Problem Situation

Teams

- Teams of 4 people.
- Each team member must upload their own documents to Canvas (cloud links are not accepted).

The Problem

Everything starts from a real problem or need. At this stage, define the focus of the study.

The final deliverable is a **Python program** that helps a company solve a problem it is facing (e.g., sales, distribution, employees, payments, suppliers).

The company must provide data in an **Excel table** so your Python program can analyze it and generate **statistics and graphs** that help visualize the situation and inform strategies to solve the problem.

If you cannot find a real company, search online for company data you can download in **Excel or CSV**.

- Possible sources: https://www.kaggle.com/datasets or search with the keyword **dataset**.
- Choose information that can support **business decision-making**.

Phase 1 (Week 2) — 6 points — Individual submission in Canvas

You may build the table as a team, but **each member must upload their own files**.

Deliverables

1. **Excel table** with the data needed to analyze the problem. You may combine multiple databases or conduct a survey for a business opportunity.

2. **Additional PDF** (mandatory — if missing, the grade for this phase is **0**), including:
    - Description of each field with data types: `int`, `str`, `bool`, `float`.
    - How the table was obtained: website name + link, or the person and company who provided it.
    - Why you selected that dataset and what was interesting about it.

Table Requirements

- **Rows**: at least **50** (more allowed).
- **Columns**: at least **10** — **4–5 qualitative** (text) and **4–5 quantitative** (numeric) (more allowed).
- **Source**: reliable and **up-to-date**.
- **Structure**: the **first row** contains column headers; **no table title** row.
- **Headers**: keep them **short**.
- The **example table** provided may **not** be used for your analysis.
- If the file is not in a proper tabular structure, **adjust it** (remove columns/rows as needed) so Python can read it.

Phase 2 — 10 points — Individual submission in Canvas

Create Python code to **read and print** the entire Excel table. Submit the **`.py` file**.

Deliverables

- **Excel file** with the company data (your table).
- **PDF** defining at least **one individual key question** that triggers the analysis to solve or improve the company's situation.
    - Each member proposes their **own** question(s).
    - **No duplicates** across team members.
    - Include a **cover page** with team members and company name.
- **Note**: Only submit the **question** in this phase, **not** the analysis or solution.

- **Important**: If you do not submit **all three files** (`.py`, `.pdf`, and Excel), you will **lose points**.

Example key questions (sales):
- Which branches sell the most?
- Which products are the best sellers?
- Who are my best customers?
- Which supplier offers the best price?

Phase 3 (Week 4) — Individual submission

`.py` file must include

- Code to **read and print** the Excel table.
- Functions to answer **your** question(s) (not your teammates'), including:
  - Extract **at least one column** (create a Python list).
  - Produce **at least one sub-table** using `.groupby`.
  - Apply **descriptive statistics** (min, max, mean, frequencies) on the full table or sub-table, for one or more columns.
  - **Graph(s)** representing your answer(s). Data for graphs must come **directly from the DataFrame** (no manually typed lists/arrays).
- Use **conditional statements** to compare results and suggest actions.

```
# Example policy decision
if vendedores > 100 and ventas <= 3_000_000:
    decremento = 0.10
    print("It is recommended to reduce the number of salespeople to:",
vendedores * 0.90,
          "which implies a 10% reduction")
else:
    print("Increase commissions for salespeople who met their goals")
```

PDF must include

- **Cover page** with team members and the company analyzed.
- Your **question(s)** and their **answers** (derived from your Python output).
- Your **graph(s)** generated by code.

- At least **2 actions** that add value to the business strategy (e.g., increase advertising, modify price/packaging, adjust distribution, staff reductions, or training).

Submit Individually (no cloud links)

- `.py`
- `.pdf`
- `.xlsx` or `.csv`

Phase 4 — Final integration (team code), video, and additional documents

Program + Data (team)

- Complete **`.py`** program and **Excel** file.
- Include a **password** and a **menu** to call different functions (see skeleton in Announcements).
- Each member must have **their own functions** answering their question(s) and showing their **graphs**.
- Add **comments** in code indicating the **author** and **what each function does**.

PDF: Ethics

- Explain how you will legally **protect company information**.
- Base your explanation on:
    - **CACEI Code of Ethics**: http://cacei.org.mx/docs/codigo_etica.pdf
    - **ACM/IEEE-CS Software Engineering Code of Ethics**: https://ethics.acm.org/code-of-ethics/software-engineering-code/
- **Include at least two codes from each**, and explain **in your own words** how they help protect company information.

PDF: Questionnaire (individual)

- Answers must be **your own** (not identical to teammates').
- Include:
    - **Algorithm or flowchart** of the end-to-end process (not a code flowchart).
    - **How** you obtained the database (steps).
    - **Functions/libraries** used for analysis.

    - **Technologies** you know and which helps most in your professional practice (with detail).
    - Reflection: **Is technology important** in your professional life? Why or why not?

YouTube Video (unlisted, 2–4 minutes) — to submit in elumnen

- Appear on camera and speak.
- Introduce yourself, your team, and the company analyzed.
- Show the **Python** file and the **Excel** file.
- Run the **complete code** (show output when you press **RUN**).
- Explain **only your part**: question(s), statistics obtained, and how the graph(s) were made.
- Close with your **conclusions** and the **actions/strategies** to resolve or improve the company’s situation.
- Record in **ZOOM** with **desktop sharing** so graphs are visible.
- You may use **1–2 slides** for conclusions.

Upload in Phase 4

- **Python file (.py)** — the full team program must run.
- **Excel file** — same for the team.
- **PDF (Ethics)** and **PDF (Questionnaire)**.
- **YouTube link** (set to **unlisted**). If set to **Private**, the video cannot be reviewed and the video score is **0**.
- **Do not** upload **.zip** files or **cloud links**.