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USER MANUAL GREEN SPACES MANAGEMENT

G132 - CAFFEINE

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Index

- Glossary* 2
- Introduction* 4
 - Purpose and Scope*4
- System Overview*..... 5
- System Requirements* 6
- System Features*..... 7
- Troubleshooting* 21
- Frequently Asked Questions*..... 24

Glossary

Agenda	Mechanism used to plan each week's work. It includes entries in which is defined a task to be carried out by a team, with some vehicles/equipment assigned, in a specific time interval on a determined date.
Collaborator	A person who is an employee of the organization and carries out design, construction and/or maintenance tasks for green areas, depending on their skills.
Diary	Log or journal kept by park or garden staff to document various activities, observations, and events related to the management and maintenance of the green space.
Employee	Same as Collaborator.
Equipment	Items used to aid collaborators, such as, sprayers, lifting platforms, chainsaws, brush cutters, blowers, ladders, cisterns and various elements that can be attached to tractors, such as disc harrows, weeders, aerators and scarifiers.
Garden	Garden space with or without trees with little or no equipment (may have a basic irrigation system).
Green Area	Same as Green Space.
Green Space	Refers to gardens or parks. Can range from small landscaped areas, parks with trees and some amenities like benches or playgrounds, to parks with multiple hectares, wooded areas, lakes, and various facilities and installations.
GSM	Acronym for Green Spaces Manager.
Green Spaces Manager	The person responsible for managing the green spaces in charge of the organization.
GSU	Acronym for Green Spaces User.
Green Spaces User	A person who uses the green spaces managed by the organization and who can through the Portal, make comments or report faults in parks and gardens on the Portal.
HRM	Acronym for Human Resources Manager.
Human Resources Manager	A person who manages human resources and defines teams based on the needs of ongoing projects and the skills of the employees.
QAM	Acronym for Software Quality Assessment Team Manager.
Software Quality Assessment Team Manager	A person who manages the Software Quality Assessment Team and its process.
VFM	Acronym for Vehicle and Equipment Fleet Manager.

Vehicle and Equipment Fleet Manager	A person who manages the fleet park, the machines, equipment and vehicles, ensuring their good condition and assigning them to the tasks to be carried out.
Java	Main programming language used to develop the application.
JavaFX	Technology utilized for the application's graphical interface development.
Job	The main occupation assigned to a collaborator. Some examples are designer, budget manager, gardener, electrician and bricklayer.
Machine	Mechanical equipment used to aid collaborators in completing tasks. They can be tractors, backhoe loaders, rotating machines, lawnmowers, among others.
Maintenance	Regular activities to ensure the proper functioning and safety of a vehicle. It's required frequency is registered by the VFM.
Portal	Platform in which parks and garden users can post comments, and report faults and malfunctions of equipment.
Python	Programming language utilized for the statistical analysis of key performance indicators (KPI), such as, water or energy consumption, most used pieces of equipment, and park users' profile by age.
Rainwater conduction	Natural process by which rainwater moves or flows through the environment within the green space.
Skill	Abilities possessed by collaborators that enable them to undertake specific tasks or responsibilities. Examples include driving various vehicle types (e.g., light or heavy), operating machines such as backhoes or tractors, tree pruning, application of agriculture phytopharmaceuticals.
Task	Activities carried out on an occasional or regular basis by teams composed of collaborators in the green spaces. can be regular (e.g. pruning trees) or occasional (e.g. repairing a broken equipment). They may also require a multi-disciplinary team and the length of the task can vary from a few minutes (e.g. replacing a light bulb) to weeks (e.g. installing an irrigation system).
Team	Temporary association of employees who will carry out a set of tasks in one or more green spaces.
To-do list	Mechanism in which are registered the pending tasks. Comprises all the tasks required to be done in order to assure the proper functioning of the parks. The entries in this list describe the required task, the degree of urgency (High, Medium, and Low), and the approximate expected duration.
Vehicle	Mode of transportation utilized by collaborators and equipment/machinery, essential for executing tasks assigned to teams. This type of vehicle may be only for passengers or mixed, light or heavy, open box or closed vans or trucks.

Introduction

Green spaces in urban areas play an important role in enhancing the quality of life for city inhabitants. They contribute significantly to improving urban air quality by absorbing pollutants and producing oxygen.

Effective management of these green spaces is essential to maximize their environmental, social, and economic benefits, ensuring they continue to contribute positively to urban living.

Purpose and Scope

The objective of the User Manual is to provide guidance on how to effectively navigate and use the developed program, specifically for the Green Space Managers (GSMs) and administrators.

Within this manual, these users will find clear and concise information, as well as guidelines, on operating the program and maximizing its benefits.

It covers a wide range of topics, ensuring that users have access to everything they need to resolve any issues or inquiries related to the program's basic functionalities.

System Overview

The main goal of this program is to facilitate and provide a more organized management system to our managers and administrators. The program allows these users to control everything that involves public spaces, including its users and maintenance.

The application is organized by user. Each user has a specific role and access to different functionalities:

- Human Resources Manager - manages the human resources and defines teams based on the skills of the employees.
- Green Space Manager - manages the green spaces, which includes planning and building irrigation system.
- Vehicle and Equipment - manages the vehicles and machines, ensuring their good condition.
- Software Quality Assessment Team Manager – manages the Software Quality Assessment Team and its process.
- Collaborator – employee in the organization and carries out tasks for green areas, according to their skills.

System Requirements

Integrated Development Environment (IDE):

IntelliJ IDEA

Version: 2021.3 or later

Java Development Kit (JDK):

JDK 11 or higher

Compatible Operating Systems:

Windows 10 or later

macOS 10.15 (Catalina) or later

Linux distributions (such as Ubuntu 20.04 or later, Fedora 32 or later)

System Features

1. Register skills that a collaborator may have | Human Resources Manager

- Select option 1.
- Type skill's name.

```
--- HRM Menu -----  
1 - Register a Skill  
2 - Register a Job  
3 - Register a Collaborator  
4 - Assign Skills to Collaborator  
5 - Generate Team Proposal  
0 - Cancel
```

Type your option: 1

```
--- Register Skill -----
```

Name: *Tree pruning*

Skill successfully created!

2. Register a job that a collaborator needs to have | Human Resources Manager

- Select option 1.
- Type job's name.

```
--- HRM Menu -----  
1 - Register a Skill  
2 - Register a Job  
3 - Register a Collaborator  
4 - Assign Skills to Collaborator  
5 - Generate Team Proposal  
0 - Cancel
```

Type your option: 2

```
--- Register Job -----
```

Job Name: *Gardener*

Job successfully created!

3. Register a collaborator with a job and fundamental characteristics | Human Resources Manager

- Select option 3.
- Type all collaborator's information, as shown.

```
--- HRM Menu -----
1 - Register a Skill
2 - Register a Job
3 - Register a Collaborator
4 - Assign Skills to Collaborator
5 - Generate Team Proposal
0 - Cancel

Type your option: 3

--- Register Collaborator -----
1 - Gardener
Select a job: 1
Collaborator Name: John
Collaborator Birthdate (year/month/day): 2000/04/12
Collaborator Admission Date (year/month/day): 2020/05/12
Collaborator Address (street, zipcode, city): Rua das Flores, 4460-450, Porto
Collaborator Phone Number: 913452344
Collaborator Email: john@email.com
Collaborator Taxpayer Number: 123456789
Collaborator Identification Document Type (CC, BI or Passport): CC
Collaborator Identification Document Number: 12345678 4 AB1

Collaborator successfully registered!
```

4. Assign one or more skills to a collaborator | Human Resources Manager

- Select option 4.
- Select the collaborator.
- Select the skills you want to assign. It shows all available skills, so, when a skill is assigned, it does not appear in the list. To stop assigning, press 0.

```
--- HRM Menu -----
1 - Register a Skill
2 - Register a Job
3 - Register a Collaborator
4 - Assign Skills to Collaborator
5 - Generate Team Proposal
0 - Cancel

Type your option: 4

--- Assign Skills to Collaborator -----
1 - John : 12345678 4 AB1
Select a collaborator: 1
1 - Tree pruning
2 - Tractors operation
Select a skill (press 0 to stop): 1
1 - Tractors operation
Select a skill (press 0 to stop): 0

Skills successfully assigned!
```

5. Generate a team proposal automatically | Human Resources Manager

- Select option 5.
- Type number of minimum team size.
- Type number of maximum team size.
- Select skills necessary for the team.

```
--- HRM Menu -----
1 - Register a Skill
2 - Register a Job
3 - Register a Collaborator
4 - Assign Skills to Collaborator
5 - Generate Team Proposal
0 - Cancel

Type your option: 5

--- Generate Team Proposal -----
Minimum Team Size: 2
Maximum Team Size: 4
1 - Tree pruning
2 - Tractors operation
Select a skill (press 0 to stop): 1
1 - Tree pruning
2 - Tractors operation
Select a skill (press 0 to stop): 2
1 - Tree pruning
2 - Tractors operation
Select a skill (press 0 to stop): 0

Team Proposal:
Collaborator: John
Skills: [Tree pruning]
Collaborator: Louis
Skills: [Tractors operation]
Accept team proposal? (y or n): y

Team successfully created!
```

6. Get monthly water consumption of a specific green space | Green Space Manager

- Select option 1.
- Type the year, start and end months you want to obtain.
- Type ID of the green space.

Options:

1. Get monthly water consumption of a green space

2. Get costs of monthly water consumptions

3. Exit

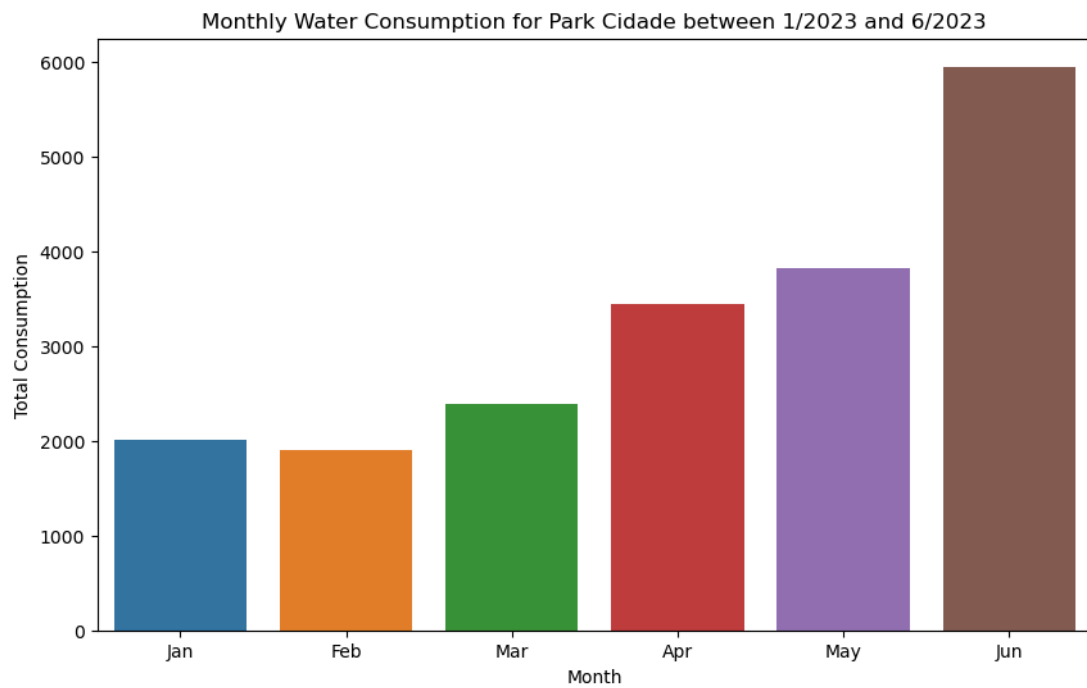
Select: 1

Year: 2023

Start month: 1

End month: 6

Park ID: Cidade



7. Get costs of monthly water consumptions | Green Space Manager

- Select option 2.
- Type the number of parks you want to analyze.
- Type the ID of respective green spaces.

Example:

AVERAGE OF MONTHLY COSTS

Parque Cidade:
Average of monthly costs: 2739.64€
Parque Oriental:
Average of monthly costs: 759.31€
Parque ArcaAgua:
Average of monthly costs: 191.43€

PARKS WITH HIGHEST AND LOWEST WATER CONSUMPTION

Park with highest water consumption in one day: Cidade
Highest consumption registered: 922.6546875
Mean consumption: 117.53
Median consumption: 86.00
Standard deviation: 71.06
Coefficient of skewness: 4.14

RELATIVE AND ABSOLUTE FREQUENCY TABLE

	Classe	Limite Inferior	Limite Superior	Freq. Absoluta	Freq. Relativa
0	Classe 1	61.750000	233.930937	435	0.199358
1	Classe 2	233.930937	406.111875	13	0.005958
2	Classe 3	406.111875	578.292812	2	0.000917
3	Classe 4	578.292812	750.473750	0	0.000000
4	Classe 5	750.473750	922.654688	1	0.000458

OUTLIERS

	Park	Year	Month	Day	Consumption	Date
509	Cidade	2023	4	29	491.400000	2023-04-29
804	Cidade	2023	6	27	922.654688	2023-06-27
824	Cidade	2023	7	1	230.574094	2023-07-01
829	Cidade	2023	7	2	242.219250	2023-07-02
834	Cidade	2023	7	3	232.903125	2023-07-03
...
1104	Cidade	2023	8	26	230.108287	2023-08-26
1109	Cidade	2023	8	27	216.832809	2023-08-27
1114	Cidade	2023	8	28	227.895708	2023-08-28
1129	Cidade	2023	8	31	221.257969	2023-08-31
2079	Cidade	2024	3	8	413.595000	2024-03-08

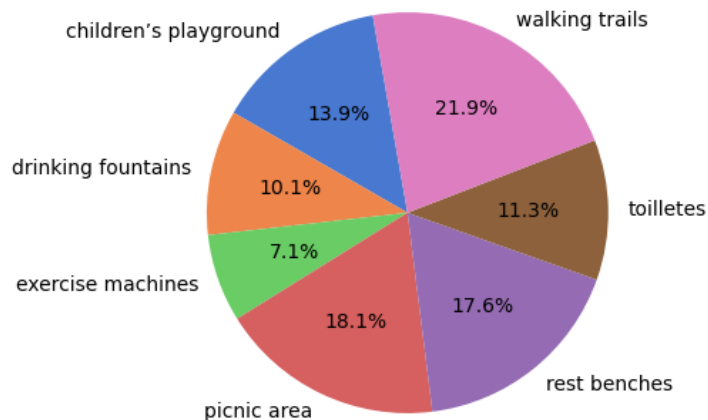
[62 rows x 6 columns]

8. Get which piece(s) of equipment is/are used in each day | Green Space Manager

- Type file name and it'll generate a pie chart.

File name: EquipmentUsed.csv

Percentage use of each piece of equipment



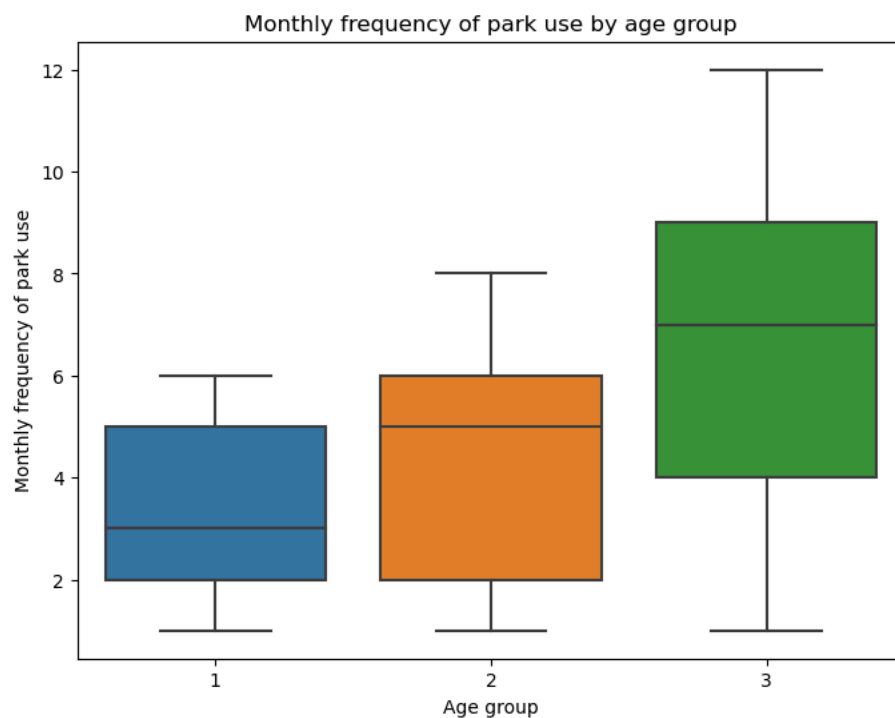
9. Collect data from the user portal about the use of a park | Green Space Manager

- Type file name and it'll generate a boxplot.

File name: Inquiry.csv

Proportion of users from each age group who would recommend the park to others

	count	proportion
Escalao		
1	131	0.473
2	182	0.544
3	187	0.455



10. Import a file with water points and distances into a unique data structure | Green Space Manager

- Select option 1.
- Type the path for the file with the costs of a green space.
- Select option 2 and then it's generated the graph with the cost of the green space.

```
--- GSM MENU -----
1 - Import csv file with water supply
2 - Calculate minimum accumulated cost
3 - Import csv file with meeting points
4 - Place signs to evacuate park users to an assembly point and to one of the several meeting points
0 - Cancel

Type your option: 1

Type the file path to the csv: mdisc/Datasets/Datasets for US13 and US14-20240515/US13_JardimDosSentimentos.csv
Success

--- GSM MENU -----
1 - Import csv file with water supply
2 - Calculate minimum accumulated cost
3 - Import csv file with meeting points
4 - Place signs to evacuate park users to an assembly point and to one of the several meeting points
0 - Cancel

Type your option: 2
CSV file '/Users/beatrizmoraes/lei-24-s2-1dm-g132-/mdisc/output/us13/US13_JardimDosSentimentos-FullGraph.csv' created successfully.
CSV file '/Users/beatrizmoraes/lei-24-s2-1dm-g132-/mdisc/output/us13/US13_JardimDosSentimentos-MinimalCostGraph.csv' created successfully.
Success!
```

11. Get routes with minimum accumulated cost | Green Space Manager

- Select option 2.
- The .csv and .png files with minimum accumulated cost is generated with the data from the file previously imported.

```
--- GSM MENU -----
1 - Import csv file with water supply
2 - Calculate minimum accumulated cost
3 - Import csv file with meeting points
4 - Place signs to evacuate park users to an assembly point and to one of the several meeting points
0 - Cancel

Type your option: 2
CSV file '/Users/beatrizmoraes/lei-24-s2-1dm-g132-/mdisc/output/us13/US13_JardimDosSentimentos-FullGraph.csv' created successfully.
CSV file '/Users/beatrizmoraes/lei-24-s2-1dm-g132-/mdisc/output/us13/US13_JardimDosSentimentos-MinimalCostGraph.csv' created successfully.
Success!
```

12. Run tests for inputs of variable size, to observe the behavior of the execution time of the previous algorithm | Software Quality Assessment Team Manager

- Select option 1.
- The .csv with execution time and .png files with a graphic are generated.

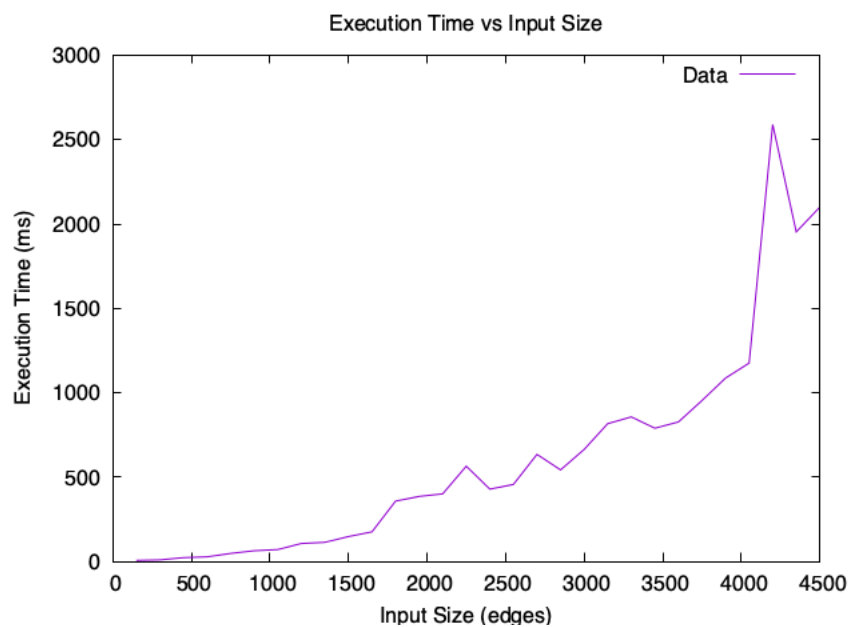
```
--- GSM MENU -----
1 - Run tests for inputs of variable size, to observe the asymptotic behavior of the execution time
0 - Cancel

Type your option: 1
Please indicate the folder with the files:

NOTE: Please only put valid files in the folder!!

Folder path: mdisc/Datasets/Datasets for US13 and US14-20240515/US14
Reading file: us14_1.csv
Reading file: us14_2.csv
Reading file: us14_3.csv
Reading file: us14_4.csv
Reading file: us14_5.csv
Reading file: us14_6.csv
Reading file: us14_7.csv
Reading file: us14_8.csv
Reading file: us14_9.csv
Reading file: us14_10.csv
Reading file: us14_11.csv
Reading file: us14_12.csv
Reading file: us14_13.csv
Reading file: us14_14.csv
Reading file: us14_15.csv
Reading file: us14_16.csv
Reading file: us14_17.csv
Reading file: us14_18.csv
Reading file: us14_19.csv
Reading file: us14_20.csv
Reading file: us14_21.csv
Reading file: us14_22.csv
Reading file: us14_23.csv
Reading file: us14_24.csv
Reading file: us14_25.csv
Reading file: us14_26.csv
```

Example:



13. Place signs to evacuate park users to an Assembly Point | Green Space Manager

- Select option 3 to import files.
- Type path of the files with meeting points and distances.
- Select option 4 to generate .csv and .png files with shortest routes to Assembly Point.

```
--- GSM MENU -----
1 - Import csv file with water supply
2 - Calculate minimum accumulated cost
3 - Import csv file with meeting points
4 - Place signs to evacuate park users to an assembly point and to one of the several meeting points
0 - Cancel

Type your option: 3

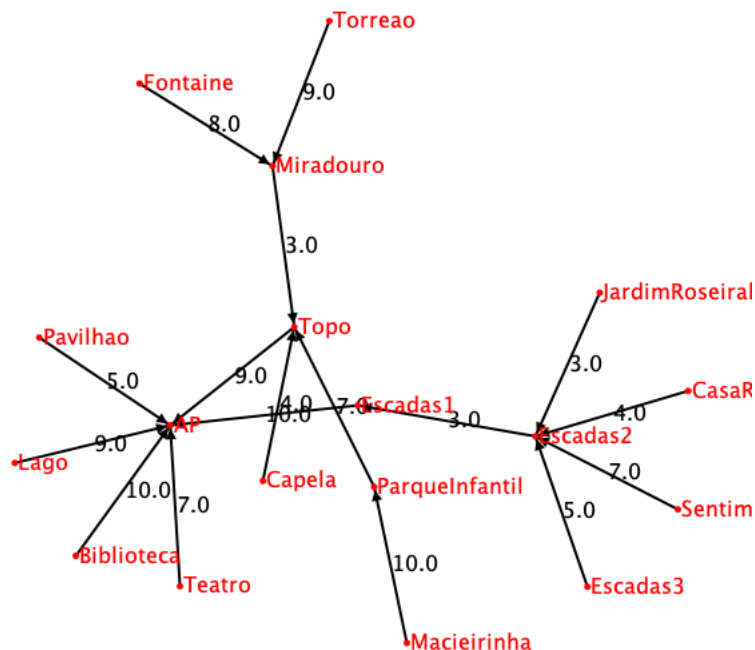
Type the file path with the places: mdisc/Datasets/Datasets for US17 and US18-20240605/us17_points_names.csv

Type the file path with the distances matrix: mdisc/Datasets/Datasets for US17 and US18-20240605/us17_matrix.csv
Success

--- GSM MENU -----
1 - Import csv file with water supply
2 - Calculate minimum accumulated cost
3 - Import csv file with meeting points
4 - Place signs to evacuate park users to an assembly point and to one of the several meeting points
0 - Cancel

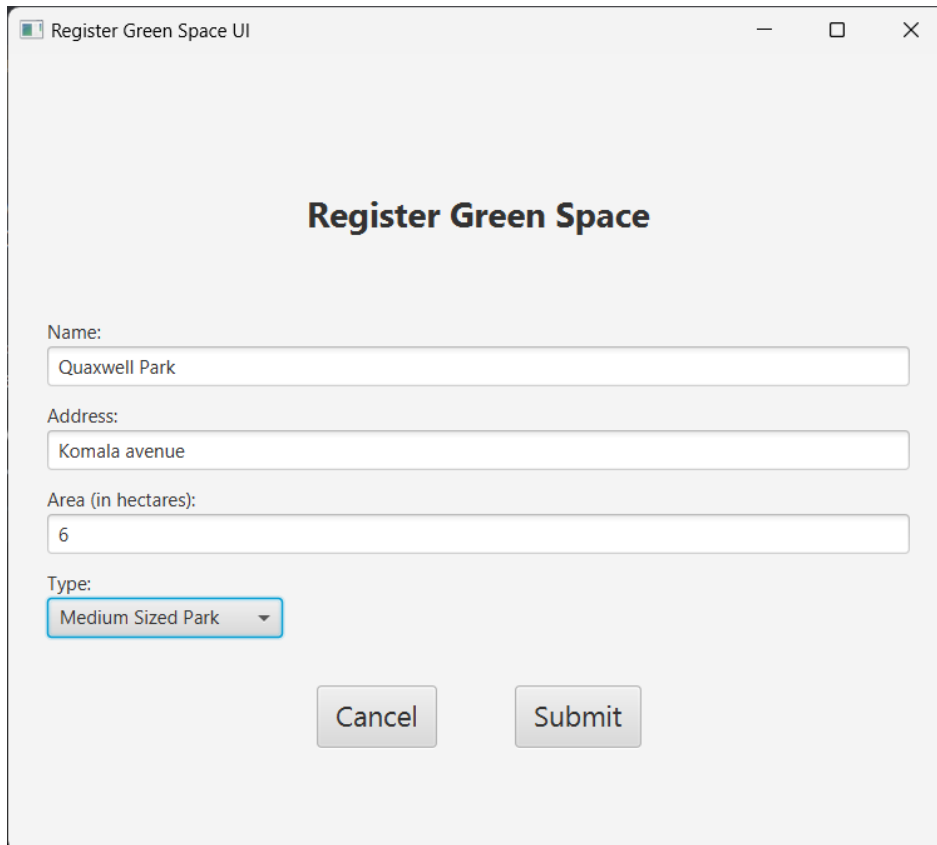
Type your option: 4
CSV file '/Users/beatrizmoraes/lei-24-s2-1dm-g132-/mdisc/output/us18/us17_matrix-Full6graph.csv' created successfully.
Deleted: /Users/beatrizmoraes/lei-24-s2-1dm-g132-/mdisc/output/us18/us17_matrix-PathsToMeetingPoint.csv
CSV file '/Users/beatrizmoraes/lei-24-s2-1dm-g132-/mdisc/output/us18/us17_matrix-PathsToMeetingPoint.csv' created successfully.
CSV file '/Users/beatrizmoraes/lei-24-s2-1dm-g132-/mdisc/output/us18/us17_matrix-PathsToMeetingPoint6graph.csv' created successfully.
Success
```

Example of generated graph:



14. Register a green space | Green Space Manager

- Select first option.
- Type green space's name, address and area.
- Select green space's type from the list.



The image shows a software window titled "Register Green Space UI". The window has a light gray background and a title bar with standard window controls (minimize, maximize, close). The main content area is titled "Register Green Space" in a bold, dark font. Below the title, there are four input fields and a dropdown menu, each with a label to its left. The first field is labeled "Name:" and contains the text "Quaxwell Park". The second field is labeled "Address:" and contains the text "Komala avenue". The third field is labeled "Area (in hectares):" and contains the number "6". The fourth field is labeled "Type:" and is a dropdown menu with "Medium Sized Park" selected. At the bottom of the form, there are two buttons: "Cancel" and "Submit".

Register Green Space UI

Register Green Space

Name:

Address:

Area (in hectares):

Type:

15. Add a new entry to the to-do list | Green Space Manager

- Select second option.
- Type task's name and description.
- Select its degree of urgency.
- Type expected duration of task, in working hours.
- Select which green space to assign the task.

Add Entry to To-Do List UI

Add Entry to To-Do List

Title:

Perform water systems maintenance

Description:

Get to the water systems locations and verify their condition.

Degree of Urgency:

High

Expected Duration (in working hours):

8

Green Space:

Quaxwell Park

Selected Green Space additional information:

Address: Komala avenue

Area: 6 hectares

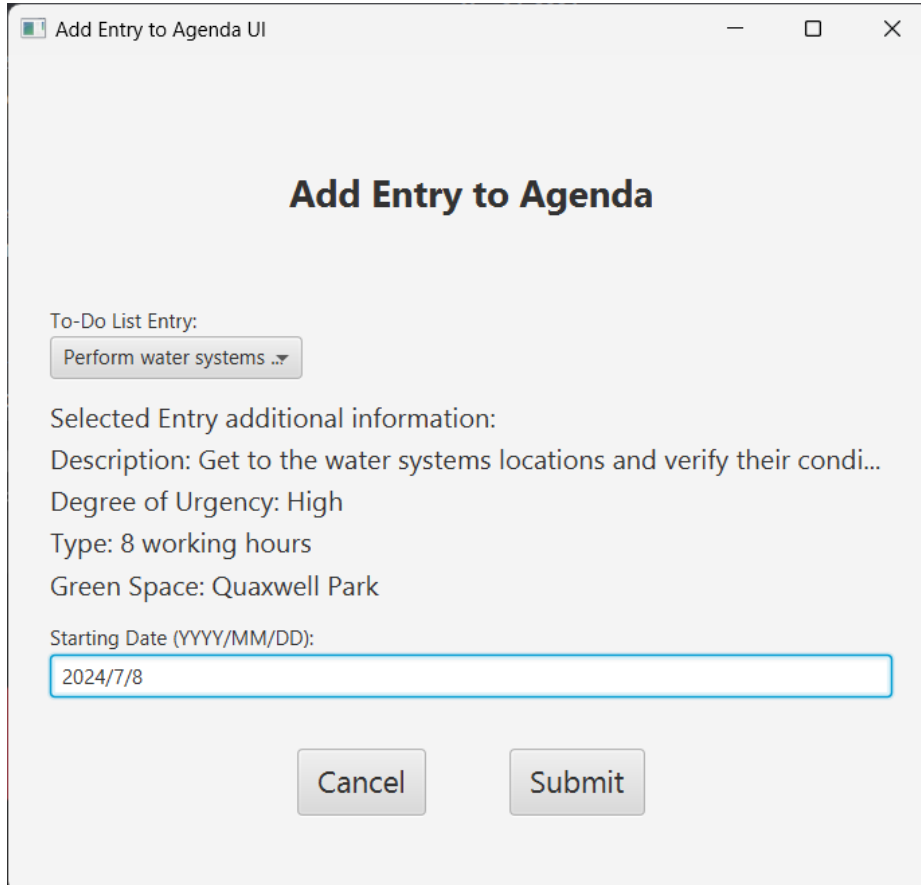
Type: mediumSizedPark

Cancel

Submit

16. Add a new entry in the agenda | Green Space Manager

- Select third option.
- Type task's name and description.
- Select its degree of urgency.



The screenshot shows a window titled "Add Entry to Agenda UI" with standard window controls (minimize, maximize, close). The main heading is "Add Entry to Agenda". Below it, there is a section "To-Do List Entry:" with a dropdown menu showing "Perform water systems ..▼". Underneath, the "Selected Entry additional information:" is displayed, including "Description: Get to the water systems locations and verify their condi...", "Degree of Urgency: High", "Type: 8 working hours", and "Green Space: Quaxwell Park". A "Starting Date (YYYY/MM/DD):" label is followed by a text input field containing "2024/7/8". At the bottom, there are "Cancel" and "Submit" buttons.

Add Entry to Agenda UI

Add Entry to Agenda

To-Do List Entry:

Perform water systems ..▼

Selected Entry additional information:

Description: Get to the water systems locations and verify their condi...

Degree of Urgency: High

Type: 8 working hours

Green Space: Quaxwell Park

Starting Date (YYYY/MM/DD):

2024/7/8

Cancel Submit

17. Assign a team to an entry in the agenda | Green Space Manager

- Select fourth option.
- Select task from list.
- Select team from list to assign a task.

Assign Team to Agenda Entry UI

Assign Team to Agenda Entry

Agenda Entry:

Verification of equipment...

Selected Entry additional information:

Description: Drive through the park and verify if everything is working.

Degree of Urgency: Medium

Type: 5 working hours

Green Space: Parque do heroismo

Starting Date: 2024/6/20

Team:

Composed of: Olivia Ro...

Selected Team additional information:

Composed of:

Olivia Rodrigues: [Driving light vehicles]

Luís Irmandade: [Lighting systems maintenance, Cleaning, Watering s...

Eduardo Machado: [Pruning trees, Cleaning, Watering plants, Planting]

Cancel

Submit

18. List all green spaces managed by me | Green Space Manager

- Select option 5.

```
--- GSM MENU -----
 1 - MDISC - Import csv file with water supply
 2 - MDISC - Calculate minimum accumulated cost
 3 - MDISC - Import csv file with meeting points
 4 - MDISC - Place signs to evacuate park users to an assembly point and to one of the several meeting points
 5 - List All GreenSpaces Managed by Me
 0 - Cancel

Type your option: 5
Name: parque
  Type: garden
  Address: Rua do parque
  Area: 30
Name: parque1
  Type: mediumSizedPark
  Address: rua do parque 1
  Area: 20
```

19. Consult the tasks assigned to me | Collaborator

Troubleshooting

ISSUE 1: Application fails to start

- **Symptom:** The application does not launch when the user tries to open it.
- **Instructions:**
 - Check if your computer meets the minimum system requirements.
 - Ensure that Java is installed and updated.
 - Check for any error messages displayed when trying to start the application.
- **Solution:**
 - Reinstall the application.
 - Update Java to the latest version.
 - Restart your computer and try again.

ISSUE 2: Login issues

- **Symptom:** Unable to log into the system.
- **Instructions:**
 - Verify that the username and password are correct.
 - Check if the account is active.
- **Solution:**
 - Reset the password if forgotten.
 - Contact support if necessary.

ISSUE 3: Unable to register a collaborator

- **Symptom:** Error message appears when trying to register a new collaborator.
- **Instructions:**
 - Verify that all mandatory fields are filled correctly.
 - Check if the taxpayer number and identification document number are in the correct format.
- **Solution:**
 - Ensure all input fields follow the format requirements.
 - Correct any invalid data entries and try again.

ISSUE 4: Skills assignment fails

- **Symptom:** Cannot assign skills to a collaborator.
- **Instructions:**
 - Check if the skill name contains special characters or digits.
 - Ensure the collaborator is already registered in the system.
- **Solution:**
 - Remove any special characters or digits from the skill name.
 - Register the collaborator first, then assign skills.

ISSUE 5: Team proposal generation fails

- **Symptom:** Automatic team proposal generation fails.
- **Instructions:**
 - Verify that the max and minimum team sizes and required skills are correctly specified.
 - Check for any errors in collaborator skill assignment.
- **Solution:**
 - Ensure all inputs for team generation are correct.
 - Correct any errors in skill assignments and try again.

ISSUE 6: Unable to add entry to agenda

- **Symptom:** Entry doesn't appear in list of to-do list entries.
- **Instructions:**
 - Verify that the entry was previously created.
- **Solution:**
 - Register the entry first in the to-do list, then add it to the agenda.

ISSUE 7: Unable to assign team to an agenda entry

- **Symptom:** Team doesn't appear in the list.
- **Instructions:**
 - Verify that the team was previously generated.
- **Solution:**
 - Register the team first, then assign it to an agenda entry.

ISSUE 8: Importing files fails

- **Symptom:** Error when importing files.
- **Instructions:**
 - Verify that the file paths are correct.
 - Verify user permissions.
 - Check for any special characters or incorrect formats.
- **Solution:**
 - Correctly copy file paths.
 - Ensure user has permission to access the files.

ISSUE 9: Unable to locate .png files generated

- **Symptom:** .png files don't appear after being created
- **Instructions:**
 - Verify that the files were successfully created.
 - Verify output folder.
- **Solution:**
 - Successfully generate requested files.

ISSUE 10: Unable to register a green space

- **Symptom:** Error message appears when trying to register a new green space.
- **Instructions:**
 - Verify that all mandatory fields are filled correctly.
 - Check if green space's type was selected.
- **Solution:**
 - Ensure all input fields are filled and follow the format requirements.

Frequently Asked Questions

Q1: Is it possible to register more than one skill/job at a time?

A1: No, it's only possible to register one by time.

Q2: Is it mandatory to insert all information requested when adding a collaborator?

A2: Yes

Q3: Can a skill be assigned to more than one collaborator?

A3: Yes

Q4: Can a collaborator be in more than one team at the same time?

A4: No

Q5: Is it mandatory for a collaborator to have skills assigned to be able to be in a team?

A5: Yes

Q6: Can an entry be added directly to the agenda?

A6: No, the entry is added in the to-do list and then it can be added in the agenda when it's planned.

Q7: Is it possible to register two green spaces with the same area but in different typology?

A7: Yes, the classification is not automatic, it's up to the GSM to decide about it.

Q8: Can an entry in the agenda that already has a Team assigned be reassigned another Team?

A8: No.

Q9: Is it possible to add an entry that has a time period that already has an existing entry in the agenda?

A9: Yes, because different tasks can be executed at the same time in the same park.