

Homework 2 - Floor Layout Designer

Topics covered: ***Working with Classes and Linked List***

Homework due: **October 23 at 11:00PM**

Objective:

The objective of this homework is to create classes for specifying a 2D space layout, which should be represented internally as a linked list.

Scenario:

You are creating a floor layout designer (FLD). Using this tool you may specify the layout of the rooms of a residence, called a floor plan, consisting of basic room types and spaces for various activities. To simplify, you will only consider a rectangular foot print for your floor plan. That means all the rooms can be arranged within four sides of an area of rectangular shape. The sides are equivalent to the outside walls. The internal walls serve to partition the interior space of the home. Indicate the interface elements on the wall, such as door, window, opening space, etc. Think in terms of partitioning a 2D space into non-overlapping rectangles (rooms or spaces). Each rectangle has its attributes, such as geometry (size, dimensions, and placement), topology (connecteness, adjacency), and function (the room type).

Part A – OOD -Design the classes to be used in a floor layout designer program.

You may use the following sample floor plan to guide you in the definition of the classes needed for your FLD application. Show your work.



2D Floor Plans

A 2D floor plan is a type of diagram that shows the layout of a space from above including the walls and rooms. 2D means that the floor plan is a “flat” drawing, without perspective or depth. A 2D floor plan can be a sketch, a blueprint or computer drawing.

Part B – OOP – Design the code to implement a floor plan.

The description of the layout of the rooms should be given in terms of a linked list data structure. Given the definition of the classes, you should write a driver program to generate the design outcomes such as total home space, private space, and public space.

Make all necessary assumptions to design a layout of a home, say, with two bedrooms, bathroom, kitchen, and other utility spaces, as shown in the figure above. Make sure to explain all the functions required to create space/room with desired dimensions, and to place them in order to fill the given footprint of the floor. Write a driver program to generate the output design information, such as total square footage (the size of the home space), the private space and the public space.

Submission:

Submit a report of both Part A and B. Part A report should include the problem statement, the requirements, the assumptions made, and the rationale why and how your classes are derived.

Part B should include sample results printout and instructions for compiling and running the programs, the source code files and any required data files in a zip file.

This homework can be done in group. Make sure to include the name of all group members (up to four members), and what each member contributed.

Submission should be submitted via BlackBoard.

Grading:

1. 40% - Part A – OOD.
2. 40% - Part B – OOP.
3. 20% - Documentation.