<table>
<thead>
<tr>
<th></th>
<th>Temp</th>
<th>Humidity</th>
<th>Water Source</th>
<th>Crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>hot</td>
<td>high</td>
<td>yes</td>
<td>Rice</td>
</tr>
<tr>
<td>2</td>
<td>Mild</td>
<td>high</td>
<td>yes</td>
<td>Rice</td>
</tr>
<tr>
<td>3</td>
<td>Cool</td>
<td>High</td>
<td>yes</td>
<td>Rice</td>
</tr>
<tr>
<td>4</td>
<td>Mild</td>
<td>High</td>
<td>no</td>
<td>Rice</td>
</tr>
<tr>
<td>5</td>
<td>Hot</td>
<td>Normal</td>
<td>no</td>
<td>cotton</td>
</tr>
<tr>
<td>6</td>
<td>Hot</td>
<td>Low</td>
<td>no</td>
<td>cotton</td>
</tr>
<tr>
<td>7</td>
<td>Cool</td>
<td>Normal</td>
<td>no</td>
<td>cotton</td>
</tr>
<tr>
<td>8</td>
<td>Mild</td>
<td>Low</td>
<td>no</td>
<td>cotton</td>
</tr>
<tr>
<td>9</td>
<td>Hot</td>
<td>Normal</td>
<td>yes</td>
<td>Bean</td>
</tr>
<tr>
<td>10</td>
<td>Mild</td>
<td>Normal</td>
<td>yes</td>
<td>bean</td>
</tr>
<tr>
<td>11</td>
<td>Mild</td>
<td>Low</td>
<td>yes</td>
<td>bean</td>
</tr>
<tr>
<td>12</td>
<td>Cool</td>
<td>Low</td>
<td>yes</td>
<td>wheat</td>
</tr>
</tbody>
</table>

For crop:

\[
\frac{4}{12} \log_{10}12 + \frac{4}{12} \log_{10}12 + \frac{3}{12} \log_{10}3 + \frac{1}{12} \log_{10}12
\]

\[
.528 + .528 + .5 + .298 = 1.854
\]

For temp:

\[
\frac{1}{4} \log_{10}1 + \frac{2}{4} \log_{10}4 + \frac{1}{4} \log_{10}1
\]

\[
.5 + .5 + .5 = 1.5
\]

\[
\frac{2}{5} \log_{10}2 + \frac{1}{5} \log_{10}1 + \frac{2}{5} \log_{10}2
\]

\[
.529 + .464 + .529 = 1.522
\]

\[
\frac{1}{3} \log_{10}1 + \frac{1}{3} \log_{10}1 + \frac{1}{3} \log_{10}1
\]

\[
.528 + .528 + .528 = 1.584
\]

\[
\frac{1.5}{12} \times 12 + \frac{1.522}{5} \times 12 + \frac{1.584}{3} \times 12
\]

\[
.5 + .634 + .396 = 1.53
\]

For humidity:

\[\frac{4}{4} \log_{10}4 = 0\]

\[\frac{2}{4} \log_{10}2 + \frac{2}{4} \log_{10}2\]

\[.5 + .5 = 1\]

\[\frac{2}{4} \log_{10}2 + \frac{1}{4} \log_{10}1 + \frac{1}{4} \log_{10}1\]

\[.5 + .5 + .5 = 1.5\]

\[\frac{1}{4} \log_{10}1 + \frac{1}{4} \log_{10}1\]

\[.33 + .5 = .83\]
For water source:

\[(3/7 \log 3/7) + (3/7 \log 3/7) + (1/7 \log 1/7)\]
\[= .523 + .523 + .401 = 1.447\]

\[(1/5 \log 1/5) + (4/5 \log 4/5)\]
\[= .464 + .258 = .722\]

\[(1.447 \times 7/12) + (.722 \times 5/12)\]
\[= .844 + .3 = 1.144\]

Temp: \[1.854 - 1.53 = .324\]
Humidity: \[1.854 - .83 = 1.024\] wins
Water Source: \[1.854 - 1.144 = .71\]

Humidity High: finished
Humidity Normal:
for crop:
\[(2/4 \log 2/4) + (2/4 \log 2/4)\]
\[= .5 + .5 = 1\]
for temp:
\[(1/2 \log 1/2) + (1/2 \log 1/2)\]
\[= .5 + .5 = 1\]
(1 log1) = 0
(1 log1) = 0
(1 x 2/4) = .5
for water:
(1 log1) = 0
(1 log1) = 0
0

Temp: \[1 - .5 = .5\]
Water: \[1 - 0 = 1\] wins

Water yes: finished
Water no: finished

Humidity Low:
for crop:
\[(2/4 \log 2/4) + (1/4 \log 1/4) + (1/4 \log 1/4)\]
\[= .5 + .5 = 1\]
for temp:
(1 log1) = 0
(1 log1) = 0
(1/2 log1/2) + (1/2 log1/2)
\[= .5 + .5 = 1\]
(1 x 2/4) = .5
for water:
(1 \log 1) = 0
(\frac{1}{2} \log 1/2) + (\frac{1}{2} \log 1/2)
\quad .5 + .5 = 1
(1 \times 2/4) = .5

Temp: 1 - .5 = .5 tie?
Water: 1 - .5 = .5 tie?

Water yes: No calculations needed since there are only 2 options
Water no: finished

**Rules:**

Rule 1: IF humidity is HIGH
Then crop is RICE

Rule 2: IF humidity is NORMAL
AND water source is YES
THEN crop is BEAN

Rule 3: IF humidity is NORMAL
AND water source is NO
THEN crop is COTTON

Rule 4: IF humidity is LOW
AND Water source is NO
THEN crop is COTTON

Rule 5: IF humidity is LOW
AND water source is YES
AND temperature is COOL
THEN crop is WHEAT

Rule 6: IF humidity is LOW
AND water source is YES
AND temperature is MILD
THEN crop is BEAN