Sistec S.r.l. sede legale e R&D presso **Polo Tecnologico di Pordenone** Viale de la Comina 25, 33170 Pordenone

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Flexible Production Line for Fire-Doors

Introduction:

This manufacturing plant is designed around the needs of the customer in line with the latest Japanese *lean production* manufacturing system using *total quality control* and *just in time*, where complexity is in itself a cost.

It is in total contrast to a very high production manufacturing plant where the aim is to manufacture as much as possible in the least possible time, working with very large batches.

With our system production is less complex and more flexible, making optimum use of equipment, reducing storage time and planning errors and ensuring better management of supplies.

As *lean production* is based on ensuring the manufacturing process works closely with other business functions and on paying greater attention to customer needs, it is an essential choice for businesses with a total quality focus.

Plant Description :

This is a highly flexible single batch management fire-door production plant. The plant is run by supervisor software which manages the entire door production process. The operator has 10 available door production variables (width, height, porthole size and position etc.) for configuring every single door as well as the daily production plan.

1. Bending AREA

1.1. Punching machine

1.2. Sheet metal centring /tilting unit

1.3. Pincer magazine

1.4. Robot no. 1 on 7th linear axis

1.5. Loading bays

1.6. Bending press

1.7. Automatic tool changer

2. Filling and Gluing AREA

2.1. Two-level conveyor

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2.2. Filling station (manual)

2.3. Gluing station with Cartesian distributor

3. Closing AREA

3.1. Centring and closing system

3.2. Centring / tilting unit

3.3. Robot on 7th axis

3.4. Special bending press (with ram rising from below)

3.5. Unloading bays

Cycle Description:

1. Robot no. 1 collects the sheet-metal (box) from one of the four collection bays, centres it and loads it onto the punching machine.
2. During the punching cycle the robot collects and loads the sheet-metal (lid) onto the centring tool.
3. At the end of the punching cycle the robot unloads the sheet metal (box) and loads the sheet-metal (lid) onto the punching machine. The punching machine has two centring tools which optimize loading/unloading time from the punching machine itself.
4. While the sheet-metal (lid) is on the punching machine the robot transfers itself, bends the sheet-metal (box) and places it on the upper level of the conveyor. The process for repositioning cutters for boxes and lids of different sizes is carried out automatically in shadow time.
5. The box is carried along on the conveyor and stops at the filling station where the operator completes welding and filling tasks and where it is automatically labelled with an ink-jet labeller. Ink-jet labelling is to prevent the operator from mixing up boxes and lids during transfer from one robot cell to the other. At the same time a metal plate is pressed that will later be riveted on after painting.
6. The box is transferred to the automatic gluing station and, after gluing, to the 2nd robot cell.
7. On completion of the sheet-metal (lid) processing cycle robot 1 discharges the sheet-metal (lid) onto a centring tool, reloads the punching machine, retrieves the lid and performs the first bending operation with the bender.
8. The lid is placed on the lower level of the conveyor and is transferred to robot cell no. 2.

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9. Robot no. 2 removes the lid from the lower level of the conveyor and places it on the box on the upper level conveyor.

10. Robot no. 2 takes the preassembled box and lid and finishes bending the lid by pressing and folding on three sides with a special press, without having to tilt the door, and places them in the unloading bay.

The cycle length required to make a door depends on the variable options of the batch and ranges from 4 minutes for a single door, to 3 minutes per door for larger batches.

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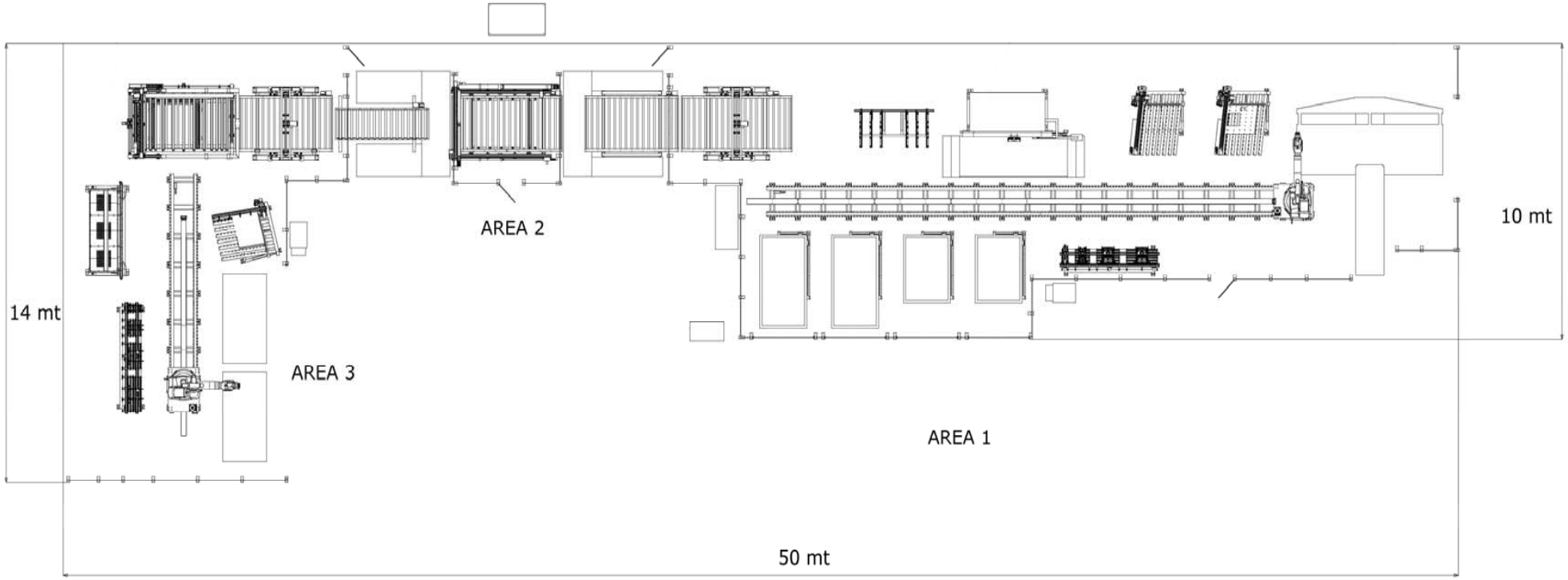

GENERAL LAYOUT

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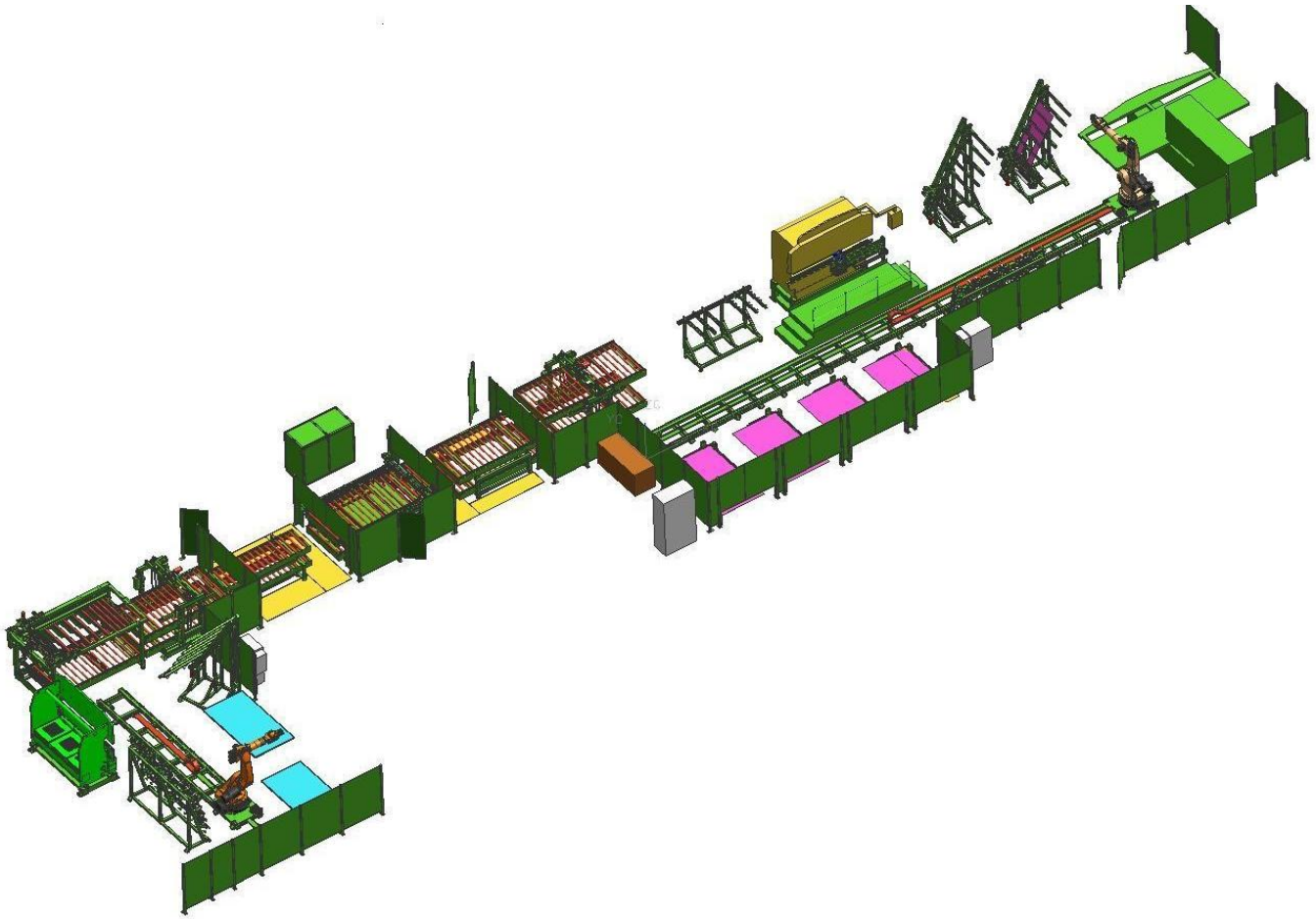

GENERAL 3D VIEW

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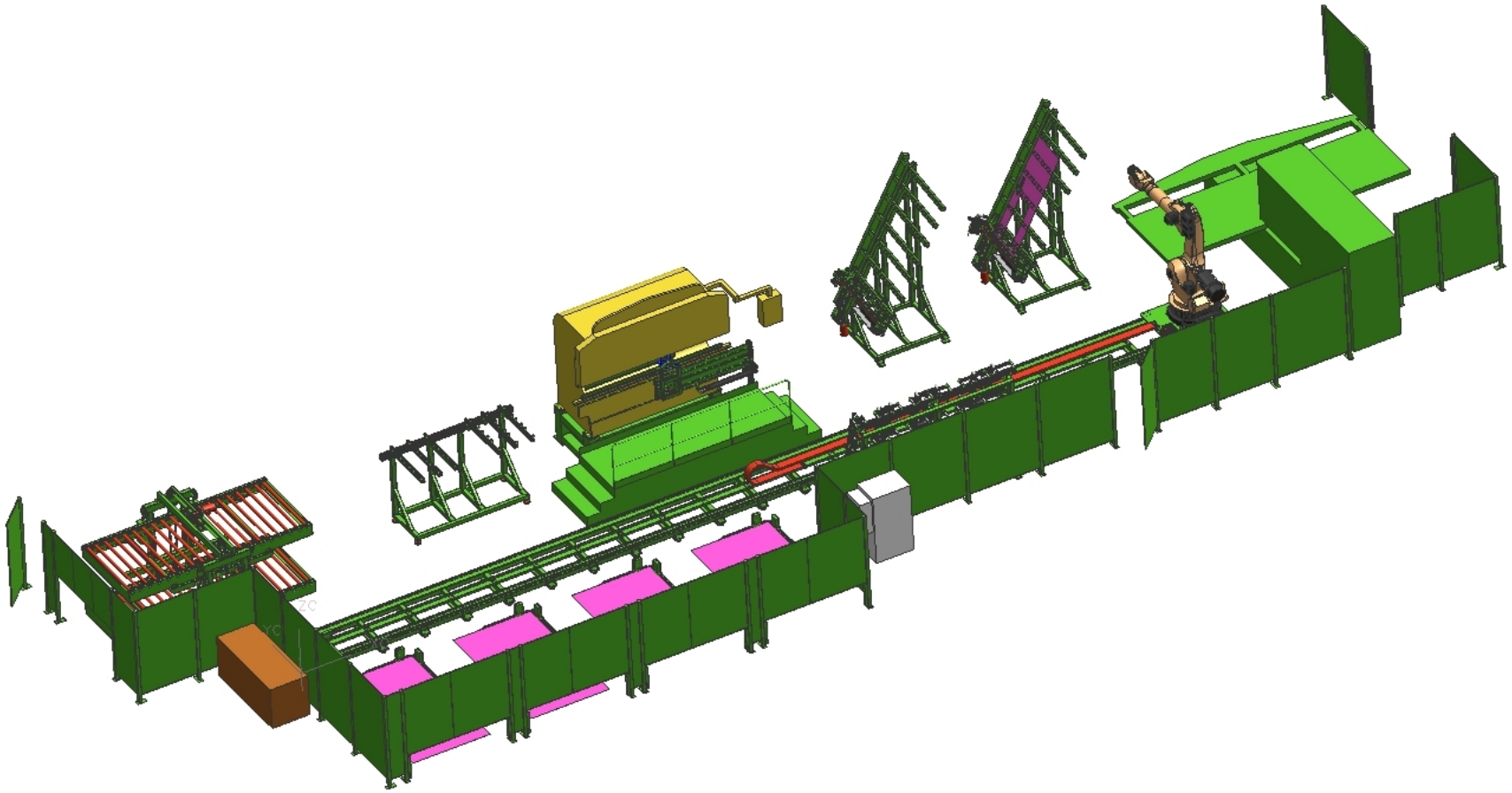

3D VIEW AREA 1

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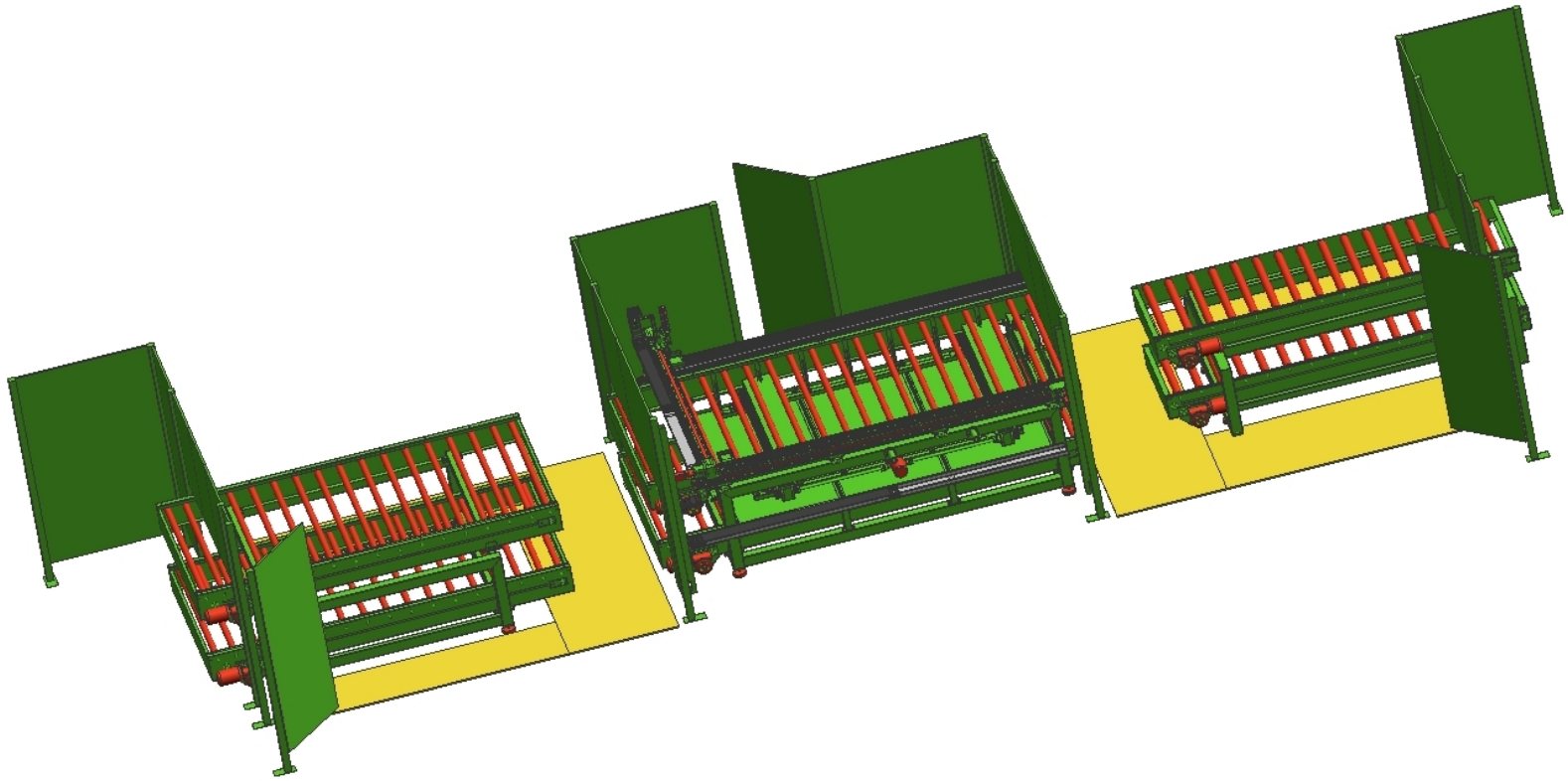

3D VIEW AREA 2

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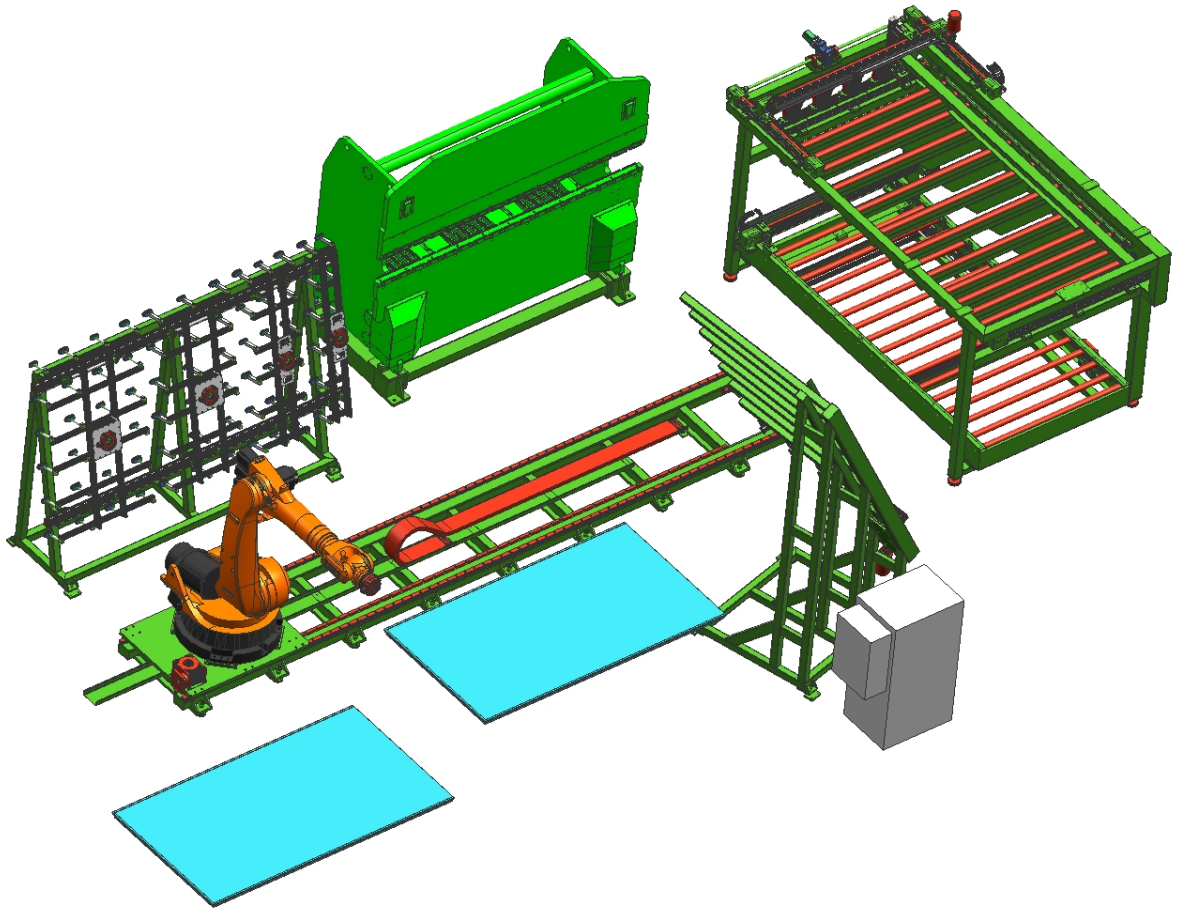

3D VIEW AREA 3

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