1. (a) $a \times b$, $a \times c$, $a \times d$, $b \times c$, $b \times d$, $c \times d$, $b \geq a$, $c \times a$, $c \times b$, $d \geq a$, $d \geq b$, $d \times c$

(b) No
(c) No

(d) The MaxiMin solution is \{b, d\}
(e) The LexiMin solution is d

(f) The expected values are as follows:
\[E[a] = \frac{3}{16} \cdot 9 + \frac{5}{16} \cdot 5 + \frac{7}{16} \cdot 8 + \frac{3}{16} \cdot 3 = \frac{103}{16} = 6.4375\]
\[E[b] = \frac{59}{8} = 7.375\]
\[E[c] = \frac{109}{16} = 6.8125\]
\[E[d] = \frac{119}{16} = 7.4375\]

Thus she would choose d.

(g) None of the answers would change because act e is strictly dominated by another act (namely c).

2. (a) At the decision node on the left he would choose A. Thus the lottery on the left is
\[
\begin{pmatrix}
\frac{2}{5} & \frac{1}{5} & \frac{2}{5} \\
$40 & $45 & $30
\end{pmatrix}
\]
whose expected value is 37. Thus \(X \geq 37\).

(b) The expected value of the lottery corresponding to taking action L (and then A) is \(32 + 15q\). Thus it must be that \(32 + 15q \leq 35\), that is, \(q \leq \frac{1}{3}\).

(c) The expected value of taking L and then A is \(\frac{115}{3} = 38.33 > 35\). Thus Corey will take action L and if his second decision node is reached then he will take action A.

3. (a) There is only one preference relation that rationalizes the observations:

<table>
<thead>
<tr>
<th>Observation</th>
<th>Deduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>{(B, C, D), D}</td>
<td>D is better then B and C</td>
</tr>
<tr>
<td>{(B, C, F), C}</td>
<td>C is better than B and F</td>
</tr>
<tr>
<td>{(A, B, E, F), F}</td>
<td>F is better than A, B and E</td>
</tr>
<tr>
<td>{(A, E), A}</td>
<td>A is better than E</td>
</tr>
<tr>
<td>{(B, E), E}</td>
<td>E is better than B</td>
</tr>
</tbody>
</table>

By (1)-(3) and transitivity, D is better than any other alternative. By (2) and (3) and transitivity, C is better than A, B, E and F. Thus C is the second-best alternative. By (3) F is the third best
alternative. By (4) and (5) and transitivity, A is the fourth best. By (5) E ranks fifth and B ranks last.

\[
\begin{array}{c|c}
\text{Utility} & \\
\hline
\text{best} & D & 6 \\
 & C & 5 \\
(b) & F & 4 \\
 & A & 3 \\
 & E & 2 \\
\text{worst} & B & 1 \\
\end{array}
\]

(c) Since her behavior is rational, she would have chosen A.