**“Final” Option**

1. Starting position:
   1. 3 robots, 1 conveyer belt with photoelectric barrier and color scanner
   2. Next to robot one are three predefined spaces with pallets. On the palettes are three differently colored blocks (red, green, blue) randomly distributed (4 blocks per palette => 12 blocks in total
   3. Conveyer belt leads from robot 2 to robot 3
   4. Robot one is connect to one RPi, Robots 2 and 3 are connected to one RPi
2. Send start signal with Node-RED
3. Robot 1 picks up pallet 1 and places in the reach of robot 2
   1. Robot 1 sends signal via Node-RED for Robot 2 to start unloading from pallet
4. Robot 2 picks up one block at a time from the pallet and places it on the conveyer belt
5. After each block, the conveyer belt moves a bit more than one block-length after which the next block is placed.
6. Robot 2 sends signal via Node-RED for Robot 1 do remove the pallet and load the next pallet
7. Repeat steps 3-6 until all three pallets / all 12 blocks are loaded onto the conveyer belt
8. Robot 2 sends signal via Node-RED that all blocks are loaded onto the conveyer belt
9. The conveyer belt moves the blocks toward robot 3 until the photoelectric barrier detects a block and stops
10. Robot 3 picks up the block in front of the barrier and places it on the color sensor
11. Color sensor determines the color of the block
12. Robot 3 picks up the block and places it either on the “output”-pallets or the “waste”-basket depending on the color of the block and the respective amount of this color that has already been sorted. Each “output”-pallet can only hold four blocks. If the maximum has been reached the respective block will be removed to the “waste”-basket
13. Repeat steps 5 -8 until are blocks are sorted
14. Send signal via Node-RED that all blocks have been sorted and the process is finished

**Robot 1 (heavy lifter):**

**Tasks:** Picking up palettes, serving to robot 2

**Attachment:** Claw

**Connections:** none

**Scripts on connected Raspberry Pi:**

* 1. Transfer of palettes to robot 2

**Robot 2 (pick’n’placer):**

**Tasks:** Transferring blocks from palettes to conveyer belt.

**Attachment:** Suction cup

**Connections:** Conveyer belt, photoelectric barrier

**Scripts on connected Raspberry Pi:**

* 1. Transfer of blocks to belt
  2. Stepwise transport of blocks to robot 3

**Robot 3 (pick’n’sorter):**

**Tasks:** Transferring blocks from palettes to color sensor, sorting blocks onto palettes or waste basket

**Attachment:** Suction cup

**Connections:** Color sensor

**Scripts on connected Raspberry Pi:**

* 1. Transfer of blocks to sensor
  2. Determining color of blocks
  3. Transfer of blocks to correct final spot

**Additional features in case the above process proves too easy:**

The palettes onto which robot 3 places the colored blocks do not have a pre-defined color. Instead, robot 3 starts sorting before all blocks are on the conveyer belt and the first block is placed on palette 1 making this the assigned palette for this color. From this stage, the system needs to keep track of which palettes has which color assigned to it.

**Initial Ideas:**

**Option 1 – sorting of random colors**

1. Starting position:
   1. Three different colored blocks (red, green, blue) are randomly placed on given spaces next to robots 1 and 2
   2. A conveyer belt leads from robots 1 and 2 to robot 3
   3. Next to the robot 3 there are predefined spaces for each color
2. Robots 1 & 2 alternately pick up one of the “random colored” blocks and place them on the conveyer belt
3. As soon as one block reaches the photoelectric barrier the conveyer belt comes to a halt
4. Robot 3 picks up the block
   1. Places it on the color scan
   2. Classifys the color
   3. Sorts and places it to the correct predefined space

**Option 2 – sorting of sorted colors / infinite loop**

1. Starting position:
   1. Three different colored blocks (red, green, blue) are sorted and placed on given spaces next to robots 1 and 2
   2. A conveyer belt leads from robots 1 and 2 to robot 3
   3. Next to the robot 3 there are predefined spaces for each color
2. Robots 1 & 2 alternately pick up one of the blocks and place them on the conveyer belt
3. As soon as one block reaches the photoelectric barrier the conveyer belt comes to a halt
4. Robot 3 picks up the block
   1. Places it on the color scan
   2. Classifys the color
   3. Sorts and places it to the correct predefined space
5. After all blocks are sorted
   1. Robots 1 & 2 pick up the pallets with the sorted blocks and
   2. Place them on the starting position / predefined spaces

This loop could go on for any amount of runs.