Let $M$ be a mattress. ("mattress" has not been rigorously defined in this class.) The mattress group is the group of symmetries of $M$ — ie, the collection of things we can do to $M$ while $M$ still fits snugly into its frame.

We have the following operations:

In class, we saw:

<table>
<thead>
<tr>
<th></th>
<th>$e$</th>
<th>$R_x$</th>
<th>$R_y$</th>
<th>$R_z$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$e$</td>
<td>$e$</td>
<td>$R_x$</td>
<td>$R_y$</td>
<td>$R_z$</td>
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<tr>
<td>$R_x$</td>
<td>$R_x$</td>
<td>$e$</td>
<td>$R_z$</td>
<td>$R_y$</td>
</tr>
<tr>
<td>$R_y$</td>
<td>$R_y$</td>
<td>$R_z$</td>
<td>$e$</td>
<td>$R_x$</td>
</tr>
<tr>
<td>$R_z$</td>
<td>$R_z$</td>
<td>$R_y$</td>
<td>$R_x$</td>
<td>$e$</td>
</tr>
</tbody>
</table>
Some principles I stated:
(You can prove these if you want; they're not bad!)

- In a group's multiplication table, each row/column contains each element of \( G \) exactly once. (Use cancellation law).

- If a mult. table is symmetric about diagonal, \( G \) is abelian.

\[ \begin{array}{c|ccc}
  & h & \cdots & g \\
\hline
h & h^2 & h_g & \\
h_g & gh & & g^2 \\
\end{array} \]

\[ \Rightarrow gh = hg. \]

**Example:** Mattress group is abelian.