Ibrahimi
Ecole normale supérieure de Laghouat – Taleb Abderrahmane
Ecole Polytechnique d'architecture et d'Urbanisme-Hocine Aït Ahmed
Ecole Supérieure de Commerce-Mouloud Kacem Naït Belkacem
Ecole Supérieure de Gestion et d'Economie Numérique
Ecole Supérieure des Sciences appliquées d'Alger
Ecole Supérieure des Sciences de l'Aliment et des Industries Agroalimentaires d'Alger
École Supérieure en Sciences et Technologies de l'Informatique et du Numérique de Bejaia
Université d'Alger 1 – Benyoucef Benkhedda
Université d'Alger 2 – Abou el Kacem Saâdallah
Université d'Alger 3 – Brahim Soltane Chaibout
Université de Béjaia – Abderrahmane Mira
Université de Blida 2 – Lounici Ali
Université de Ghardaia
Université de la Formation Continue
Université de Tamenghasset
Université de Tizi Ouzou – Mouloud Maameri
Université des sciences et de la technologie d'Alger, Houari Boumediène
Université Blida 1 – Saad Dahlab
Université de Bouira – Akli Mohand Oulhadj
Université de Boumerdès – M'hamed Bougara
Université de Djelfa – Ziane Achour
Université de Khemis Miliana – Djilali Bounaama
Université de Laghouat – Amar Telidji
Université Médéa – Yahia Farès

Sports events
Aviron
Athlétisme
Badminton
Basketball
Boxe
Cyclisme
Echecs
Escrime
Football
Gymnastique
Haltérophilie
Handball
Judo
Karaté
Natation
Taekwondo
Tennis
Tennis de table
Tir à l'arc
Volleyball