LAB ON PHYSICAL DATA WAREHOUSE DESIGN AND DASHBOARDING
FOR THE ACME-FLYING USE CASE

For this lab block you must:

1) Using Pentaho Business Analytics tool, available at https://www.essi.upc.edu/dtim/pentaho[1], propose and implement a set of Dashboard elements (charts) that enable to follow the given **set of KPIs**.
2) Using Oracle DB, propose and implement a physical design of the data warehouse, by means of proposing access structures (i.e., indexes[2]) to optimize a set of queries, needed for evaluating **the KPIs** (i.e., SQL queries that return data for them). Thus, you must:
    a. Propose a set of queries that retrieve the data for the given set of KPIs (i.e., the charts),
    b. Propose access structures (i.e., indexes) to optimize you DW for the given workload (i.e., queries and their frequencies).

The solutions should adhere to the following instructions:

- *Target schema.* You are given a target DW schema for ACME use case, now **including a (non-materialized) view** that joins the two factual tables and thus enables calculating the required KPIs. You should use the script to create the relational schema of your DW in Oracle DB. In addition, for the Pentaho Business Analytics tool, you are given a prepared Mondrian XML schema[3] for ACME use case that provides a **multidimensional view** over the relational DW schema.
  Important: *Before loading the schema into the tool, open the XML document in a text editor and update the name replacing **???** with the name of your team (e.g., acme??? -> acme11D3A).*
- *Data.* Use the SQL script provided in LearnSQL for loading the testing data into the previously created relational DW schema[4].
- *Workload (KPIs).* The following KPIs and their corresponding frequencies should be considered.

  (30%) Give me FH and FC per month, filtered by the aircraft model.

    - *Visualization requirement*: Enable following trends, identifying changes, and peaks through time.

  (30%) Give me ADOSS, ADOSU per year, filtered by the aircraft from the fleet.

    - *Visualization requirement*: Enable identifying differences among groups over time.

  (20%) Give me the RRh, RRc, PRRh, PRRc, MRRh and MRRc per month, filtered by the aircraft model.

    - *Visualization requirement*: Enable following trends, identifying changes, and peaks of through time.

  (20%) Give me the MRRh and MRRc per aircraft model, filtered by the airport of the reporting person.

    - *Visualisation requirement*: Enable following the ratio among different categories.

[1] You are provided with a user to access Pentaho User Console.
[2] You must not use materialized views in this exercise.
[3] Mondrian Schema: https://mondrian.pentaho.com/documentation/schema.php
[4] Notice that such a script is replacing previously created ETL process, only for evaluation purposes of the lab.

Deliverables:

1) Data access structures (i.e., indexes), created in your Oracle DB accounts, that optimize the DW for the given workload (submitted through Learn SQL for evaluation).
2) PDF file (**one single A4 page, 2.5cm margins, font size 12, inline space 1.15**) with:
    a. Proposed SQL queries to retrieve data for the created the queries
    b. Data access structures (i.e., indexes), created in your Oracle DB accounts, that optimize the DW for the given workload (previously created queries).
    c. All assumptions made and justifying the decisions you made for physical DW design (if any).
3) A Dashboard with a set of charts, created in the Pentaho Business Analytics tool (using User Console), that allow end users to visualize and follow given KPIs.
4) PDF file (**one single A4 page, 2.5cm margins, font size 12, inline space 1.15**) with:
    a. All assumptions made and justifying the decisions you made for Dashboard creation (if any).

Assessment criteria:

i) Conciseness of explanations (only first page will be considered in the evaluation)
ii) Understandability
iii) Coherence
iv) Soundness

Evaluation:

- 60% Deliverables
- 40% Exercises related to the project done individually in the classroom the corresponding day