$$\mathbf{questions} \leftarrow [1..8]$$

$$\mathbf{reponses} \leftarrow [a, b, c, d]$$

$$\bigwedge_{\mathbf{q} \in \mathbf{questions}} \mathrm{exact}(1, R_{\mathbf{reponses}, \mathbf{q}})$$

$$R_{a,1} \Leftrightarrow \mathrm{exact}(1, R_{d, \mathbf{questions}})$$

$$R_{b,1} \Leftrightarrow \mathrm{exact}(2, R_{d, \mathbf{questions}})$$

$$R_{c,1} \Leftrightarrow \mathrm{exact}(3, R_{d, \mathbf{questions}})$$

$$R_{d,1} \Leftrightarrow \mathrm{exact}(4, R_{d, \mathbf{questions}})$$

$$\bigvee_{\mathbf{n} \in [0..8]} \left(\mathrm{exact}(\mathbf{n}, R_{d, \mathbf{questions}}) \wedge \bigwedge_{\mathbf{c} \in \mathbf{reponses}} \mathrm{atleast}(\mathbf{n}, R_{\mathbf{c}, \mathbf{questions}}) \right) \Leftrightarrow R_{a,2}$$

$$\bigvee_{\mathbf{n} \in [0..8]} \left(\mathrm{exact}(\mathbf{n}, R_{b, \mathbf{questions}}) \wedge \bigwedge_{\mathbf{c} \in \mathbf{reponses}} \mathrm{atleast}(\mathbf{n}, R_{\mathbf{c}, \mathbf{questions}}) \right) \Leftrightarrow R_{b,2}$$

$$\bigvee_{\mathbf{n} \in [0..8]} \left(\mathrm{exact}(\mathbf{n}, R_{c, \mathbf{questions}}) \wedge \bigwedge_{\mathbf{c} \in \mathbf{reponses}} \mathrm{atleast}(\mathbf{n}, R_{\mathbf{c}, \mathbf{questions}}) \right) \Leftrightarrow R_{c,2}$$

$$\bigvee_{\mathbf{n} \in [0..8]} \left(\mathrm{exact}(\mathbf{n}, R_{a, \mathbf{questions}}) \wedge \bigwedge_{\mathbf{c} \in \mathbf{reponses}} \mathrm{atleast}(\mathbf{n}, R_{\mathbf{c}, \mathbf{questions}}) \right) \Leftrightarrow R_{d,2}$$

$$\bigvee_{\mathbf{n} \in [0..8]} \left(\mathrm{exact}(\mathbf{n}, R_{d, \mathbf{questions}}) \wedge \bigwedge_{\mathbf{c} \in \mathbf{reponses}} \mathrm{atmost}(\mathbf{n}, R_{\mathbf{c}, \mathbf{questions}}) \right) \Leftrightarrow R_{a,3}$$

$$\bigvee_{\mathbf{n} \in [0..8]} \left(\mathrm{exact}(\mathbf{n}, R_{c, \mathbf{questions}}) \wedge \bigwedge_{\mathbf{c} \in \mathbf{reponses}} \mathrm{atmost}(\mathbf{n}, R_{\mathbf{c}, \mathbf{questions}}) \right) \Leftrightarrow R_{b,3}$$

$$\bigvee_{\mathbf{n} \in [0..8]} \left(\mathrm{exact}(\mathbf{n}, R_{b, \mathbf{questions}}) \wedge \bigwedge_{\mathbf{c} \in \mathbf{reponses}} \mathrm{atmost}(\mathbf{n}, R_{\mathbf{c}, \mathbf{questions}}) \right) \Leftrightarrow R_{c,3}$$

$$\bigvee_{\mathbf{n} \in [0..8]} \left(\mathrm{exact}(\mathbf{n}, R_{a, \mathbf{questions}}) \wedge \bigwedge_{\mathbf{c} \in \mathbf{reponses}} \mathrm{atmost}(\mathbf{n}, R_{\mathbf{c}, \mathbf{questions}}) \right) \Leftrightarrow R_{d,3}$$

$$\mathrm{exact}(4, R_{a, \mathbf{questions}}) \Leftrightarrow R_{a,4}$$

$$\mathrm{exact}(1, R_{a, \mathbf{questions}}) \Leftrightarrow R_{b,4}$$

$$\mathrm{exact}(0, R_{b, \mathbf{questions}}) \Leftrightarrow R_{c,4}$$

$$\bigvee_{\mathbf{n} \in [0..8]} (\mathrm{exact}(\mathbf{n}, R_{a, \mathbf{questions}}) \wedge \mathrm{exact}(\mathbf{n}, R_{c, \mathbf{questions}})) \Leftrightarrow R_{d,4}$$

$$\left(\bigwedge_{\substack{\mathbf{q}\in\mathbf{questions}\\ \mathbf{q}<5}} \neg R_{a,\mathbf{q}} \wedge R_{a,5} \right) \Leftrightarrow R_{a,5}$$

$$\left(\bigwedge_{\substack{\mathbf{q}\in\mathbf{questions}\\ \mathbf{q}<6}} \neg R_{a,\mathbf{q}} \wedge R_{a,6} \right) \Leftrightarrow R_{b,5}$$

$$\left(\bigwedge_{\substack{\mathbf{q}\in\mathbf{questions}\\ \mathbf{q}<7}} \neg R_{b,\mathbf{q}} \wedge R_{b,7} \right) \Leftrightarrow R_{c,5}$$

$$R_{a,1} \Leftrightarrow R_{d,5}$$

$$R_{a,6} \Leftrightarrow \bigvee_{\mathbf{r}\in\mathbf{reponses}} \left(\bigvee_{\mathbf{n}\in[0..8]} \left(\mathrm{exact}(\mathbf{n}, R_{\mathbf{r},\mathbf{questions}}) \wedge \bigwedge_{\mathbf{c}\in\mathbf{reponses}} \mathrm{atmost}(\mathbf{n}, R_{\mathbf{c},\mathbf{questions}}) \right) \wedge \mathrm{exact}(3, R_{\mathbf{r},\mathbf{que}}\ldots$$

$$R_{b,6} \Leftrightarrow \bigvee_{\mathbf{r}\in\mathbf{reponses}} \left(\bigvee_{\mathbf{n}\in[0..8]} \left(\mathrm{exact}(\mathbf{n}, R_{\mathbf{r},\mathbf{questions}}) \wedge \bigwedge_{\mathbf{c}\in\mathbf{reponses}} \mathrm{atmost}(\mathbf{n}, R_{\mathbf{c},\mathbf{questions}}) \right) \wedge \mathrm{exact}(4, R_{\mathbf{r},\mathbf{que}}\ldots$$

$$R_{c,6} \Leftrightarrow \bigvee_{\mathbf{r}\in\mathbf{reponses}} \left(\bigvee_{\mathbf{n}\in[0..8]} \left(\mathrm{exact}(\mathbf{n}, R_{\mathbf{r},\mathbf{questions}}) \wedge \bigwedge_{\mathbf{c}\in\mathbf{reponses}} \mathrm{atmost}(\mathbf{n}, R_{\mathbf{c},\mathbf{questions}}) \right) \wedge \mathrm{exact}(5, R_{\mathbf{r},\mathbf{que}}\ldots$$

$$R_{d,6} \Leftrightarrow \bigvee_{\mathbf{r}\in\mathbf{reponses}} \left(\bigvee_{\mathbf{n}\in[0..8]} \left(\mathrm{exact}(\mathbf{n}, R_{\mathbf{r},\mathbf{questions}}) \wedge \bigwedge_{\mathbf{c}\in\mathbf{reponses}} \mathrm{atmost}(\mathbf{n}, R_{\mathbf{c},\mathbf{questions}}) \right) \wedge \mathrm{exact}(6, R_{\mathbf{r},\mathbf{que}}\ldots$$

$$\mathrm{exact}(1, [R_{\mathbf{r},\mathbf{q}} \wedge R_{\mathbf{r},\mathbf{q}+1} \mid \mathbf{r},\mathbf{q} \in \mathbf{reponses} \times [1..7]])$$

$$R_{a,7} \Leftrightarrow \bigvee_{\mathbf{r}\in\mathbf{reponses}} (R_{\mathbf{r},2} \wedge R_{\mathbf{r},3})$$

$$R_{b,7} \Leftrightarrow \bigvee_{\mathbf{r}\in\mathbf{reponses}} (R_{\mathbf{r},7} \wedge R_{\mathbf{r},8})$$

$$R_{c,7} \Leftrightarrow \bigvee_{\mathbf{r}\in\mathbf{reponses}} (R_{\mathbf{r},1} \wedge R_{\mathbf{r},2})$$

$$R_{d,7} \Leftrightarrow \bigvee_{\mathbf{r}\in\mathbf{reponses}} (R_{\mathbf{r},4} \wedge R_{\mathbf{r},5})$$

$$R_{a,8} \Rightarrow (\mathrm{exact}(2, R_{a,\mathbf{questions}}) \wedge R_{a,4})$$

$$R_{b,8} \Rightarrow (\mathrm{exact}(2, R_{b,\mathbf{questions}}) \wedge R_{b,2})$$

$$R_{c,8} \Rightarrow (\mathrm{exact}(2, R_{c,\mathbf{questions}}) \wedge R_{c,3})$$

$$R_{d,8} \Rightarrow (\mathrm{exact}(2, R_{d,\mathbf{questions}}) \wedge R_{d,7})$$