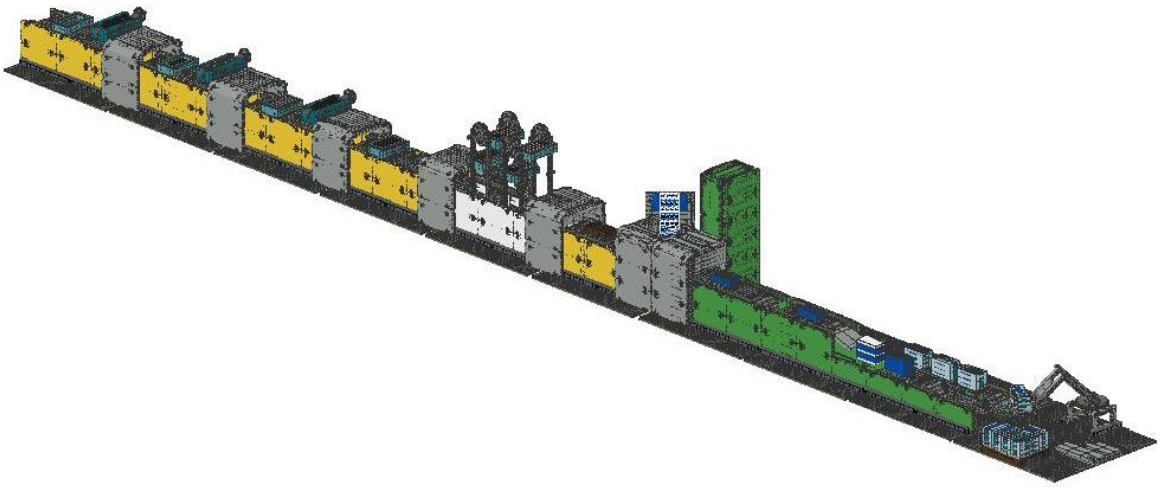
automated Chocolate Factory

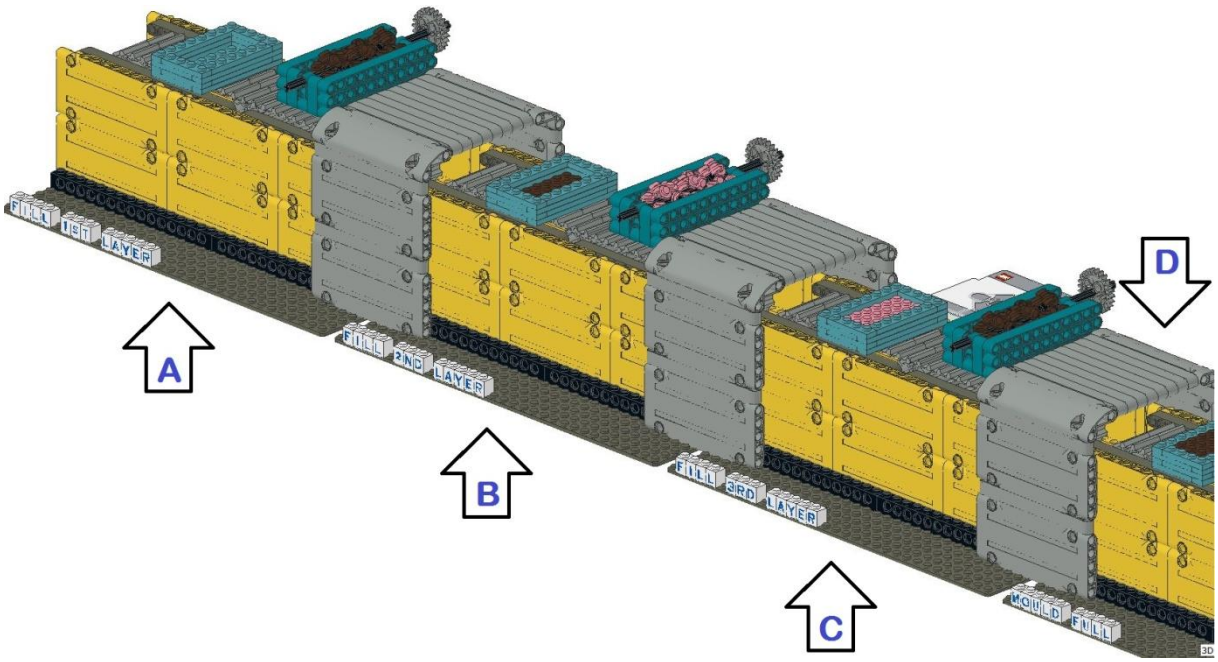
After a guided tour to the Milka chocolate factory in Bludenz / Austria, during the Milka Chocolate Festival 2015, I was excited about the factory and instantly thought about bringing it to life with the help of the LEGO Mindstorms robotic system.



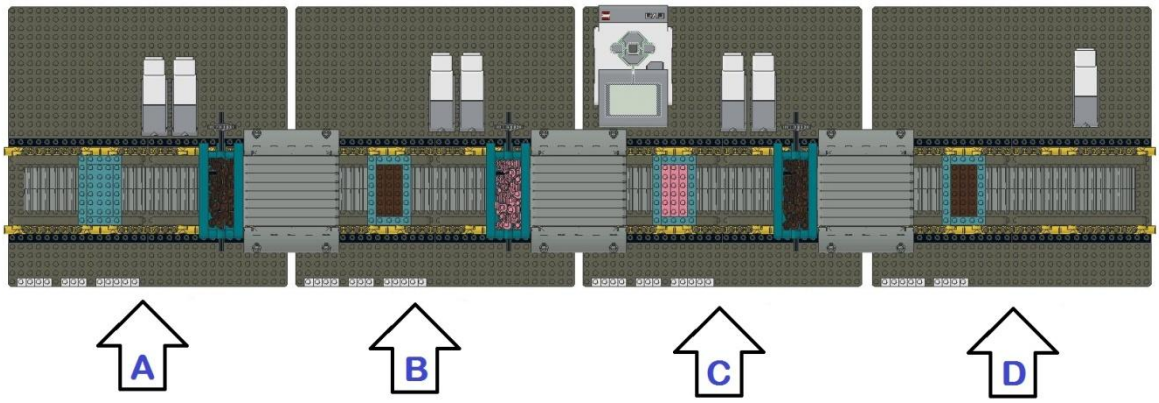
Mike Brandl, August 2015

The automated chocolate factory consists of the following modules:

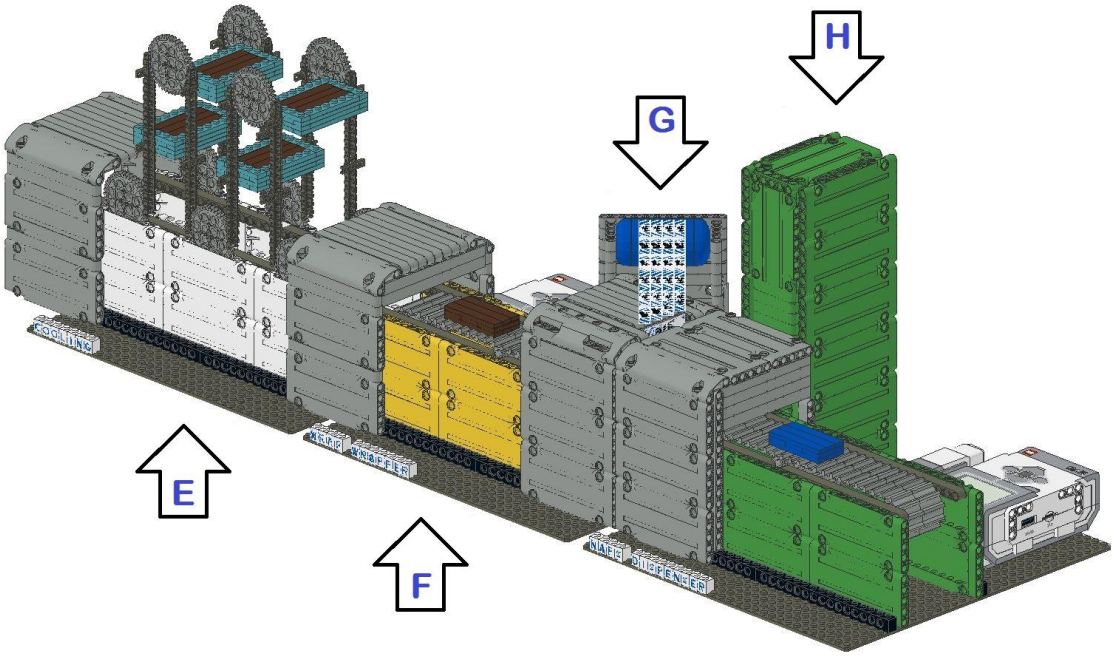
Chapter 1 - THE „BIRTH“ OF THE CHOCOLATE BAR (chocolate bar made of LEGO bricks):



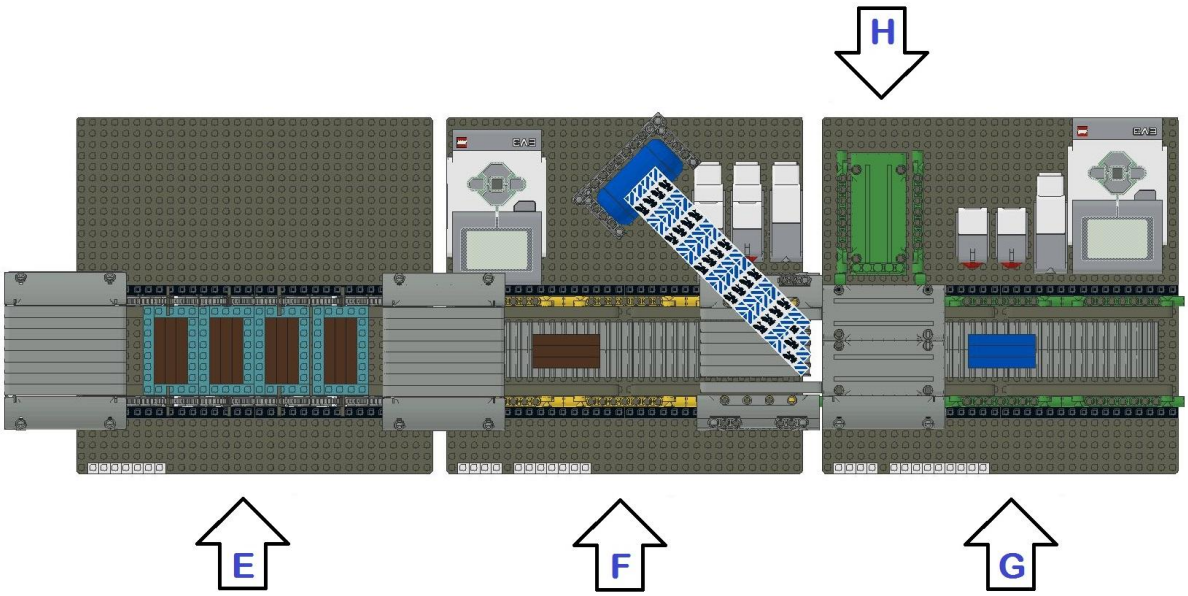
module A: empty chocolate mould
module B: 1st layer filled in - chocolate
module C: 2nd layer filled in - strawberry cream
module D: 3rd layer filled in – chocolate



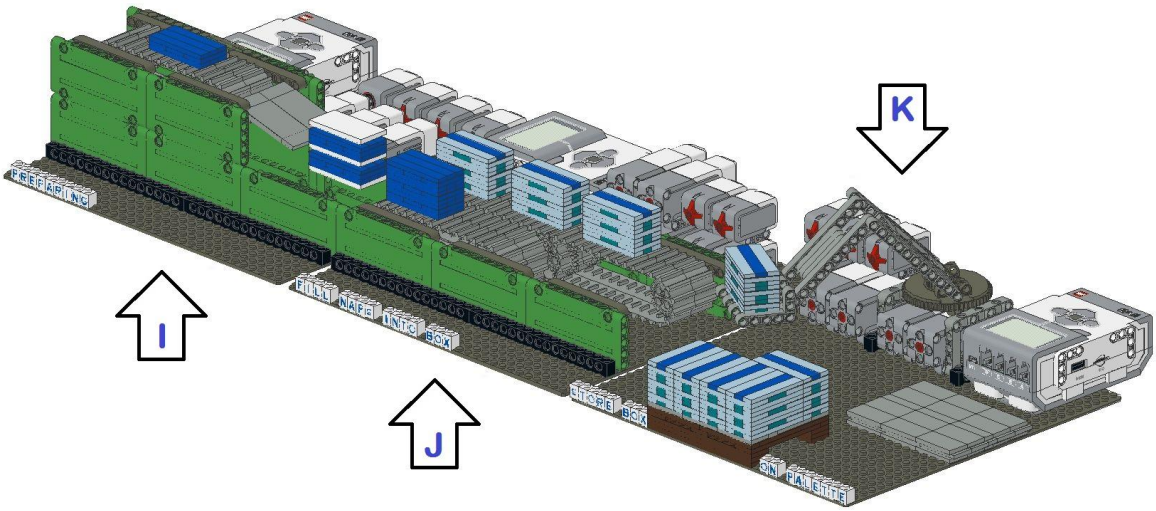
Chapter 2 - THE CHANGE FROM BRICKS TO CHOCOLATE:



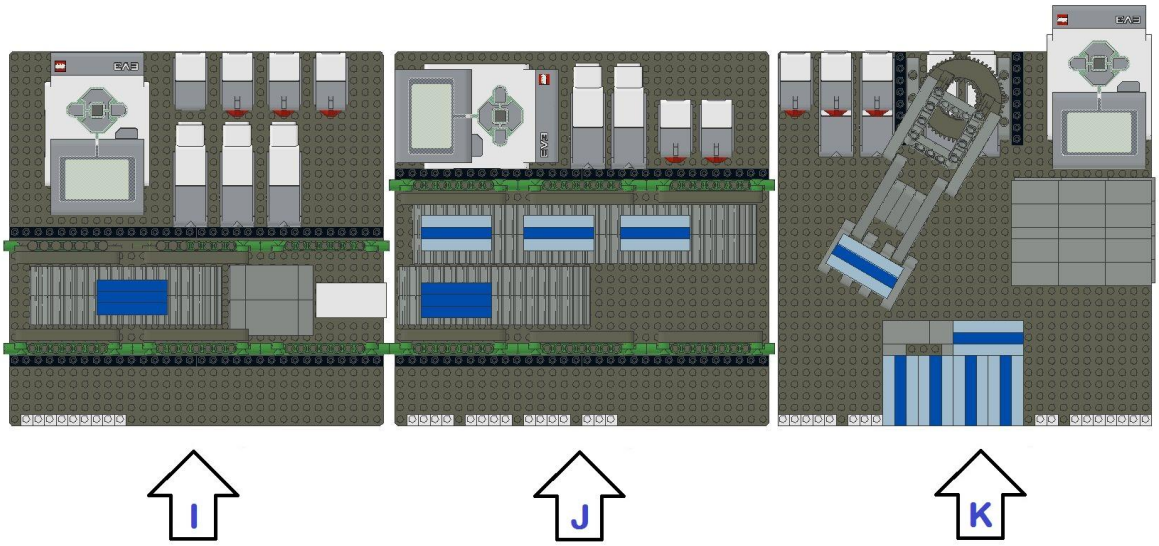
module E: cooling of the filled mould
module F: emptying the mould, LEGO bricks chocolate bar
module G: wraping of the chocolate bar, hidden change to Milka Naps
module H: storage of Mika Naps



Chapter 3 - READY FOR DELIVERY:



module I: ready for boxing, grouping three Milka Naps
module J: boxing of three Milka Naps to a cardboard box
module K: handling of the filled boxes with the aid of a four axis robot, storage on palettes



FUNCTIONS IN DETAIL:
(please consider this as a raw hand drawing – a proposal of doable functions)

module A: start your engines … the empty mould is waiting to be filled with chocolate, the feed hopper is filled with liquid chocolate (small LEGO studs), the conveyor belt starts moving, a mixer stirs the first feed hopper …

module B: … the mould is going through the first shaker and is now filled with the first layer of chocolate, the conveyor belt keeps moving, a mixer stirs the second feed hopper …

module C: … the mould is going through the second shaker and is now filled with a layer of strawberry cream, the conveyor belt keeps moving, a mixer stirs the third feed hopper …

module D: … the mould is going through the third shaker and is now filled with a second layer of chocolate, the conveyor belt keeps moving, the mould is filled up …

module E: … the mould now has an even chocolate surface and is entering the cooling chamber, going up and down, following the transport chain …

module F: … cooling done, the mould is emptied onto the moving conveyor belt, the LEGO bricks chocolate bar is visible in it‘s full glory …

module G: … the wraping station, the LEGO bricks chocolate bar is incoming and the foil drum is delivering the package foil, let’s wrap some Milka Naps …

module H: … and a real Milka Naps is laying on the moving conveyor belt, this module makes the hidden change from a LEGO bricks chocolate bar to a real Milka Naps, the storage tower is providing one Milka Naps at a time in exchange …

module I: … the moving conveyor belt transports the Milka Naps to the grouping station where three of them are grouped to be filled into the cardboard box …

module J: … a group of three Milka Naps are filled into an empty cardboard box, the boxes are closed and moving on on the conveyor belt (either the cardboard boxes are made before and are provided as a stack of open boxes, or there will be another robot making those boxes out of a prepared cardboard piece, folding and glueing it into shape, but that is a (complicated) project on it’s own … tempting, but complicated) …

module K: … the filled boxes are arriving at their last station, a four axis manipulating robot is handling one box at a time, piling them up on a palette, gouping three boxes on one side and two other boxes rotated at 90 degrees on the other side, just like the original Kuka robot …