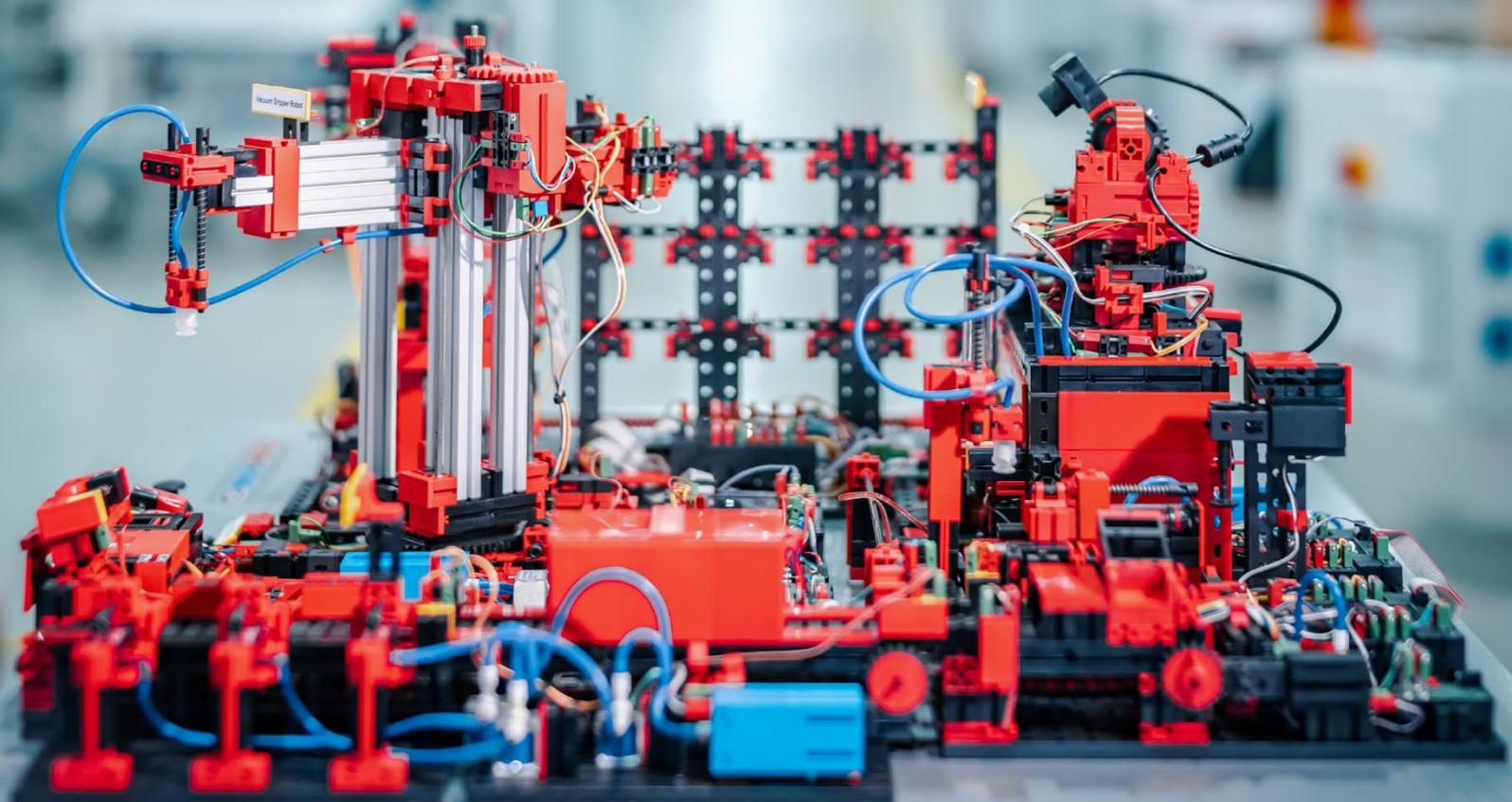


LEARNING FACTORY 4.0 24V

Accompanying booklet

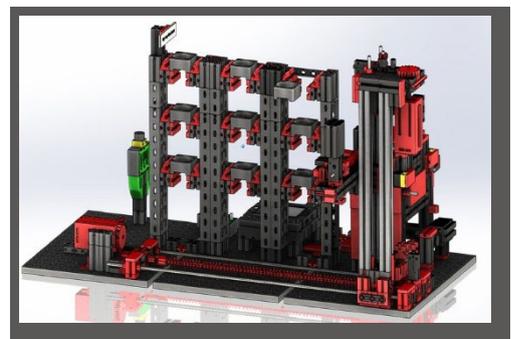
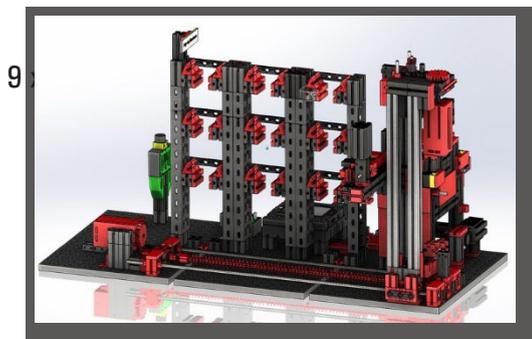
Status: 22.03.2024



In the following tasks, you will learn how to operate the factory and the dashboard.

Task 1

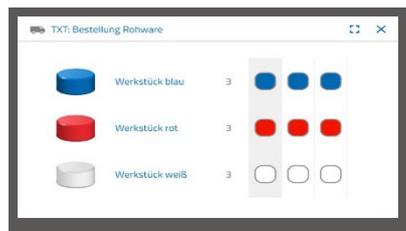
Before raw goods can be stored in the high-bay warehouse, the compartments must be filled with the empty containers supplied. This is the first task you have to perform as a warehouse clerk.



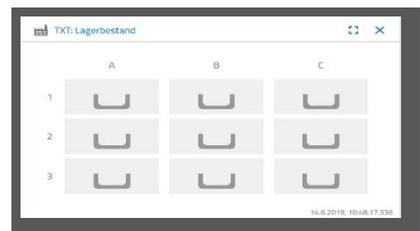
Your dashboard looks like this:



order
blue, red, white not available, stock 0



Order raw material
No order placed



Stock
Stock empty, as no raw materials were stored



Important: If this is not the case, you can use the supplied key fob or card (with integrated NFC tag) to reset the dashboard windows to the default setting.



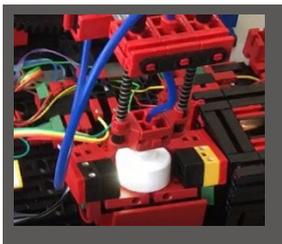
Task 2

Order raw materials to be stored in the high-bay warehouse as stock. To do this, store the raw materials manually in the input station.

First store only one white stone as a workpiece.



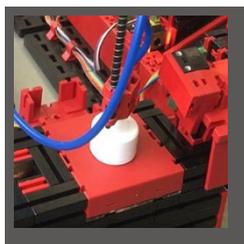
Insert a white stone into the material input. The workpiece (raw material) interrupts the light barrier. This process is recognized as an "inbound delivery" and is highlighted in green in the "Production process" dashboard window with the "Inbound delivery" icon.



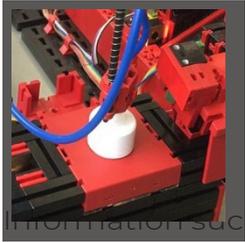
The vacuum suction gripper then moves to the storage position, picks up the raw goods and moves them to the NFC reader.

The process is displayed in the dashboard window as follows:

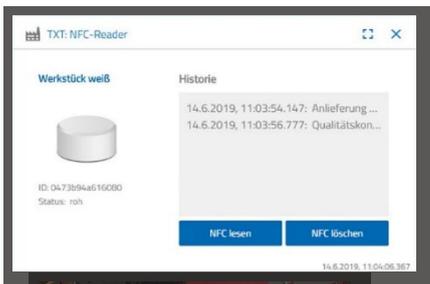
Delivery and vacuum suction pads are active and are displayed in green.



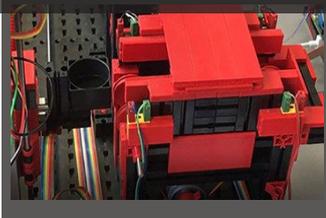
All data on the NFC tag of the raw goods (described above) is deleted here.



The next step involves determining the color of the raw goods. To do this, the vacuum suction gripper moves the raw goods over the color sensor. The data is available to the NFC reader for further processing. Before the raw goods are stored, the determined color data, as well as other information such as delivery data and quality control data is written to the NFC tag using the NFC reader. As both factory modules (delivery and vacuum suction pad) are still active, this is still displayed in green in the "Production process" dashboard window.



This data is displayed in the "NFC reader" dashboard window.



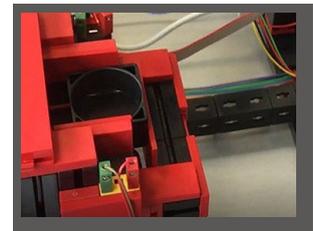
The high-bay warehouse provides an empty container for picking up the raw goods. To do this, the gripper arm moves to the position for an empty container, picks it up with its pusher and places it on the input/output device.



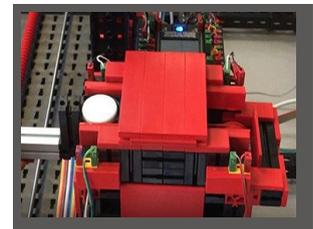
The container is transported to the input position via a conveyor system.



The vacuum suction pad arm rotates to the deposit position, moves downwards and deposits the raw goods in the waiting container.



The container with the raw goods is transported in the input/output device to the pick-up position of the gripper arm of the high-bay warehouse. Here, the container is picked up, transported to the storage location in the high-bay warehouse and deposited there.



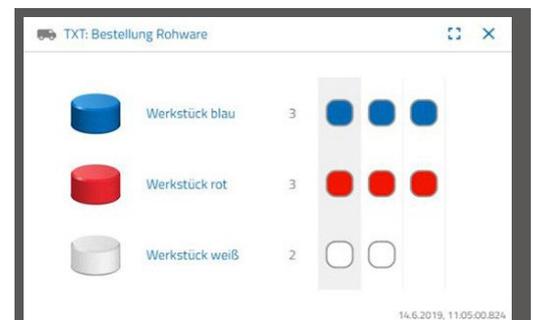
The "Production process" dashboard window shows you how the rest of the storage process is progressing. The icons of all active factory modules light up green when the factory modules are in action.



Look at the following dashboard windows - **TXT: Order raw material**, **TXT: Stock** and **TXT: Purchase order**.

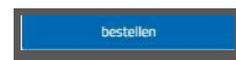
TXT: Order raw material

As a warehouse clerk, you have 3 workpieces per color available for ordering raw materials. After you have stored a white brick in task 2, the dashboard window "TXT: Order raw material" displays the maximum number of white bricks, white bricks by 1. This leaves you with 2 workpieces for storage.



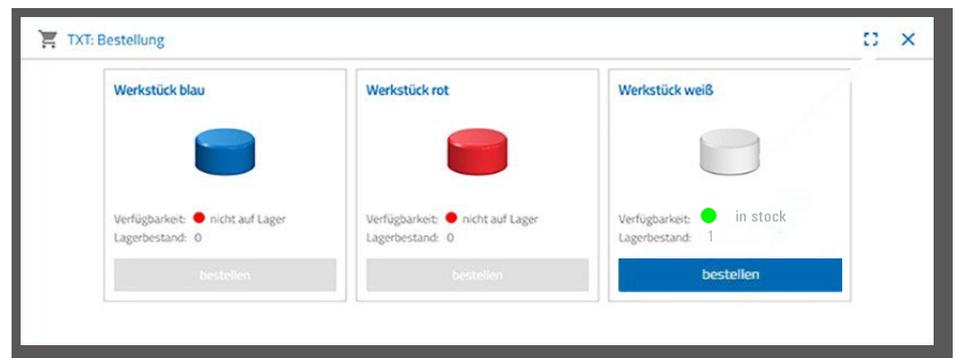
TXT: Stock

In the "TXT: Stock" dashboard window, you will now see a white brick in the stock system. This means that you can order this workpiece as a customer and have it processed.



TXT: Order

The "TXT: Order" dashboard window now shows you that a white stone is in stock and can therefore be ordered.



Task 3

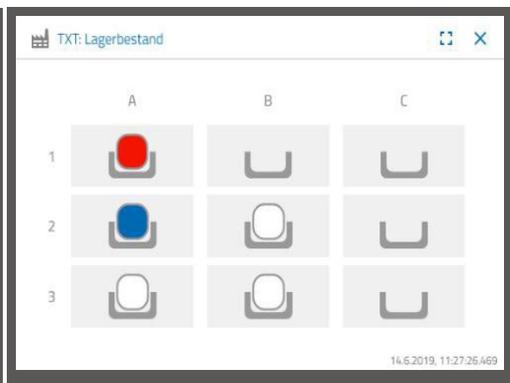
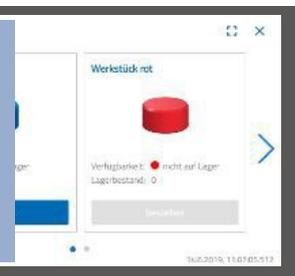
Order raw materials to be stored in the high-bay warehouse as stock. To do this, store the raw materials manually in the input station.

Now store a blue stone as a workpiece.

Place a blue brick in the high-bay warehouse as described in task 2. Once the storage work has been completed, the result is displayed again in the dashboard.

Task 4

Store more raw materials in the high-bay warehouse for stockpiling. You still need two white and one red workpiece.



Task 5

Put yourself in the shoes of a customer who wants to order a white workpiece, for example. Order a white workpiece.



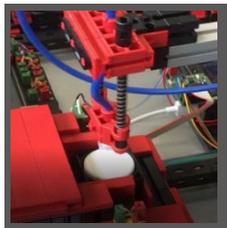
To do this, use the mouse to activate the blue "Order" button in the "TXT: Order" dashboard window.



This happens in the factory: The transport arm of the high-bay warehouse moves into the loading position of a "white workpiece".



picks it up and places it in the input/output station of the high-bay warehouse. There it is conveyed to the pick-up position of the vacuum suction pad.

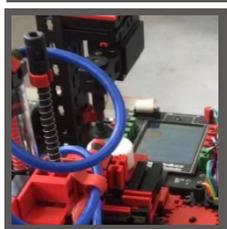


The vacuum suction pad picks up the workpiece at the pick-up position and places it on the kiln slide.

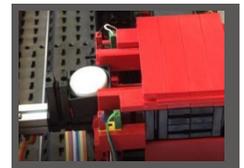


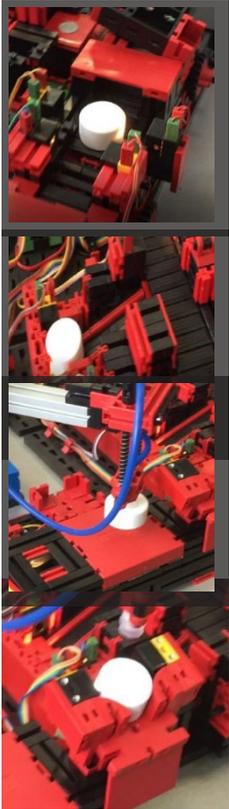
The workpiece is inserted, fired and removed from the kiln.

The small transport carriage with vacuum suction cup takes over the transport to the processing machine "milling machine".



The transport carriage with vacuum suction cups places the part on the turntable, which is then used to rotate it to the milling machine. After the milling process has been completed, the workpiece is rotated by 90 degrees and pneumatically pushed onto a conveyor belt.





On its way to the sorting device, the workpiece passes through a color recognition system.

Depending on the color detected, the workpiece is pneumatically pushed off the conveyor belt onto a material chute. The workpiece is located in a pick-up area and can be transported onwards from here using the vacuum suction gripper.

This places the workpiece on the NFC reader for final labeling. There it is labeled with workpiece-relevant data such as order date, production or delivery data.

Finally, the workpiece is deposited in the output tray of the input/output station.



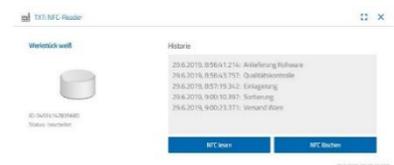
You can also track the work steps in the dashboard:

Raw materials are retrieved from the high-bay warehouse and fed into the machining process.

Raw materials are processed in the multi-machining station (kiln, milling machine).

Processed workpieces are sorted by color and provided with workpiece-relevant data via the NFC reader.

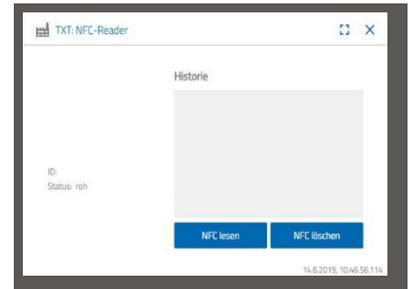
Workpiece is ready for delivery and can be removed from the system.



Task 6

A white brick has accidentally fallen from the high rack and you want to know what data has been written to the NFC tag.

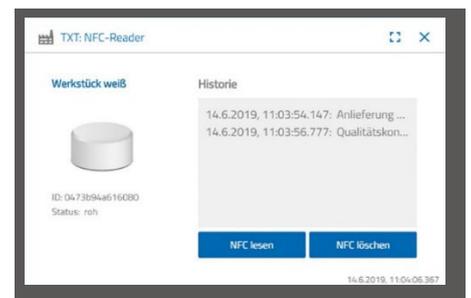
The system must be in idle mode for this. Place the workpiece on the NFC reader and activate the "Read NFC" button in the "TXT: NFC reader" dashboard window.



The NFC reader reads the data and displays it in the dashboard window.

You can use the "Delete NFC" button to delete the data if necessary.

delete the data if necessary.

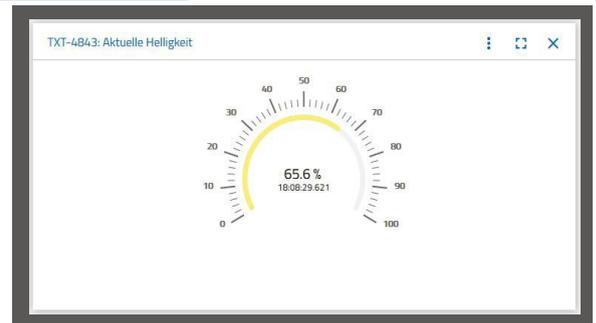


Task 7

Evaluate data from your environmental station. To do this, first display the data in the graph area of the dashboard view. Save the data as .csv file and use it in a spreadsheet program.

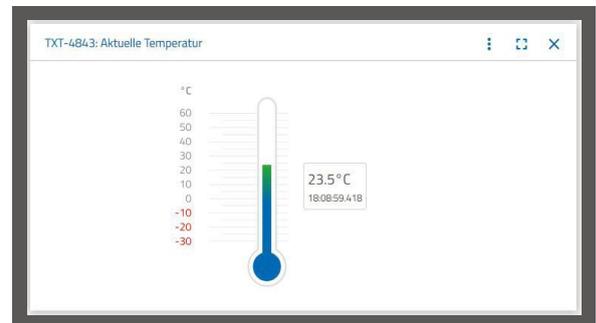


Determine data on
Brightness of the surroundings in
your factory.

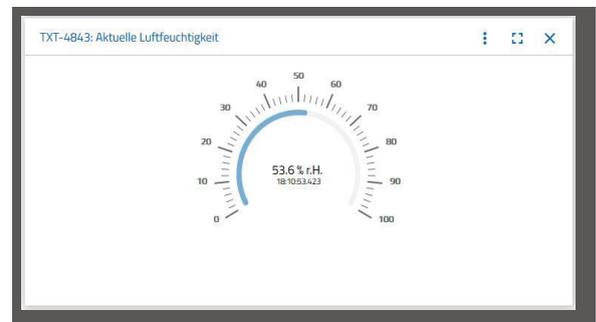


+

Determine the current temperature data of your
factory and process it in a spreadsheet program.



Determine the humidity values over a longer period of
time and display them graphically in the dashboard.



Task 8

Monitor your factory using the built-in camera. Move the camera over your factory and take 2 pictures of the factory. Save an image for documentation. Delete images you no longer need from the gallery



To move the camera, use the "TXT: Camera control" dashboard window.

The buttons that are important for the task have already been explained to you in the description of the dashboard.

Move the camera over your factory. Use the **"blue arrow keys"** to move the vertical and horizontal axis of your camera.

The factory section that the camera is currently recording is also displayed in the "TXT: Camera" dashboard window.

Select three images and save them in the "TXT: Gallery" dashboard window. To do this, use the **"Create snapshot for the current image"** button.

Select 1 image from the gallery that you would like to process in an image editing program. To do this, click on the **"Download"**. A context menu appears in which you can specify the storage location and the file name.

Use the **"Delete"** button to delete images that are no longer required.

