Generatore delle schede di allenamento (Documento tecnico - teorico)

Emanuele S.[1]

[1]ICT Engineer, Software Engineer, Cyber Security Engineer Consultant
Email address: emanuele.sa.dev@outlook.com

Abstract

This project implements a desktop application in Java for creating, editing, and managing workout plans for gyms and personal trainers.
The application allows generating workout plans in PDF format, complete with gym logo, customized athlete information, and exercise scheduling.

To access the complete project repository or get more information, contact the author's email address found in the "Autore" section.

1 Introduction

In gyms, manual management of workout plans is still very common, causing:

- ◇ time wasted in drafting;
- ◇ unclear information on the workout plans;
- ◇ lack of uniformity in presentation.

This project proposes an easy-to-use software solution, based on open-source technologies, that reduces management time and improves the quality of the workout plans provided to clients (athletes).

2 System Architecture

The application is developed in Java with a graphical user interface (GUI) created in Eclipse. The system is structured as follows:

- ◇ User Interface (GUI): allows insertion and modification of workout data (athlete information, exercises with related details).
- ◇ Data Management: Java data structures to store exercises, sets, repetitions, and notes.
- ◇ PDF Generator: module that uses a Java library to create printable workout plans with the gym logo.
- ◇ Persistence System: saving workout plans locally without using a database, making it more portable and easier to configure.

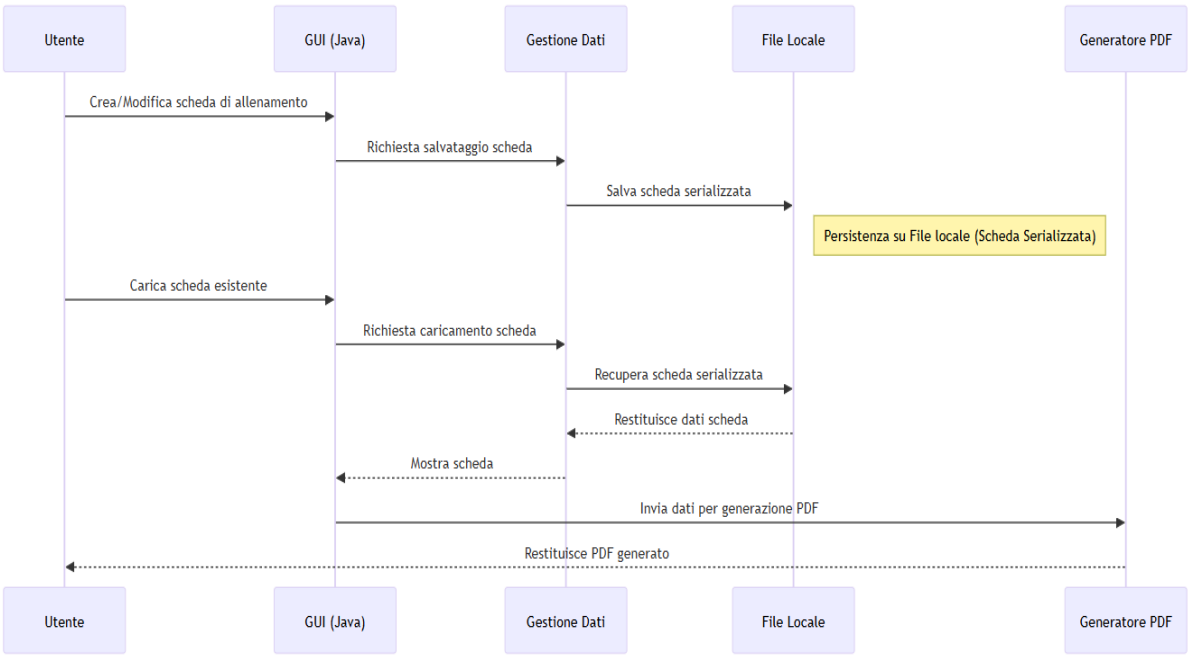


Figure 1: Official gym logo

3 Technologies Used

Below are the technologies and resources that mainly characterize this development

Component	**Technology**
Programming Language	Java
IDE	Eclipse
Framework	WindowBuilder
PDF Generation	openPDF 2.0.3 (.jar Library)
Operating System	Any with JVM

Table 1: Technologies used in the project

4 Main Features and Product Overview

The software allows creating and managing workout plans for gym athletes.
Each plan contains:

- ◇ Common features (gym information and logo)
- ◇ Customized features based on the athlete's training

Currently, the product allows creating and managing up to **6 workout days per plan**, with no limit on the number of exercises per day.
The product has an intuitive graphical interface and a dedicated window for usage and configuration instructions.

Through the GUI it is possible to:

- ◇ Create a new workout plan
- ◇ Edit the characteristics of each exercise (except the name)

Exercise characteristics are divided into:

- ◇ **Mandatory**
  - Number of sets and repetitions
  - Rest time
- ◇ **Optional**
  - Superset (yes/no) and with which exercise
  - Description

Once the general fields (athlete name and goal) are completed, it is possible to generate a PDF version of the workout plan with illustrations.

The PDF includes:

- ◇ Gym name (top center)
- ◇ Gym logo (top right)
- ◇ Gym information (geographic location, ID code – top left)
- ◇ Plan information (below gym info)
- ◇ List of workout days with exercises (central section)
- ◇ Plan ownership information (bottom)

When generating the PDF, a serialized file of the plan is also created, allowing previously created plans to be reloaded and edited (ensuring persistence of processed plans).

In edit mode, it is possible to:

- ◇ Reload a saved plan
- ◇ Make changes
- ◇ Save a new PDF and serialized file version

A configuration window [6] allows defining paths for:

- ◇ Log file
- ◇ Destination folder for generated PDFs
- ◇ Image source

To assist the end user, an interface guides the first-time configuration of the software [7].

Below is a summary of the functionalities offered by the software:

- ◇ Graphical interface with action buttons
- ◇ Ability to load new exercises
- ◇ Create new plans
- ◇ Load and modify existing plans
- ◇ Plan management (max 3 days)
  - Exercise name
  - Number of repetitions
  - Rest time
  - Superset (yes/no)
- ◇ Create new plans with:
  - Gym logo
  - Gym information
    - ∗ Geographic location
    - ∗ Tax code
  - Plan information
    - ∗ Athlete name
    - ∗ Goal

5 Technical Description

The following describes in detail the various functionalities offered by the application, with code excerpts shown.
The project is structured as shown in figure [2].

- ◇ **...beans**
  Contains backend logic classes
- ◇ **...gui**
  Contains classes that generate graphical interfaces
- ◇ **...PdfGenerator**
  Contains classes for PDF file generation

Figure 2: Project hierarchy

Figure 3: Main application menu

Category	Functionality	Notes
Interface	Intuitive GUI with action buttons	Includes window with usage instructions
Exercise Management	- Load new exercises - Edit exercise characteristics (sets, repetitions, rest time, superset, description)	Exercise name is not editable
Plan Management	- Create new plans - Edit existing plans - Max 4 days per plan - Unlimited exercises per day	Each day can contain unlimited exercises
Gym Data	- Gym logo - Geographic location	Data shown in PDF header
Plan Data	- Athlete name - Training goal	Data shown in PDF header
Export	- PDF generation with illustrations - Layout with header, body, and footer	PDF structured for printing and easy reading
Saving	- Creation of serialized plan file - Loading previously saved plans	Proprietary format to ensure compatibility with future versions
Configurations	- Set paths for log file, generated PDFs, and images	Guided configuration available
Help	- First-time configuration instructions	Contains a textual guide

Table 2: Gym workout plan management system features

5.1 Creating a Workout Plan

In the plan creation window [5], exercise selection menus are available. Once the user selects an exercise, it is displayed in the central section, where its fields can be filled in to customize it within the plan. Among these fields, the number of repetitions and rest time are mandatory; all others are optional.

Once customized, the user can assign the exercise to a specific day by selecting the day number in the central section. Finally, by pressing the appropriate button, the exercise is added to the plan. This updates the left section of the screen, where all days and their associated exercises are displayed.

The user can edit already-inserted exercises by clicking the relevant row in the left section. This reloads the saved data into the central section, allowing modifications via the edit button.

Before saving the plan (necessary for PDF generation), the user must complete the goal and athlete information fields. Missing mandatory fields interrupts the process, showing an error message [4] and preventing further progress.

The user can also swap the position of two exercises in the same day by filling in both yellow box fields with the respective positions to be exchanged, then pressing the swap button.

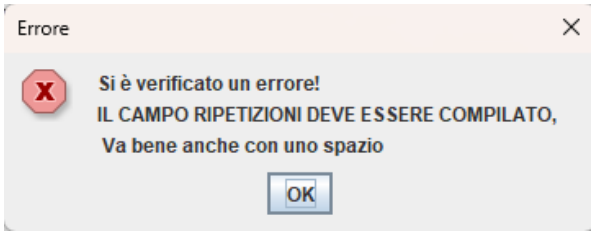


Figure 4: Error message

Similarly, exercises can be deleted using the same procedure. Both swap and delete operations are completed by pressing the respective action button.

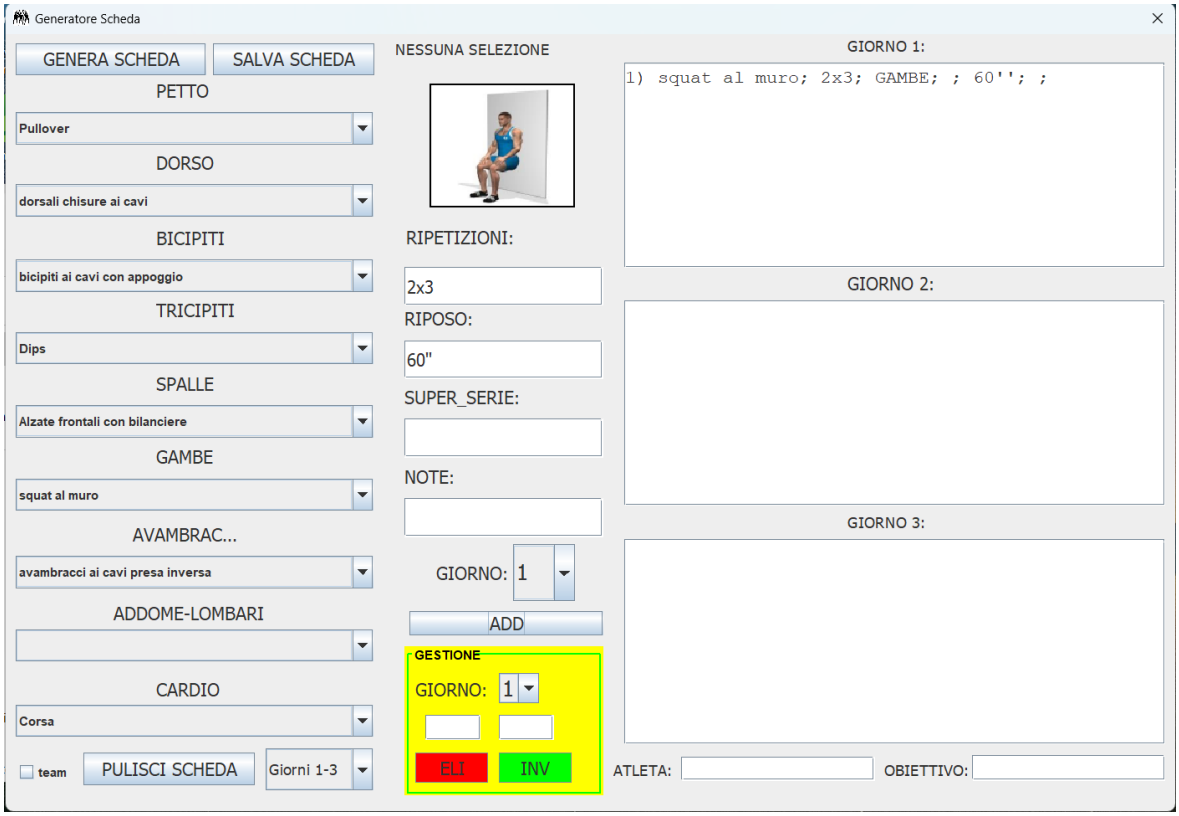


Figure 5: Workout plan creation window

5.2 Initial Configuration

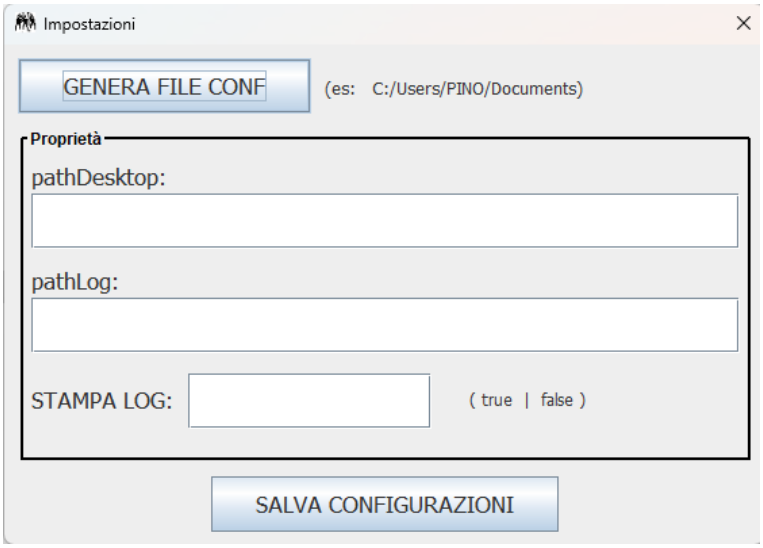


Figure 6: Configuration window

The first operation the user must perform is generating the configuration file by pressing the action button "GENERA FILE CONF", then restarting the software as instructed by the automatic notification.
This operation generates a .ini file in the same directory as the .jar executable.
The .ini file contains three properties:

- **pathDesktop**:
  Indicates where the application will retrieve resources for workout plan generation (exercise images).
- **pathLog**:
  Indicates the directory where the software expects the "logfileSchede.log" file.
- **logAttivi**:
  Boolean value indicating whether to print logs for error analysis.

After restarting the software, return to the configuration window and fill in the three fields. The "STAMPA LOG" field accepts a string but must represent a boolean value as indicated by the label next to it.

Note: If logs are not needed, it is recommended to set "STAMPA LOG" to "false" to avoid generating a log file that could grow large over time and cause memory issues!

Once these steps are completed, the user must finalize the configuration by pressing the appropriate action button.

For the correct functioning of the application and proper PDF generation, the software expects to find 9 folders (uppercase names) in the path indicated in "pathDesktop":

- BICIPITI
- PETTO
- DORSO

- ◇ TRICIPITI
- ◇ SPALLE
- ◇ GAMBE
- ◇ AVAMBRACCI
- ◇ ADDOME-LOMBALI
- ◇ CARDIO

These folders contain exercise icons grouped by muscle group, from which the software will retrieve them.

Note: All first-time configuration instructions are available in the "INFORMAZIONI" window [7] accessible from the main menu.

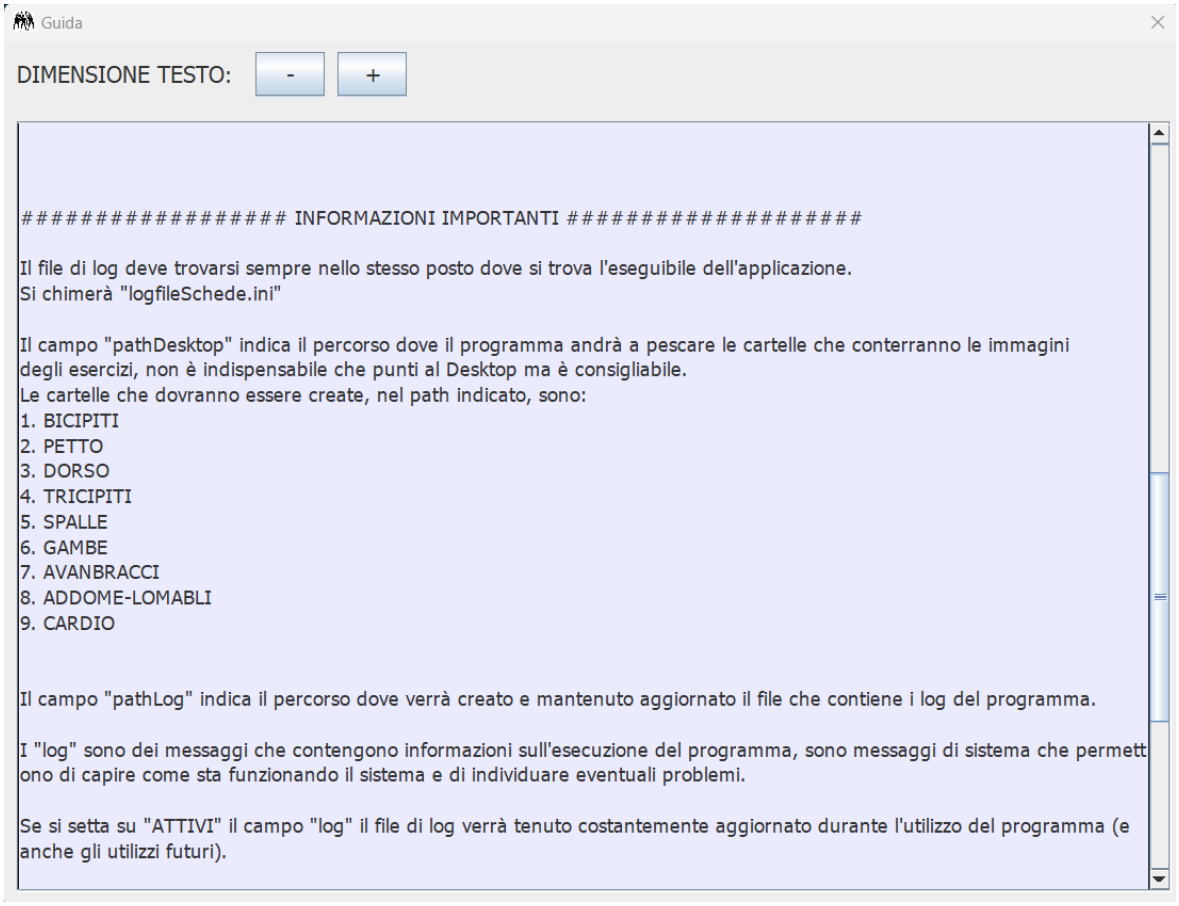


Figure 7: Enter Caption

5.3 Plan Generation

The result (shown on pages 10 and 11) displays all information associated with the plan and all days with their exercises.

VIS CLUB 2016

Via Tagliavia, 12 - 89128 - Reggio Calabria (R.C.)
C.F.: 92098740833
Obiettivo: Ricomposizione | Atleta: Emanuele

Giorno 1

Panca piana con bilanciere
4 x 12-10-8-8
Rec: 90
aumenta ogni serie

Croci ai cavi su inclinata
4 x 10
Rec: 60
4" in discesa

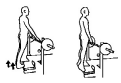
Chest Press
4 x 10/12
Rec: 90
dopo l'ultima serie diminuire al 50% e fare cedimento

Pectoral Machine
3 x 20
Rec: 20

Curl con bilanciere
4 x 6/8
Rec: 60
dopo l'ultima serie riposa 10" e cedimento

curl con bilanciere panca scott
4 x 10/12
Rec: 60

Curl manubri su inclinata
3 x 12 + MAX
Rec: 45
12 normali poi quanti ne puoi in piedi



Polpacci a corpo libero
5 x 25
Rec: 30

Giorno 2

rematore t-bar
4 x 15-12-10-8
Rec: 90
nelle prime 2 tenere 2" iso

Lat machine presa dritta
4 x 12-10-8-8
Rec: 80
se nell'ultima ne fai 8 aumenta settimana pros.

Rematore con manubrio
3 x 8/10
Rec: 45
2" isometria

pull down
4 x 15
0
SUPER con 5

Scrollate con manubri
4 x 15
60
SUPER con 4

French Press con bilanciere
3 x 8/10
Rec: 60
dopo l'ultima serie riposa 10 sec e a cedimento

Tricipiti con la corda
3 x 8+8
Rec: 90

Dips tra panche
2 x MAX
Rec: 60

Crunch a terra mani dietro la nuca
5 x 10+10
0
SUPER con 10
10 con peso e 10 senza

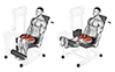
Plank
5 x 30 sec
40
SUPER con 9

Giorno 3

Leg Extension
2 x 20
60
SUPER con 9

squat con bilanciere
4 x 10-8-6-6
Rec: 2 min

Leg Press orizzontale
3 x 8+8
Rec: 90



Leg Extension
3 x 8/10
0
SUPER con 5

goblet squat
3 x 12
60
SUPER con 4

squat bulgaro
2 x 10 a lato
Rec: 60
con manubrio

Leg Curl da sdraiato
4 x 15-12-10-8
Rec: 90

stacco rumeno con bilanciere
3 x 10/12
Rec: 60

Polpacci a corpo libero
5 x 25
Rec: 30

Giorno 4

 Alzate laterali **4 x 12-10-8-6** **Rec: 2 min**	 Shoulder Press **4 x 8/10** **Rec: 90**	 alzate laterali su panca inclinata **2 x 12/15** **Rec: 60**	 alzate frontali con barra **3 x 12** **Rec: 60** 4" a scendere	 aperture posteriori con manurbi prono su panca **3 x 12** **Rec: 60**	 Alzate laterali al cavo basso **3 x15** **Rec: 60**
 Crunch ai cavi **3 x 12/15** **Rec: 40**	 Plank **2 x MAX** **Rec: 60**				

6 Results and Testing

The end user is satisfied with the result: creating workout plans is very quick, and execution times for all product functionalities are negligible (extremely short).
It is emphasized that the product is easy to use and intuitive for the end user (with medium/low technological experience).
According to the end user, the application generated perfectly formatted and readable PDFs.
The user did not require any support during the initial configuration, relying solely on the documentation in the dedicated information window [7].

7 Future Extensions

In the future, the product could be improved by adding new features, such as:

- ◇ Storing generated plans in a database (e.g., SQL)
  This functionality was not implemented to keep product configuration and usage extremely simple (according to client requirements)
- ◇ Ability to configure gym information and logo in the plan, allowing one product to be configured for multiple gyms
- ◇ Ability to store exercise images in a database
- ◇ Ability to access via FTP a standard image kit for a basic exercise package

8 Conclusions

The product proved to be reliable and efficient in its purpose.
The user appreciated all the functionalities offered by the software, as well as the development time of the entire project, including technical documentation (about twenty days including review meetings and requirement changes).

9 Resources

Java Documentation
OpenPdf Documentation

10 Author

Emanuele S.

Computer engineer with a master's degree cum laude, with a solid academic background and several years of professional experience in the ICT sector.

I have worked on complex projects in the banking and automotive fields, gaining skills in both software development and cybersecurity, and I am also a forensic developer.

During my career, I have developed backends in Java using modern frameworks such as Spring Boot and Hibernate, designing and integrating Identity and Access Management solutions to ensure secure and scalable role, permission, and authentication

management. I have managed relational databases such as MySQL and PostgreSQL, applying Agile methodologies with distributed teams and ensuring rapid delivery times. My work has involved direct collaboration with clients, from requirements gathering to defining technical specifications, up to project delivery.
This experience has allowed me to refine communication, problem-solving, and the ability to take ownership of a project end-to-end, ensuring robust, scalable, and secure solutions.

Contacts
emanuele.sa.dev@outlook.com