

ATOMIC SENTENCES:

- SNJ: Snakeman possesses the RushJet
- NMJ: Needleman possesses the RushJet
- GMJ: Geminiman possess the RushJet
- SWM: Shadowman possesses the RushMarine
- SNM: Snakeman possesses the RushMarine

KNOWLEDGE BASE AND CNF:

- One of Snakeman, Needleman and Geminiman has the Rushjet.
  - a.  $SNrj \vee Nrj \vee Grj$
  - b. This is already in CNF
- One of Snakeman and Shadowman has the Rushmarine
  - $SNrm \vee SHrm$
  - a. This is already in CNF
- There is only one Rushjet, i.e. if one robot master has it, the others don't
  - $SNrj \rightarrow (\neg Nrj \wedge \neg Grj)$ 
    - $\neg SNrj \vee (\neg Nrj \wedge \neg Grj)$
    - $(\neg SNrj \vee \neg Nrj) \wedge (\neg SNrj \vee \neg Grj)$
  - $Nrj \rightarrow (\neg SNrj \wedge \neg Grj)$ 
    - $\neg Nrj \vee (\neg SNrj \wedge \neg Grj)$
    - $(\neg Nrj \vee \neg SNrj) \wedge (\neg Nrj \vee \neg Grj)$
  - $Grj \rightarrow (\neg SNrj \wedge \neg Nrj)$ 
    - $\neg Grj \vee (\neg SNrj \wedge \neg Nrj)$
    - $(\neg Grj \vee \neg SNrj) \wedge (\neg Grj \vee \neg Nrj)$
- Similarly, there is only one Rushmarine
  - a.  $(SNrm \rightarrow \neg SHrm) \vee (SHrm \rightarrow \neg SNrm)$
  - b.  $SNrm \rightarrow \neg SHrm$ 
    - i.  $\neg SNrm \vee \neg SHrm$
  - c.  $SHrm \rightarrow \neg SNrm$ 
    - i.  $\neg SHrm \vee \neg SNrm$
- The same robot doesn't have both items
  - a.  $\neg(SNrj \wedge SNrm) \wedge \neg(Nmj \wedge Nrm) \wedge \neg(Gmj \wedge Grm) \wedge \neg(SHrj \wedge SHrm)$ 
    - i.  $(\neg SNrj \vee \neg SNrm) \wedge (\neg Nmj \vee \neg Nrm) \wedge (\neg Gmj \vee \neg Grm) \wedge (\neg SHrj \vee \neg SHrm)$
  - In this case only Snakeman has the possibility of both items;
    - ii.  $\neg(SNrj \wedge SNrm)$ 
      - $\neg SNrj \vee \neg SNrm$
- If Geminiman has the Rushjet, then Shadowman does not have the Rushmarine
  - a.  $Gmj \rightarrow \neg SHrm$ 
    - $(\neg Gmj \vee \neg SHrm)$

- If Shadowman has the Rushmarine, then Snakeman does not have the Rushjet
  - a.  $SHrm \rightarrow \neg SNrj$ 
    - $\neg SHrm \vee \neg SNrj$
- If Snakeman has the Rushmarine, then Geminiman does not have the Rushjet
  - a.  $SNrm \rightarrow \neg Grj$ 
    - $\neg SNrm \vee \neg Grj$

CONVERT TO CNF AND TO THE FULL KB