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Assignment 10

8.27 Obtain a passport application for your country, identify the rules determining eligibility for a passport, and translate them into first-order logic, following the steps outlined in Section 8.4.

Answer:

To obtain a passport application of our country, we identify the rules determining eligibility for a passport. These rules will vary by country. Consider a citizen. The basic rules are

1. A person born in the Bangladesh, whose parent is a Bangladesh Citizen or Bangladesh resident, is a Bangladesh citizen by birth.
2. A person born outside the, one of whose parent is a citizen by birth, is a citizen by descent.

Then translate these rules into first-order logic:

1. $\forall x \text{ Person}(x) \wedge \text{Born}(x, \text{Bangladesh}) \wedge (\forall y \text{ Parent}(y, x))$

$\Rightarrow ((\exists r \text{ Citizen}(y, \text{Bangladesh}, r) \vee \text{Resident}(y, \text{Bangladesh}))) \Rightarrow \text{Citizen}(x, \text{Bangladesh}, \text{Birth}).$

2. $\forall x \text{ Person}(x) \wedge \text{Born}(x, \text{Bangladesh}) \wedge (\exists y \text{ Parent}(y, x) \wedge \text{Citizen}(y, \text{Bangladesh}, \text{Birth}))$

$\Rightarrow \text{Citizen}(x, \text{Bangladesh}, \text{Descent})$