

Predicate Logic Arguments (Some valid, some invalid)

1. $\forall x (F(x) \rightarrow G(x))$ $\exists x \neg G(x)$ $\therefore \exists x \neg F(x)$	2. $\forall x (F(x) \rightarrow \forall y G(y))$ $F(a)$ $\therefore \forall x G(x)$	3. $\forall x (A(x) \rightarrow B(x))$ $\forall x (\neg A(x) \rightarrow C(x))$ $\therefore \forall x (\neg B(x) \rightarrow \neg C(x))$
4. $\exists x (A(x) \wedge \neg B(x))$ $\exists x (A(x) \wedge \neg C(x))$ $\exists x (\neg B(x) \wedge D(x))$ $\therefore \exists x (A(x) \wedge \neg B(x) \wedge D(x))$	5. $\forall x (A(x) \rightarrow F(x))$ $\exists x F(x) \rightarrow \neg \exists y G(y)$ $\therefore \forall x (\exists y A(y) \rightarrow \neg G(x))$	6. $\exists x (A(x) \vee \neg B(x))$ $\forall x ((A(x) \wedge \neg B(x)) \rightarrow C(x))$ $\therefore \exists x C(x)$
7. $\forall x \neg F(x, x)$ $\neg \forall x G(x) \rightarrow \exists y F(y, a)$ $\therefore \exists z (G(z) \wedge F(z, z))$	8. $\forall x \exists y (F(x) \wedge G(x, y))$ $\therefore \exists y \forall x (F(x) \wedge G(x, y))$	9. $\exists x (F(x) \wedge \forall y (G(y) \rightarrow L(x, y)))$ $\forall x (F(x) \rightarrow \forall y (M(y) \rightarrow \neg L(x, y)))$ $\therefore \forall x (G(x) \rightarrow \neg M(x))$
10. $F(a) \vee \exists y G(y, a)$ $F(b) \vee \exists y \neg G(y, b)$ $\therefore \exists y G(y, a)$	11. $\forall x \neg J(x)$ $\exists y (H(b, y) \vee R(y, y)) \rightarrow \exists x J(x)$ $\therefore \forall y \neg (H(b, y) \vee R(y, y))$	12. $\forall z (L(z) \leftrightarrow H(z))$ $\forall x \neg (H(x) \vee \neg B(x))$ $\therefore \neg L(b)$
13. $\neg \forall x K(x, x) \vee \forall y H(y, y)$ $\therefore \exists z (\neg H(z, z) \rightarrow \neg K(z, z))$	14. $\forall x \forall y (F(x) \vee G(x, y))$ $\exists x F(x)$ $\therefore \exists x \exists y G(x, y)$	15. $\forall x \forall y \forall z ((L(x, y) \wedge L(y, z)) \rightarrow L(x, z))$ $\forall x \forall y (L(x, y) \rightarrow L(y, x))$ $\therefore \forall x L(x, x)$
16. $\forall x (S(x) \rightarrow \exists y (S(y) \wedge \forall z (B(z, y) \leftrightarrow (B(z, x) \wedge B(z, z))))))$ $\forall x \neg B(x, x)$ $\exists x S(x)$ $\therefore \exists x (S(x) \wedge \forall y \neg B(y, x))$	17. $\forall x \forall y ((A(x) \wedge B(y)) \rightarrow C(x, y))$ $\exists y (F(y) \wedge \forall z (H(z) \rightarrow C(y, z)))$ $\forall x \forall y \forall z ((L(x, y) \wedge L(y, z)) \rightarrow L(x, z))$ $\forall x (F(x) \rightarrow B(x))$ $\therefore \forall z \forall y ((A(z) \wedge H(y)) \rightarrow C(z, y))$	18. $\forall x (\exists y (A(y) \wedge B(x, y)) \rightarrow C(x))$ $\exists y (D(y) \wedge \exists x (F(x) \wedge G(x) \wedge B(y, x)))$ $\forall x (F(x) \rightarrow A(x))$ $\exists x (C(x) \wedge D(x)) \rightarrow (\exists y (D(y) \wedge \exists z B(y, z)) \rightarrow \forall x F(x))$ $\therefore \forall x A(x)$