PR 2 Logika Komputasional

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3 $\exists x.(makanan(x) \wedge \forall y.(mahasiswa(y) \rightarrow suka(y,x)))$
→ Terdapat makanan yang disukai oleh semua mahasiswa

$\forall y.(mahasiswa(y) \rightarrow \exists x.(makanan(x) \wedge suka(y,x)))$
→ Semua mahasiswa menyukai beberapa makanan tertentu

5 Premis : $kelas(Jeki)$, $umur19(Jeki)$, $\forall x.(umur19(x) \rightarrow sim(x))$

1.	$kelas(Jeki)$	Premis
2.	$umur19(Jeki)$	Premis
3.	$\forall x.(umur19(x) \rightarrow sim(x))$	Premis
4.	$umur19(Jeki) \rightarrow sim(Jeki)$	UI 3
5.	$sim(Jeki)$	MP 2,4
6.	$kelas(Jeki) \wedge sim(Jeki)$	AI 1,5
7.	$\exists x.(kelas(x) \wedge sim(x))$	EG 6

6 Fakta : $\forall x.(p(x) \rightarrow q(x)) \rightarrow \exists x.(r(x) \wedge s(x))$
$\forall x.(p(x) \rightarrow s(x)) \wedge \forall x.(s(x) \rightarrow q(x))$
Kesimpulan : $\exists x.\, s(x)$

1.	$\forall x.(p(x) \rightarrow q(x)) \rightarrow \exists x.(r(x) \wedge s(x))$	Premis
2.	$\forall x.(p(x) \rightarrow s(x)) \wedge \forall x.(s(x) \rightarrow q(x))$	Premis
3.	$\forall x.(p(x) \rightarrow s(x))$	AE 2
4.	$\forall x.(s(x) \rightarrow q(x))$	AE 2
5.	$p(a) \rightarrow s(a)$	UI 3
6.	$s(a) \rightarrow q(a)$	UI 4
7.	$p(a) \rightarrow q(a)$	SH 5,6
8.	$(p(a) \rightarrow q(a)) \rightarrow \exists x.(r(x) \wedge s(x))$	UI 1
9.	$(p(a) \rightarrow q(a)) \rightarrow (r(b) \wedge s(b))$	EI 8
10.	$r(b) \wedge s(b)$	MP 7,9
11.	$s(b)$	AE 10
12.	$\exists x(s(x))$	EG 11

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9 $\forall x[p(x) \rightarrow (\exists y[q(x,y) \wedge \neg r(y)] \wedge \neg \exists y[q(x,y) \wedge q(y,x)] \wedge \forall y[\neg p(y) \rightarrow \neg s(x,y)])]$

I : $\forall x[\neg p(x) \vee (\exists y[q(x,y) \wedge \neg r(y)] \wedge \neg \exists y[q(x,y) \wedge q(y,x)] \wedge \forall y[p(y) \vee \neg s(x,y)])]$

N : $\forall x[\neg p(x) \vee (\exists y[q(x,y) \wedge \neg r(y)] \wedge \forall y[\neg q(x,y) \vee \neg q(y,x)] \wedge \forall y[p(y) \vee \neg s(x,y)])]$

S : $\forall x[\neg p(x) \vee (\exists y[q(x,y) \wedge \neg r(y)] \wedge \forall z[\neg q(x,z) \vee \neg q(z,x)] \wedge \forall w[p(w) \vee \neg s(x,w)])]$

E : $\forall x[\neg p(x) \vee ([q(x,f(x)) \wedge \neg r(f(x))] \wedge \forall z[\neg q(x,z) \vee \neg q(z,x)] \wedge \forall w[p(w) \vee \neg s(x,w)])]$

A : $\neg p(x) \vee ([q(x,f(x)) \wedge \neg r(f(x))] \wedge [\neg q(x,z) \vee \neg q(z,x)] \wedge [p(w) \vee \neg s(x,w)])$

D : $[(\neg p(x) \vee q(x,f(x))) \wedge (\neg p(x) \vee \neg r(f(x))] \wedge [\neg p(x) \vee \neg q(x,z) \vee \neg q(z,x)] \wedge [\neg p(x) \vee p(w) \vee \neg s(x,w)]$

C : $\{\neg p(x), q(x,f(x))\}$

$\{\neg p(x), \neg r(f(x))\}$

$\{\neg p(x), \neg q(x,z), \neg q(z,x)\}$

$\{\neg p(x), p(w), \neg s(x,w)\}$

10 ⓐ color(tweety, yellow) dan color(x,y)

Compare : color(tweety, yellow), color(x,y), {}

compare : color, color, {}

result : {}

compare : tweety, x, {}

result : {tweety ← x}

compare : yellow, y, {tweety ← x}

result : {tweety ← x, yellow ← y}

result : {tweety ← x, yellow ← y}

ⓑ color(tweety, yellow) dan color(x,x)

Compare : color(tweety, yellow), color(x,x), {}

compare : color, color, {}

result : {}

compare : tweety, x, {}

result : {tweety ← x}

compare : yellow, x, {tweety ← x}

result : {tweety ← x, yellow ← x}

result : {tweety ← x, yellow ← x}

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ⓒ compare : color(hat(postman), blue), color(hat(y), x), {}
compare : color, color, {}
result : {}
compare : hat, hat, {}
result : {}
compare : postman, y, {}
result : {postman ← y}
compare : blue, x, {postman ← y}
result : {postman ← y, blue ← x}
result : {postman ← y, blue ← x}

ⓓ compare : q(x,x), q(y, f(y)), {}
compare : q, q, {}
result : {}
compare : x, y, {}
result : {x ← y}
compare : x, f(y), {x ← y}
compare : y, f(y), {x ← y}
result : {x ← y, f(y) ← y}
result : {x ← y, f(y) ← y}

ⓔ compare : p(A, x, f(g(y))), p(z, f(z), f(A)), {}
compare : p, p, {}
result : {}
compare : A, z, {}
result : {A ← z}
compare : x, f(z), {A ← z}
result : {A ← z, x ← f(z)}
compare : f, f, {A ← z, x ← f(z)}
result : {A ← z, x ← f(z)}
compare : g(y), A, {A ← z, x ← f(z)}
compare : g(y), z, {A ← z, x ← f(z)}
result : {A ← z, x ← f(z), g(y) ← z}
result : {A ← z, x ← f(z), g(y) ← z}

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© compare : color(hat(postman), blue), color(hat(y), x), {}
compare : color, color, {}
result : {}
compare : hat, hat, {}
result : {}
compare : postman, y, {}
result : {postman ← y}
compare : blue, x, {postman ← y}
result : {postman ← y, blue ← x}
result : {postman ← y, blue ← x}

(d) compare : q(x,x), q(y, f(y)), {}
compare : q, q, {}
result : {}
compare : x, y, {}
result : {x ← y}
compare : x, f(y), {x ← y}
compare : y, f(y), {x ← y}
result : {x ← y, f(y) ← y}
result : {x ← y, f(y) ← y}

(e) compare : p(A, x, f(g(y))), p(z, f(z), f(A)), {}
compare : p, p, {}
result : {}
compare : A, z, {}
result : {A ← z}
compare : x, f(z), {A ← z}
result : {A ← z, x ← f(z)}
compare : f, f, {A ← z, x ← f(z)}
result : {A ← z, x ← f(z)}
compare : g(y), A, {A ← z, x ← f(z)}
compare : g(y), z, {A ← z, x ← f(z)}
result : {A ← z, x ← f(z), g(y) ← z}
result : {A ← z, x ← f(z), g(y) ← z}

(f) $f(x, g(f(a), u)) = f(g(u, v), x)$

Compare : f, f, $\{\}$
result : $\{\}$
Compare : x, $g(u, v)$, $\{\}$
result : $\{x \leftarrow g(u, v)\}$
compare : $g(f(a), u)$, x, $\{x \leftarrow g(u, v)\}$
compare : $g(f(a), u)$, $g(u, v)$, $\{x \leftarrow g(u, v)\}$
compare : $f(a)$, u, $\{x \leftarrow g(u, v)\}$
result : $\{x \leftarrow g(u, v),\ f(a) \leftarrow u\}$
compare : u, v, $\{x \leftarrow g(u, v),\ f(a) \leftarrow u\}$
result : $\{x \leftarrow g(u, v),\ f(a) \leftarrow u,\ u \leftarrow v\}$
result : $\{x \leftarrow g(u, v),\ g(u, v) \leftarrow x,\ f(a) \leftarrow u,\ u \leftarrow v\}$

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1.	$\{\neg p(x,y),\ \neg q(x,y,f(x,y))\}$	Premis
2.	$\{\neg r(y,z),\ q(a,y,z)\}$	Premis
3.	$\{r(y,z),\ \neg q(a,y,z)\}$	Premis
4.	$\{p(x,g(x)),\ q(x,g(x),z)\}$	Premis
5.	$\{\neg r(x,y),\ \neg q(x,w,z)\}$	Premis
6.	$\{\neg p(x,y),\ \neg r(y,z)\}$	1,2
7.	$\{\neg q(a,x,z),\ \neg q(x,w,z)\}$	3,5
8.	$\{p(x,y),\ r(y,z)\}$	3,4 MGU $\{g(x) \leftarrow y,\ a \leftarrow x\}$
9.	$\{\neg r(y,z),\ r(y,z),\ \neg q(a,y,z)\}$	6,8
10.	$\{\}$	8,9