

Why I would like to work at Borewell

At Cardiff university I have been lucky to study a wide range of languages and modules. However, I am most interested in working with high level programming languages which is why I am keen to find a placement which will allow me to improve on and extend my technical skills in languages such as Java. Borewell is a reputable UK based software house which I would be not only be proud to work for, but able to extend my technical and team skills.

My program 'Room'

The purpose of the Room program is to allow the user to enter in the dimensions of a room via a simple command line interface using RoomRunner. The user will be asked to enter the dimensions one at a time and pressing return in between. Once the length, width and height have been chosen, the user must press return once to reveal the area of the floor, volume of the room and the surface area requiring paint to two decimal places.

If the user has incorrectly entered in a value, the program will end and the user will be told to enter integers/decimals larger than zero.

The RoomTest is a simple test file to check that the expected values are outputted when certain values are inputted.

Assumptions

- The room dimensions is the dictionary definition of a dimension i.e length, width and height
- The amount of paint needed has been worked out as the surface area that needs painting, rather than the number of litres of paint needed
- When working out the amount of paint needed, doors and windows are not taken into consideration
- The dimensions are constant values
- The dimensions are all inputted in metres
- The room is square or rectangle so the walls are orthogonal to one another.

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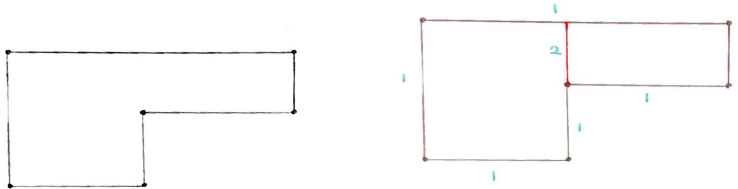
Extension of the program

One of the first extensions I would make would be to take windows and doors into consideration as well as having an option to change the unit of measurement to provide flexibility to my program.

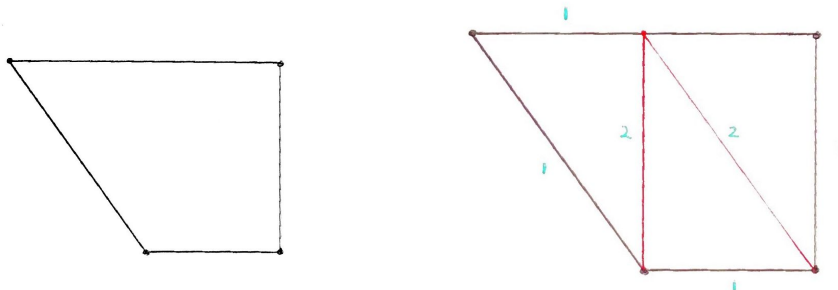
Secondly, I would change my code to work out the area, wall paint and volume with not only regular shaped polygons, but also in irregular. This would mean that rather than taking in the dimensions of a room (l, w, h), the program would take a series of points (x,y). These points

would represent room corners allowing more than simple rectangular rooms to be used in the program.

For a room that has walls that are orthogonal to one another, the series of points would be able to be used by the program to place lines within the room to provide a series of internal squares. Once the lines had been placed, the algorithm would work out the intersection points between the lines within the room to iteratively work out the areas of the internal squares to calculate the total area. This can be seen by the diagrams below.



If the input also allowed for non orthogonal walls, then the implementation would be more complicated and involve sub-dividing the room into internal triangles rather than internal squares. For this I would look into using 'Triangulation by Ear Clipping'¹ where an ear of a polygon is a triangle formed by three consecutive vertices. In addition to having orthogonal walls which can be seen in my diagram below, there may also be curved walls. This could be implemented further by extending point definition to allow a radius to be defined between two points dealt with by "ears" evaluating internal area.



Once the area had been implemented for all of these possibilities, the volume and perimeter of the room would not be difficult to implement.

¹ <https://www.geometrictools.com/Documentation/TriangulationByEarClipping.pdf>