

GIT Department of Computer Engineering
CSE 222/505 - Spring 2022
Homework 1 Report

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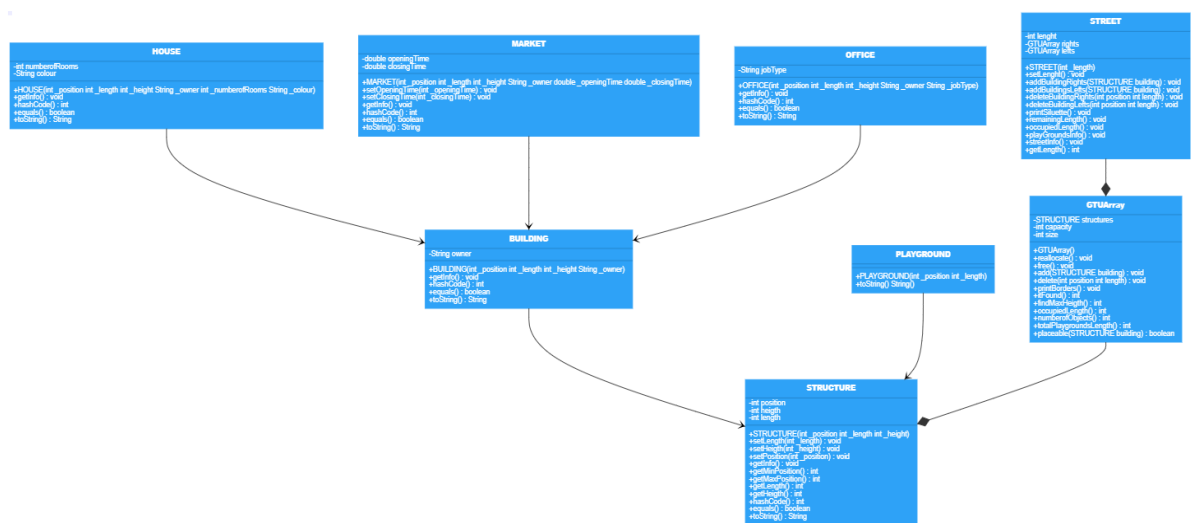
1. SYSTEM REQUIREMENTS

- The system needs one class for street. Street class keeps length of the street. So it must have one parameter constructor, setter and getter.
- The system needs one class for structures. Structure class keeps position, length and height of the structure. So it must have 3 parameters constructor, setters and getters. It also must override hashCode, equals method to compare structures and its subclasses. It also must override toString method to represent structure class.
- The system needs two class for buildings and playgrounds. Building keeps owner of the building. It must have 4 parameter constructor, 3 parameters for ancestor class, also it must have getter. Building class must override hashCode, equals method to compare buildings and its subclasses. It also must override toString method to represent building class. Playground class does not keep anything different than structure class. But it cannot be ancestor class of building class logically. Playground class need 2 parameters constructor, because its height is fixed.
- The system needs three class for houses, markets and offices. House class keeps number of rooms and color of the house. House class needs 6 parameters constructors, 4 parameters for ancestor classes, setters and getters. Market class keeps opening and closing time of the market. Market class needs 6 parameters constructors, 4 parameters for ancestor classes, setters and getters. Office class keeps type of the job. Office class needs 5 parameters constructor, 4 parameters for ancestor classes. House, market and office classes must override hashCode and equals method to compare classes. They also must override toString method to represent this classes.
- There should be a class to keep structure array to deal with increasing/decreasing capacity of array.

2. USE CASE AND CLASS DIAGRAMS

- The classes for houses, markets and offices should be extended by building class.

- The classes for buildings and playgrounds should be extended by structure class.
- There should be an “has-a” relationship between street and GTUArray class.
- There should be an “has-a” relationship between GTUArray and structure.



NOTE: The “.png” file of UML Diagram will be added to “.rar” file to see more clearly.

NOTE: GTUArray keeps STRUCTURE array, but the program which I draw UML diagram on it is not compatible with “[]” sign.

3. PROBLEM SOLUTION APPROACH

i. Printing Silhouette of the Structure Problem

To print the silhouette of the structure, we need a 2D char array. The size of the array should be length of the street * maximum height of the structures. For this reason, we need maximum height. To find maximum height, the heights of all structures should be compared. After creating array, borders of all structures should be drawn on the array by '*' if it is not in the any other structures borders. Fills inside borders with 'X'. After all the borders are drawn, convert 'X' to ' '.

ii. Structure Array Problem

If we do the capacity increase operation for every element of structure array it would be too many operations. So if the capacity of array is full, increase the capacity by multiplying it by 2. It provides us to do fewer operations. When decreasing capacity, similar problem occurs. To avoid unnecessary memory usage, when size is half of the capacity, decrease the capacity by dividing it by 2.

4. RUNNING AND RESULTS

The results have been added to the assignment file.