

Problem statement for the CS12420 2013-2014 exam

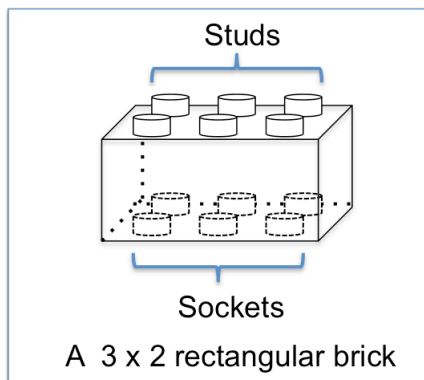
The following problem statement forms part of the CS12420 May exam. We decided to give you this so that you can think about the problem prior to the exam and also so that you don't have to spend so much time reading and understanding the statement during the exam.

The statement is missing a few extra parts that will be provided during the exam as well as questions related to the problem. We suggest that you look at previous year exam papers to see the kinds of questions we set.

Finally, this problem only pertains to part of the exam paper.

The problem

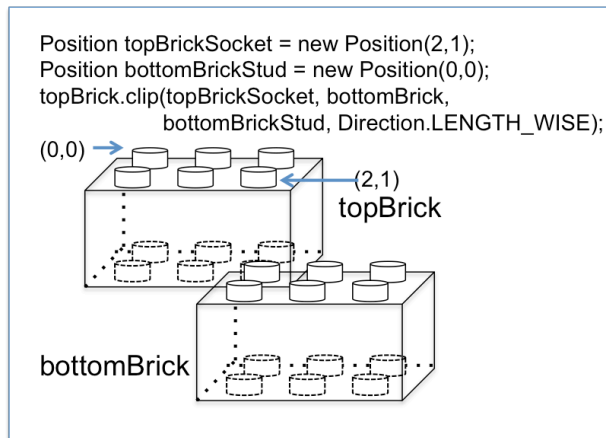
You are working on a game that will allow users to create buildings and other things using rigid bricks. These bricks have raised studs that clip into the sockets of other bricks. Here is a 3 by 2 rectangular brick that has six studs on the top and six sockets underneath.



The game comes with 1 by 1 rectangular bricks, 2 by 1 rectangular bricks and 3 by 2 rectangular bricks. It also has versions of these rectangular bricks that have no studs (smooth top), and versions of these rectangular bricks with no sockets (smooth bottoms). Clearly, a brick that has no sockets cannot be clipped onto a brick with either studs or no studs. Other kinds of bricks may be added to the game in the future. These may be rectangular or indeed other shapes.

The bricks each have a serial number and a colour.

The *clip* method is used to clip two bricks together. The top brick may overlap the lower brick. Note that only two bricks at a time can be clipped together. The *startSocket* parameter specifies the *Position* of the starting socket of the top brick. The *Position* class specifies the X and Y coordinates of the stud or socket, where position $x=0$ and $y=0$ is the position to the far left and furthest from the end user viewing the brick. The direction of clipping is either `LENGTH_WISE` or `WIDTH_WISE`. If `LENGTH_WISE` then the top brick is clipped with its longest edge showing. This is shown in the following diagram.



If WIDTH_WISE then the top brick's shortest edge will face towards the game user. In the above example it would clip onto the leftmost two studs of the bottom brick and overhang the front of the bottom brick.