

Programação Orientada aos Objetos**2022/2023****Project*****StarThrive – Business Manager*****Deadline:** 07/12/2022**Platform:** Inforestudante**Grade:** 7 points

Note: Fraud denotes a serious lack of ethics and constitutes unacceptable behaviour. Fraud situations will be severely penalized, according to the regulations and legislation in force.

The StarThrive company is responsible for the management of several companies. StarThrive manages companies in the restaurant and grocery business. With the success of StarThrive, it is required to start better organizing the list of companies. It is intended that you develop an application to manage the companies managed by StarThrive. These companies are characterized by category, name, district and location (GPS coordinates). Companies can be of catering or grocery category. Catering category companies can be coffee shops, pastries or restaurants. Catering category companies have the cost of waiters as a major expense, and as such, they are also characterized by the number of waiters and the cost of the average annual salary. Coffee shops are also characterized by the average number of customers per day, the average number of coffees sold per day and the average annual turnover per coffee sold per day. Pastries are also characterized by the average number of customers per day, the number of cakes they sell per day and the average annual turnover per cake sold per day. Restaurants can be local restaurant or *fast-food*. A restaurant is characterized by the average number of customers per day and the number of operating days per year. A local restaurant is also characterized by the number of indoor tables, number of tables on the terrace, annual license cost per terrace table and the average billing value of each table per day. A *fast-food restaurant* is also characterized by the number of indoor tables, the average billing value of each table per day, the average daily number of drive-thru customers, *and* the average daily billing value per *drive-thru customer*. Companies in the grocery category can be a fruit store or a market. Fruit stores are characterized by the number of products, the average annual billing value per product and the annual cost of cleaning the establishment. Markets are characterized by type (min, super, hyper), by the area of corridors (m²), by the average annual turnover per m² and by the annual cost of cleaning the establishment.

Since one of the main objectives of the StarThrive company is the management of annual expenses and income, the formula for calculating annual expenses and income for each category of company is presented below.

Category	Annual expense	Annual recipe
Coffee shop	Number of employees X average annual salary	Average number of coffees sold daily X average annual turnover per coffee sold per day
Pastry shop	Number of employees X average annual salary	Average number of cakes sold daily X average annual turnover per cake sold per day
Local restaurant	Number of employees X average annual salary + number of tables on the terrace X cost of annual leave per table on the terrace	(Number of indoor tables + number of terrace tables) X average billing value of each table per day X number of working days per year
Fast-food restaurant	Number of employees X average annual salary	(Number of indoor tables X average billing value of each table per day + average daily number of drive-thru customers X average billing value per drive-thru customer) X number of operating days per year
Fruit shop	Annual cost of cleaning the establishment	Number of products X average annual billing value per product
Marketplace	Annual cost of cleaning the establishment	Area of corridors in m ² X average annual billing value per m ²

The application, to be used by a StarThrive employee, should allow the production of the lists and indicators presented below.

- List of companies managed by StarThrive presenting at least the following information
 - Company name
 - Type of company
 - District
 - Annual expense
 - Annual recipe
 - Profit (yes/no)
- For each type of company, present the company with the highest annual revenue (name and value), the company with the lowest annual expense (name and value) and the company with the highest annual profit (name and profit value).
- Present the 2 catering companies with the highest number of customers per day.

The interaction with the user must be carried out through a simple JAVA graphical interface (*JFrames*) that allows the user to:

- List, create, edit and delete companies.
- Present the requested listings and indicators.

The application must be provided with a text file (*starthrive.txt*) containing data on at least 5 companies of each category in order to demonstrate all the application's features. The structure of the text file must be defined by the student in order to allow the easy and fast editing of the file, but also to simplify its *parsing* by the application. When the application starts, it must load the companies' data from the object file (*starthrive.dat*), and if it does not exist, load the companies' data from the text file (*starthrive.txt*). It should also automatically save company changes to the object file.

Implementation

The application must be implemented in the Java language and take into account the following aspects:

1. Elaboration of a class diagram (UML) before starting the implementation, to foresee the structure of the project.
2. Solutions that do not follow the principles of object-oriented programming and the concepts of inheritance and polymorphism will be penalized.
3. Solutions that use *instanceof*, *class.getName()* or similar methods will be penalized.
4. Solutions must take into account good programming practices.
5. Each class must internally manage its data, so it must take care of protecting its variables and methods.
6. Each class should be responsible for a specific task or objective, and should not be assigned undue functions.
7. Use the *keyword static* only when justified and not to work around compiler errors.
8. Provide comments to public classes and methods in the Javadoc format. This will automatically generate an HTML file structure. Comment the rest of the code whenever the reading of the algorithms is not obvious.
9. Avoid the overindulgence usage of public variables and methods.
10. When choosing names for variables, classes and methods, the conventions adopted in the Java language must be followed.
11. In the organization of classes, code redundancy should be avoided.

Delivery

The work must be delivered to Inforestudante by **December 7, 2022**. The project must be carried out in groups of two students from the same practical class.

The following files must be delivered (**uncompressed**):

- Class diagram in UML (pdf).
- All .java classes.
- Test data files.
- ZIP file with Javadoc (HTML).
- Report (pdf).

Evaluation

For the evaluation of the work, factors of two types are considered:

- Black box (as perceived by the user):
 - Set of implemented functionalities.
 - Program robustness.
 - Interface quality.
- White box (the way it is built):
 - Quality of technical solutions found to problems.
 - Code structuring.
 - Quality of comments.

Note: Works that present compilation errors at the time of defence are not accepted. All execution errors must be detected and dealt with.

Final defence

The work will be defended through a face-to-face discussion. Students must register for a defence schedule on Inforestudante.

VERY IMPORTANT

The works will be compared (both between the works of the discipline and with code available on the Internet), in order to detect possible fraud by copying. In cases where it is verified that there was a copy of a total or partial work, the groups involved will have the projects voided, failing the course. The rules of the University of Coimbra regarding plagiarism will apply.