1.

(a) The backward induction solution is marked by double edges in the following figure.

(b) Player 1 has 5 decision nodes and two choices at each decision node, thus she has $2^5 = 32$ strategies.

(c) For example, $(B,G,J,K,M)$ (her backward induction strategy), $(A,G,J,K,M)$, etc.

(d) Player 2 has 2 decision nodes and two choices at each decision node, thus she has $2^2 = 4$ strategies.

(e) For example, $(C,E)$ (his backward induction strategy), $(D,E)$, etc.

2. (a) The utility functions are:

Player 1: \[
\begin{aligned}
z7 & = 8 \\
z4 & = 7 \\
z1, z12 & = 6 \\
z9 & = 5 \\
z5 & = 4 \\
z2 & = 3 \\
z11 & = 2 \\
z6 & = 1 \\
z3, z8, z10 & = 0 \\
\end{aligned}
\]

Player 2: \[
\begin{aligned}
z5 & = 4 \\
z1, z7, z11 & = 3 \\
z6, z12 & = 2 \\
z2, z8 & = 1 \\
z3, z4, z9, z10 & = 0 \\
\end{aligned}
\]

Player 3: \[
\begin{aligned}
z12 & = 5 \\
z3, z6 & = 4 \\
z11 & = 3 \\
z2, z7 & = 2 \\
z8, z10 & = 1 \\
z1, z4, z5, z9 & = 0 \\
\end{aligned}
\]

Thus the game is as follows:

<table>
<thead>
<tr>
<th></th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>6</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Player 3: G

<table>
<thead>
<tr>
<th></th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>8</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Player 3: H

(b) Neither Player 1 nor Player 3 have strictly dominated strategies. For Player 2 F is strictly dominated by \(E\).

(c) None of the players have strategies that are weakly but not strictly dominated.

(d) Round 1: delete \(F\). No more deletions are possible. Thus the output of the IDSDS procedure is the set \((A, D, G), (A, E, G), (B, D, G), (B, E, G), (A, D, H), (A, E, H), (B, D, H), (B, E, H)\).

(e) The Nash equilibria are \((A, D, H)\) and \((B, E, H)\).

3. The Nash equilibria are the following: (1) all the strategy profiles where the number of employees that request the cash bonus is equal to 8 and everybody else requests a certificate, and (2) all the strategy profiles where the number of employees that request the cash bonus is greater than or equal to 10 and each of the others requests either a certificate or a hat.