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To solve this issue, I designed four tables that will store the information necessary. An explanation for each table is included below each table.

1. Table: Items

- Columns:
    - item_id (primary key)
    - item_name
    - Volume

This table represents all the items in the manufacturing diagram, including cylindrical pieces, box-shaped objects, assembly tower, rectangular plate, and rectangular switch. Each item is identified by a unique **item_id** and has a corresponding **item_name** and **volume** indicating its size.

2. Table: RoundSockets

- Columns:
    - socket_id (primary key)
    - item_id (foreign key referencing **Items.item_id**)
    - Num_sockets

This table represents the round sockets in the diagram. Each round socket is identified by a unique **socket_id** and is associated with an **item_id** referencing the item it belongs to in the **Items** table. The **num_sockets** column indicates the number of round sockets for the respective item.

3. Table: Compatibility

- Columns:
    - compatibility_id (primary key)
    - item_id (foreign key referencing **Items.item_id**)
    - compatible_item_id (foreign key referencing **Items.item_id**)

This table represents the compatibility between items. Each compatibility entry has a unique **compatibility_id** and is associated with an **item_id** and a **compatible_item_id** referencing the respective items in the **Items** table. This table captures the information about which items can be assembled together.

4. Table: SpaceOccupancy

- Columns:
    - item_id (primary key, foreign key referencing **Items.item_id**)
    - occupied_coordinates: (String in the form “**[x0,y0,z0],[x1,y1,z1]**”)

This table represents the space occupancy information. Each entry corresponds to an item's space occupancy and has an **item_id** referencing the item in the **Items** table and an **occupied_coordinates** indicating the coordinates in xyz space of a hypothetical cube that the piece itself occupies, so as to not collide with any other piece.