Intelligent Retrieval from a Database, Part 4

By KB_2 we denote the set consisting of the following sentences:

1. $\forall x(Male(x) \leftrightarrow x = A \vee x = M)$.
2. $\forall xy(Parent(x, y) \leftrightarrow (x = S \wedge y = W) \vee (x = S \wedge y = A) \vee (x = W \wedge y = M)$.
3. $\forall x(Female(x) \leftrightarrow \neg Male(x))$.
4. $\forall xy(Brother(x, y) \leftrightarrow \exists z(Parent(z, x) \wedge Parent(z, y)) \wedge Male(x) \wedge x \neq y)$.

The union of KB_2 with the unique name assumption

$$\{S \neq W,\ S \neq A,\ S \neq M,\ W \neq A,\ W \neq M,\ A \neq M\}$$

is correct and complete on the level of ground atoms. This set of formulas is essentially the completion of the logic program

$Male(A)$,
$Male(M)$,
$Parent(S, W)$,
$Parent(S, A)$,
$Parent(W, M)$,
$Female(x) \leftarrow \neg Male(x)$,
$Brother(x, y) \leftarrow Parent(z, x) \wedge Parent(z, y) \wedge Male(x) \wedge x \neq y$.