

CSIT121 Assignment 1

Search and Record System for Green Star Projects

Due Date: Sunday 31st March - Week 5

Marks: 10

1. Objective

The objective of Assignment 1 is to apply the knowledge of object-oriented design and programming learned from Week 1 to Week 4 lectures. This assignment aims to help a sustainable project named Green Star manage their registered and certified projects. Green Star has more than 1700 registered projects and 4000 certified projects across Australia (see Fig. 1). The official website of Green Star is <http://new.gbca.org.au>, which contains information about the Green Star's policy, resources, events, and projects. In this assignment, students will design appropriate classes using object-oriented concepts, UML class diagrams, as well as appropriate class methods in Python.

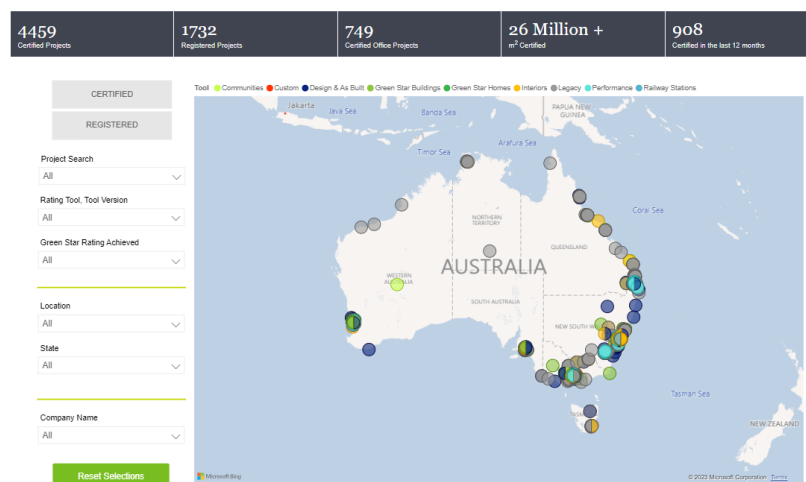


Fig. 1: An overview of Green Star projects

2. Project Description

The website <https://www.gbca.org.au/project-directory.asp> shows the directory of Green Star projects. As Fig. 2 shows, each Green Star project has detailed information, including project title, location, status, Green Star rating, etc. Companies and organizations are also involved in each project with different roles. Besides, each Green Star project belongs to one or more categories with different levels of achievement. In this assignment, students are required to:

2.1 Project Design

1. Design suitable classes using class relationships, such as association, composition and/or aggregation, to represent the relationships between projects, companies, organizations, etc.
2. Add suitable attributes for classes, including instance attributes and class attributes, to construct objects of **projects**, **companies**, **organizations**, etc.
3. Design effective class methods or instance methods to record and search for the project details based on user requests.

Company Name	Project title	Location	Status	Green Star Rating*	Final Score*	Date Certified	Rating Tool
Advertiser Newspapers Pty Ltd	GS-919AB Frank Fenner Building	Acton ACT 2601	CERTIFIED	6	76	22/11/2013	Office As Built v3
	GS-918D Frank Fenner Building	Acton ACT 2601	CERTIFIED	6	85	5/08/2013	Office Design v3
	GS-887OI The Conservatory Fitout	Adel SA 5000	CERTIFIED	5	62	12/06/2012	Office Interiors v1.1
	GS-1276D Australian Federal Police - Office Building	Adelaide Airport SA 5950	CERTIFIED	4	49	10/07/2012	Office Design v3
	GS-1439AB Australian Federal Police - Office Building	Adelaide Airport SA 5950	CERTIFIED	4	50	27/01/2015	Office As Built v3
	GS-24AB The Advertiser	ADELAIDE SA 5000	CERTIFIED	4	45	22/12/2006	Office As Built v1
	GS-33AB 151 Pirie St	ADELAIDE SA 5000	CERTIFIED	4	45	18/07/2007	Office As Built v1

Role Name	Organisation	Category	Category Achievements
Acoustic Consultant	VIPAC Engineers & Scientists	Emissions	- No light beam designs are directed into the night sky or beyond site boundaries. - All refrigerants used have an Ozone Depleting Potential (ODP) of zero. - There are no water-based heat rejection systems serving the building.
Architect	Fender Katsalidis (Aust) Pty Ltd	Energy	- The base building achieves at least a 4.5 Star NABERS (formerly ABGR) rating. - The project incorporated the car parking in the NABERS (formerly ABGR) assessment with 1 carpark space per 200m ² of NLA. - Sub-metering is installed for all substantive base building uses. - Lighting power densities are 2.0 W/m ² per 100 lux for 95% of the NLA. - Sub-metering is installed for each tenancy's lighting and small power within the building.
Building Services Engineer	Bestec Pty Ltd		
Building Surveyor	Katnich Dodd		
Main Contractor	Lendlease Group Services Pty Ltd	Indoor Environment Quality	- A carbon dioxide monitoring system is installed to track and adjust ventilation rates with low carbon dioxide levels. - Installed high frequency ballasts reduce occupants' eye strain from low frequency flicker
Quantity Surveyor	WT Partnership		
Structural/Civil Engineer	Wallbridge and Gilbert		

Fig. 2: Information of Green Star projects

2.2 Program Implementation

The general steps for this project are as follows:

1. Use object-oriented analysis (OOA) to analyze the relationships between Green Star projects, companies, organizations, and categories from the Green Star website (<https://www.gbca.org.au/project-directory.asp>), e.g., association, aggregation or composition.
2. Use object-oriented design (OOD) to propose classes for the Green Star projects and represent their relationships through a UML class diagram.
3. Design attributes (e.g., project title, location, etc.,) for classes by analyzing information from the Green Star project directory.
4. Implement appropriate methods for each class to fulfil the required functions, i.e., recording new projects to the program based on user inputs, and searching for projects based on project title and display the project details.
5. Develop a Python program that uses the while loop to get users' inputs, until users input "exit" or "X". Both lower cases and upper cases should be considered as potential inputs.
6. The Python program should allow users to search for existing projects in the program, to record new projects based on the user inputs, and store the new projects in lists or dictionaries properly.
7. Use the unittest module to test the 'search' function for one existing project.

3. Tasks

This assignment consists of three tasks:

1. Students must examine the Green Star projects on the Green Star project directory (<https://www.gbca.org.au/project-directory.asp>) using OOA and complete the class design using OOD and UML class diagrams.
2. Students must implement Python code based on their design and evaluate their programs with multiple projects. The Python program should be capable of collecting user inputs, recording new project details, searching for projects based on the project title.
3. Students must test the 'search' function for one existing project using the unittest module.
4. Students need to describe their object-oriented design, including attributes and methods of each class, the relationships between different classes and the unittest result in a PDF report. Also, the report is expected to include screenshots of the program execution for all functions.

4. Submission

1. A UML class diagram for your class design. Your UML class diagram should contain at least three classes with attributes, methods and associations and should be drawn using professional tools like UMLet. The UML class diagram should be included in your pdf report.
2. Python source code to implement your class design named as '**A1.py**'.
3. Python source code to implement your unittest named as '**A1_unittest.py**'
4. A pdf report (named '**A1_report.pdf**') to show your UML class design with the explanation, your unittest result (screenshots), and your program execution for all functions (screenshots).

Please put all the documents in a zip file (name '**A1.zip**') and submit the zip file to Assignment 1 on Moodle. Email submissions will NOT be marked.

5. Appendix

- A. The Australian Sustainable Development Goals (SDGs) website: <https://sdgs.org.au>
- B. Green Star website: <https://new.gbca.org.au>
- C. Green Star Project Directory: <https://www.gbca.org.au/project-directory>