Step 1:
Write out genotypes and label

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>94</td>
<td>bT+</td>
<td></td>
</tr>
<tr>
<td>372</td>
<td>b+1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>b+t+</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>bTl</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>+Tl</td>
<td></td>
</tr>
<tr>
<td>381</td>
<td>+T+</td>
<td></td>
</tr>
<tr>
<td>84</td>
<td>+l</td>
<td></td>
</tr>
<tr>
<td>89</td>
<td></td>
<td>+l</td>
</tr>
<tr>
<td>1125</td>
<td></td>
<td>+l+</td>
</tr>
</tbody>
</table>

b = pointed beak
l = long feathers
T = turquoise
Step 2:

<table>
<thead>
<tr>
<th>Parents</th>
<th>Recombinants</th>
</tr>
</thead>
<tbody>
<tr>
<td>372 b +</td>
<td>14 b + + +</td>
</tr>
<tr>
<td>381 T +</td>
<td>11 + T 1</td>
</tr>
</tbody>
</table>

Identify parents and recombinants
Step 3:

Determine gene order by comparing parents and recombinants.

Parents

\[ b + 1 \]
\[ T \]

Recombinants

\[ b + T \]
\[ T \]

These are the same, so they must be in the middle.

This is different,
Step 4:

Rewrite genotypes in the correct order.
Step 5

Write out parental chromosomes

<table>
<thead>
<tr>
<th>b</th>
<th>l</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>
Step 6:
Draw a crossover between gene 1 (b) and gene 2 (I) and compare gene results.

(follow the lines and write genes produced)
Step 7:
Identify which numbers correspond to genes written in Step 6

\[ +1 + \Rightarrow 84 \]
\[ b + T \Rightarrow 94 \]

(These numbers will be used to find distance between gene 1 (b) and gene 2 (T))
Step 8:

Add up numbers from Step 7.

\[ \frac{84 + 94 + 11 + 14}{1125} \times 100 = 18 \text{ mu} \]

Don't forget recombinants! (or labels!)
Step 9:
Repeat Steps 6-8 with a crossover between genes 2(I) and 3(I)

\[
\begin{align*}
80 & \times 89 + 11 + 14 \\
1125 & \div 100 = 17.2 \text{ mu}
\end{align*}
\]
Step 10:
Add numbers from gene distances together to find last distance (and map if necessary).

\[ 18 \text{ mu} + 17.2 \text{ mu} = 35.2 \text{ mu} \]