

P1 1. $\neg(\text{In}(A) \wedge \text{In}(B)), \neg(\text{In}(A) \wedge \text{In}(F))$

2. $\text{In}(A) \leftrightarrow (\text{Order}(A, 1) \vee \text{Order}(A, 2) \vee \text{Order}(A, 3) \vee \text{Order}(A, 4)),$
 $\text{In}(B) \leftrightarrow (\text{Order}(B, 1) \vee \text{Order}(B, 2) \vee \text{Order}(B, 3) \vee \text{Order}(B, 4))$

3. $\text{Order}(A, 1) \vee \text{Order}(B, 1) \vee \text{Order}(C, 1) \vee \text{Order}(D, 1) \vee \text{Order}(E, 1) \vee \text{Order}(F, 1) \vee$
 $\text{Order}(G, 1) \vee \text{Order}(H, 1) \vee \text{Order}(I, 1) \vee \text{Order}(J, 1),$
 $\text{Order}(A, 2) \vee \text{Order}(B, 2) \vee \text{Order}(C, 2) \vee \text{Order}(D, 2) \vee \text{Order}(E, 2) \vee \text{Order}(F, 2) \vee$
 $\text{Order}(G, 2) \vee \text{Order}(H, 2) \vee \text{Order}(I, 2) \vee \text{Order}(J, 2)$

4. $\neg(\text{Order}(A, 1) \wedge \text{Order}(B, 1)), \neg(\text{Order}(A, 2) \wedge \text{Order}(B, 2))$

5. $\neg(\text{Order}(A, 1) \wedge \text{Order}(A, 2)), \neg(\text{Order}(B, 1) \wedge \text{Order}(B, 2))$

P2 1. Processor Exclusivity Constraint: For each pair of tasks U, V, on any processor P, and at any time T, $\neg(\text{Exec}(U, P, T) \wedge \text{Exec}(V, P, T))$

Eg. $\neg(\text{Exec}(A, 1, 1) \wedge \text{Exec}(B, 1, 1))$

2. Task Precedence Constraint: For each pair of tasks U, V that are connected by an arc: $V \rightarrow U$, $\text{Exec}(U, P, T) \rightarrow (\text{Exec}(V, 1, 1) \vee \text{Exec}(V, 1, 2) \vee \dots \vee \text{Exec}(V, 1, T-1) \vee \dots \vee \text{Exec}(V, K, T-1))$, where K and T are the number of processors and the time U is executed.

Eg. When there's an arc $A \rightarrow D$:

$\text{Exec}(D, 1, 2) \rightarrow (\text{Exec}(A, 1, 1) \vee \text{Exec}(A, 2, 1))$

3. Temporal Constraint: For each task U, $\text{Exec}(U, 1, 1) \vee \text{Exec}(U, 1, 2) \vee \dots \vee \text{Exec}(U, 1, M) \vee \dots \vee \text{Exec}(U, K, M)$, where K and M are the number of processors and maximum time for execution

Eg. $\text{Exec}(A, 1, 1) \vee \text{Exec}(A, 1, 2) \vee \text{Exec}(A, 1, 3) \vee \text{Exec}(A, 2, 1) \vee \text{Exec}(A, 2, 2) \vee \text{Exec}(A, 2, 3)$

P3 1. Forall x, y, $F(x, y) \rightarrow F(y, x)$ (or Forall x, y, $F(x, y) \leftrightarrow F(y, x)$)

2. Forall x, y, $C(x, y) \rightarrow \neg C(y, x)$

3. Exists x, $F(A, x) \wedge F(B, x)$

4. Forall x, $C(x, A) \rightarrow \neg F(B, x)$

5. Exists x, $C(D, x) \wedge (\text{forall } y, C(y, B) \rightarrow F(x, y))$

6. Forall x, $F(D, x) \rightarrow (\text{exists } y, C(y, x))$

7. Forall x, $F(A, x) \rightarrow (\text{exists } y, C(y, x) \wedge (\text{forall } z, \neg C(z, y)))$

8. Exists x, $C(x, B) \wedge (\text{forall } y, z, C(y, B) \rightarrow \neg C(y, x))$