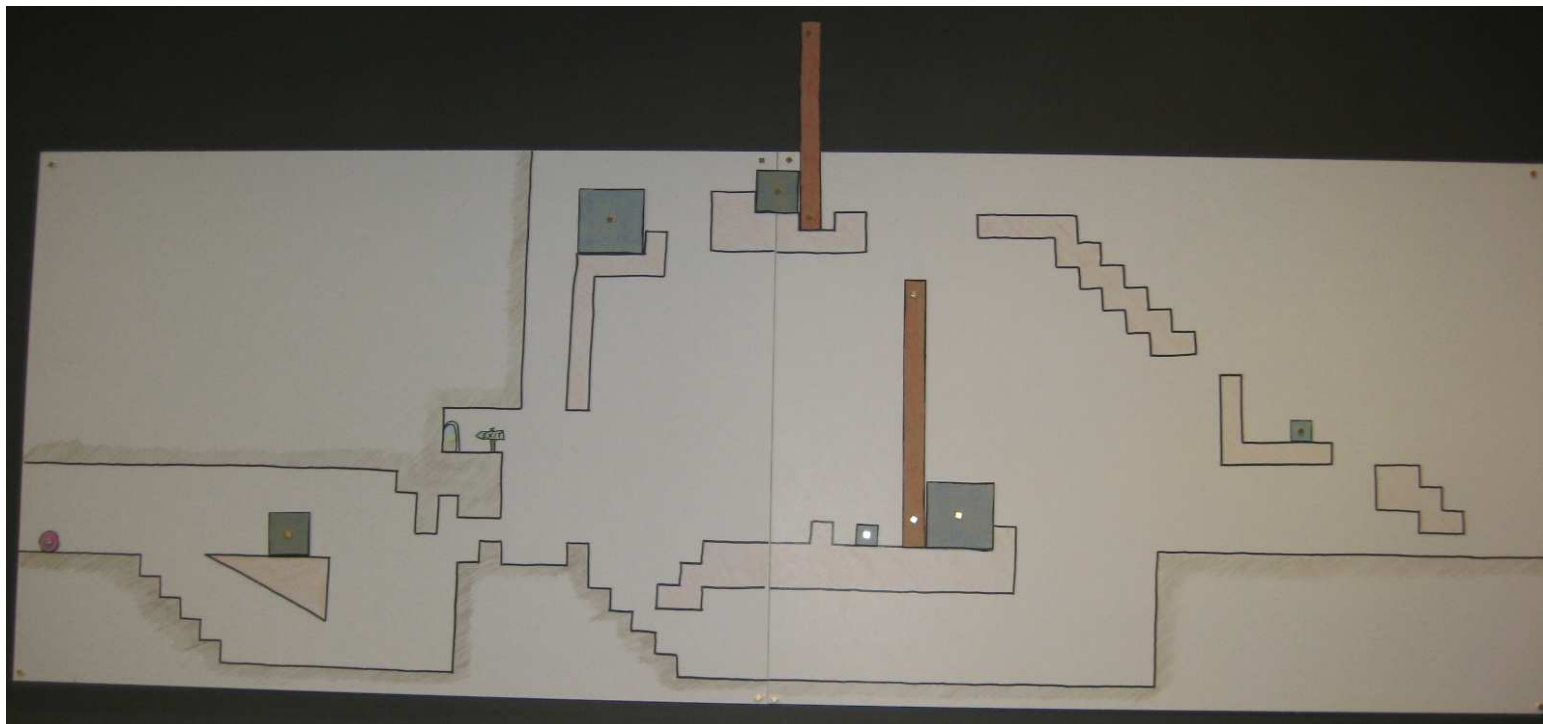


# Physical prototype

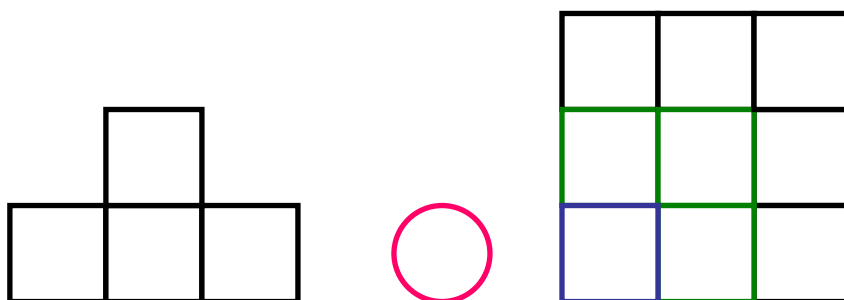
## How our prototype works

We have built our physical prototype with two sheets of A2 paper and carton. On the sheets we drew our level that we had designed before. The boxes were cut from the carton we made three different sizes, a small box of 2 cm, a middle one of 4 cm and a big one of 6 cm. Additionally, we created red planks that are only movable but not resizeable. Little Sister has a radius of 1 cm. In the following photo, one can see the three different sizes of the blue boxes, the red planks as well as Little Sister herself at the beginning of the level in pink.

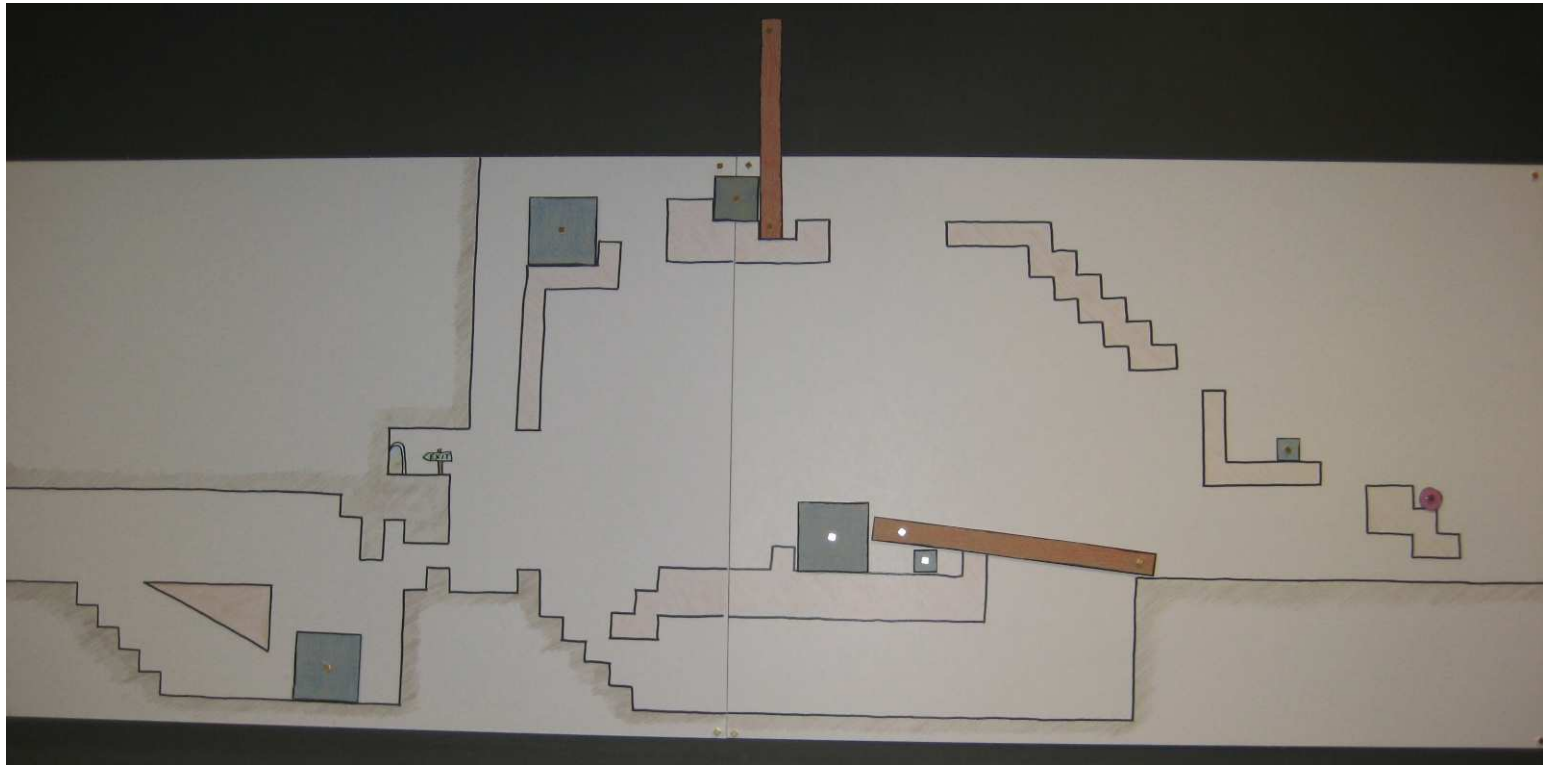


The boxes are blue to indicate their resizability and the planks are red. The player now has to steer Little Sister to the Exit and solve the puzzles by resizing the boxes, this is done by choosing one box of the three different sizes. There are rules for moving Little Sister. She can jump straight up two small boxes and she can pass gaps of a size of three small boxes.

The first illustration on the left indicates how far she can jump. One box is of the size of the smallest box. Little Sister is pink and on the right the different boxes are depicted. In blue the smallest box, in green the middle box and black the biggest box. She can still jump onto the middle box, but this is the highest spot she can reach.



These rules ensure that the player has to solve the puzzles in order to get to the exit. For example in the first part of the level, she can not jump over the gap and neither can she jump up from down the gap. In order to get on, she has to push the box down, jump on the box, resize it and then she can go on.



This is a photo where Little Sister has advanced and solved two puzzles. As already explained she first pushed down the box in the first level and resized it afterwards. In the second puzzle she needed to jump against the red plank so that it fell over the gap.

## Experience

We have tested our prototype several times. During our level design, each one of us invented one level and the others then tried to solve it. Solving the puzzles was fun to us, even if the puzzles we have used in our prototype are the easier ones. But we also enjoyed inventing the puzzles.

During that process we found out, that we can do a lot of interesting puzzles by only using boxes and planks. What is more is that 3 different sizes are enough to create challenging puzzles. If we use more sizes, it might get more difficult to design the levels and to make them physically working. For the moment we therefore will stick to just 3 sizes of the boxes. Like in our prototype, the second box will be twice the first and the third box will be three times the first. Little Sister will have the dimension of the first box. Planks will have a width similar to the first box but their length depends on the application. They will not be resizable. As we already had a lot of ideas for challenging and interesting puzzles with only the resize ability, we will rethink about implementing other abilities like levitation and so on. The only exception would be time reversal, as is motivated in the next paragraph.

We took great care, that the player can not destroy the puzzles so that they would get unsolvable. This is a big issue at the moment, as we don't yet have the function to reverse time in our first goals. Without that function, if a player has made an unforgiveable error, he

would not be able to continue. We therefore placed stoppers so that boxes can not be pushed down where they should not and we tried to use puzzles that are not destroyable.

Another issue we found is that we carefully have to balance the physical properties of the objects. For example the red planks in our prototype need to fall into the right direction. This is of course even a bigger issue when time reversal is not yet implemented.

We also detected that we will need a camera that is moving with the player, otherwise with a static camera that shows the whole level, we only can implement small levels.

Overall we can say that we are looking forward to our game but that thanks to our prototype we have already find some issues but also some points that we planned which probably won't be too important.