Cvičenie 5 – Úloha 1

Báza údajov
1. Cersei is female
2. Jaime is male
3. Tyrion is male
4. Tywin is male
5. Tywin is a parent of Cersei
6. Tywin is a parent of Jaime
7. Tywin is a parent of Tyrion
8. Joffrey is male
9. Cersei is a parent of Joffrey
10. Tommen is male
11. Cersei is a parent of Tommen

Báza znalostí
1. IF (?x) is male AND (?x) is a parent of (?y) THEN ADD (?x) is the father of (?y)
2. IF (?x) is female AND (?x) is a parent of (?y) THEN ADD (?x) is the mother of (?y)
3. IF (?x) is a parent of (?y) AND (?x) is a parent of (?z) THEN ADD (?y) is a sibling of (?z)
4. IF (?x) is a parent of (?y) AND (?y) is male THEN ADD (?y) is a son of (?x)
5. IF (?x) is a parent of (?y) AND (?y) is female THEN ADD (?y) is a daughter of (?x)
6. IF (?x) is a sibling of (?y) AND (?x) is male THEN ADD (?x) is a brother of (?y)
7. IF (?x) is a sibling of (?y) AND (?x) is female THEN ADD (?x) is a sister of (?y)

Úloha 1.1
Aplikácia pravidla 1
IF (?x) is male AND (?x) is a parent of (?y) THEN ADD (?x) is the father of (?y)

- aplikovateľné inštancie:
    - IF Tywin is male and Tywin is a parent of Cersei THEN ADD Tywin is the father of Cersei
    - IF Tywin is male and Tywin is a parent of Jaime THEN ADD Tywin is the father of Jaime
    - IF Tywin is male and Tywin is a parent of Tyrion THEN ADD Tywin is the father of Tyrion
- pridané fakty
    - 12. Tywin is the father of Cersei
    - 13. Tywin is the father of Jaime
    - 14. Tywin is the father of Tyrion

Aplikácia pravidla 2
IF (?x) is female AND (?x) is a parent of (?y) THEN ADD (?x) is the mother of (?y)

- aplikovateľné instancie:
    - IF Cersei is female AND Cersei is a parent of Joffrey THEN ADD Cersei is the mother of Joffrey
    - IF Cersei is female AND Cersei is a parent of Tommen THEN ADD Cersei is the mother of Tommen
- pridané fakty
    - 15. Cersei is the mother of Joffrey
    - 16. Cersei is the mother of Tommen

Aplikácia pravidla 3
IF (?x) is a parent of (?y) AND (?x) is a parent of (?z) THEN ADD (?y) is a sibling of (?z)

- aplikovateľné inštancie
    - IF Tywin is a parent of Cersei AND Tywin is a parent of Jaime THEN ADD Cersei is a sibling of Jaime
    - IF Tywin is a parent of Jaime AND Tywin is a parent of Cersei THEN ADD Jaime is a sibling of Cersei
    - IF Tywin is a parent of Cersei AND Tywin is a parent of Tyrion THEN ADD Cersei is a sibling of Tyrion
    - IF Tywin is a parent of Tyrion AND Tywin is a parent of Cersei THEN ADD Tyrion is a sibling of Cersei
    - IF Tywin is a parent of Jaime AND Tywin is a parent of Tyrion THEN ADD Jaime is a sibling of Tyrion
    - IF Tywin is a parent of Tyrion AND Tywin is a parent of Jaime THEN ADD Tyrion is a sibling of Jaime
    - IF Cersei is a parent of Joffrey AND Cersei is a parent of Tommen THEN ADD Joffrey is a sibling of Tommen
    - IF Cersei is a parent of Tommen AND Cersei is a parent of Joffrey THEN ADD Tommen is a sibling of Joffrey
- pridané fakty
    - 17. Cersei is a sibling of Jaime
    - 18. Jaime is a sibling of Cersei
    - 19. Cersei is a sibling of Tyrion
    - 20. Tyrion is a sibling of Cersei
    - 21. Jaime is a sibling of Tyrion
    - 22. Tyrion is a sibling of Jaime
    - 23. Joffrey is a sibling of Tommen
    - 24. Tommen is a sibling of Joffrey

Aplikácia pravidla 4
IF (?x) is a parent of (?y) AND (?y) is male THEN ADD (?y) is a son of (?x)

- aplikovateľné inštancie
    - IF Tywin is a parent of Jaime AND Jaime is male THEN ADD Jaime is a son of Tywin
    - IF Tywin is a parent of Tyrion AND Tyrion is male THEN ADD Tyrion is a son of Tywin
    - IF Cersei is a parent of Joffrey AND Joffrey is male THEN ADD Joffrey is a son of Cersei
    - IF Cersei is a parent of Tommen AND Tommen is male THEN ADD Tommen is a son of Cersei
- pridané fakty
    - 25. Jaime is a son of Tywin
    - 26. Tyrion is a son of Tywin
    - 27. Joffrey is a son of Cersei
    - 28. Tommen is a son of Cersei

Aplikácia pravidla 5
IF (?x) is a parent of (?y) AND (?y) is female THEN ADD (?y) is a daughter of (?x)

- aplikovateľné inštancie
    - IF Tywin is a parent of Cersei AND Cersei is female THEN ADD Cersei is a daughter of Tywin
- pridané fakty
    - 29. Cersei is a daughter of Tywin

Aplikácia pravidla 6
IF (?x) is a sibling of (?y) AND (?x) is male THEN ADD (?x) is a brother of (?y)

- aplikovateľné inštancie
    - IF Jaime is a sibling of Cersei AND Jaime is male THEN ADD Jaime is a brother of Cersei
    - IF Tyrion is a sibling of Cersei AND Tyrion is male THEN ADD Tyrion is a brother of Cersei
    - IF Jaime is a sibling of Tyrion AND Jaime is male THEN ADD Jaime is a brother of Tyrion
    - IF Tyrion is a sibling of Jaime AND Tyrion is male THEN ADD Tyrion is a brother of Jaime
    - IF Joffrey is a sibling of Tommen AND Joffrey is male THEN ADD Joffrey is a brother of Tommen
    - IF Tommen is a sibling of Joffrey AND Tommen is male THEN ADD Tommen is a brother of Joffrey
- pridané fakty
    - 30. Jaime is a brother of Cersei
    - 31. Tyrion is a brother of Cersei
    - 32. Jaime is a brother of Tyrion
    - 33. Tyrion is a brother of Jaime
    - 34. Joffrey is a brother of Tommen
    - 35. Tommen is a brother of Joffrey

Aplikácia pravidla 7
IF (?x) is a sibling of (?y) AND (?x) is female THEN ADD (?x) is a sister of (?y)

- aplikovateľné inštancie
    - IF Cersei is a sibling of Jaime AND Cersei is female THEN ADD Cersei is a sister of Jaime
    - IF Cersei is a sibling of Tyrion AND Cersei is female THEN ADD Cersei is a sister of Tyrion
- pridané fakty
    - 36. Cersei is a sister of Jaime
    - 37. Cersei is a sister of Tyrion

Úloha 1.2
hľadaný fakt: Cersei is a sister of Jaime
inštancia pravidla 7: IF Cersei is a sibling of Jaime AND Cersei is female THEN ADD Cersei is a sister of Jaime

Cersei is a sibling of Jaime môže byť dôsledok pravidla 3:
IF (?x) is a parent of Cersei AND (?x) is a parent of Jaime THEN ADD Cersei is a sibling of Jaime

Ak dosadíme fakty 5 a 6, dostaneme inštanciu
IF Tywin is a parent of Cersei AND Tywin is a parent of Jaime THEN ADD Cersei is a sibling of Jaime
teda odvodíme fakt
Cersei is a sibling of Jaime

takto vieme aplikovať inštanciu pravidla 7 a zistili sme, že Cersei je naozaj Jaimeho sestra

hľadaný fakt: Tyrion is a son of Tywin
inštancia pravidla 4:
IF Tywin is a parent of Tyrion AND Tyrion is male THEN ADD Tyrion is a son of Tywin

Tywin is a parent of Tyrion je fakt č. 7
Tyrion is male je fakt č. 3

inštanciu vieme aplikovať, dokázali sme, že hľadaný fakt vieme odvodiť pomocou inferencie

hľadaný fakt: Jaime is the father of Joffrey
inštancia pravidla 1:
IF Jaime is male AND Jaime is a parent of Joffrey THEN ADD Jaime is the father of Joffrey

Jaime is male je fakt č. 2
Jaime is a parent of Joffrey nemôže byť dôsledok žiadneho pravidla, teda fakt nevieme dokázať inferenciou pomocou daných produkčných pravidiel

Úloha 1.3
IF (?x) is a brother of (?y) AND (?y) is a parent of (?z) THEN ADD (?x) is the uncle of (?z)
IF (?x) is male AND (?x) is a sibling of (?y) AND (?y) is a parent of (?z) THEN ADD (?x) is the uncle of (?z)

IF (?x) is a sister of (?y) AND (?y) is a parent of (?z) THEN ADD (?x) is the aunt of (?z)
IF (?x) is female AND (?x) is a sibling of (?y) AND (?y) is a parent of (?z) THEN ADD (?x) is the aunt of (?z)

IF (?x) is male AND (?x) is a parent of (?y) AND (?y) is a parent of (?z) THEN ADD (?x) is a grandfather of (?z)

IF (?x) is female AND (?x) is a parent of (?y) AND (?y) is a parent of (?z) THEN ADD (?x) is a grandmother of (?z)