Latihan Relational Logic : Logical Entailment

Ahmad Nadil
13521029
K3

1. ① $\forall x . \forall y . (\text{Menjual}(x, y) \& \text{Softwarebajakan}(y) \rightarrow \text{Kriminal}(x))$ Premis
② $\exists y . (\text{Mempunyai}(\text{CheriaKelas}, Y) \& \text{Softwarebajakan}(Y) \& \text{Menjual}(\text{Gayus}, Y))$ Premis
③ Mempunyai(CheriaKelas, Softbajak) & Softwarebajakan(Softbajak) & Menjual(Gayus, Softbajak) EI 2
④ $\forall x . (\text{Menjual}(x, \text{Softbajak}) \& \text{Softwarebajakan}(\text{Softbajak}) \rightarrow \text{Kriminal}(x))$ UI 1
⑤ Menjual(Gayus, Softbajak) & Softwarebajakan(Softbajak) → Kriminal(Gayus)) UI 4
⑥ Menjual(Gayus, Softbajak) & Softwarebajakan(Softbajak) AE 3
⑦ Kriminal(Gayus) MP 5, 6

→ Terbukti gayus seorang kriminal.

2. ① $\exists x . (\text{dog}(x) \wedge \text{own}(\text{john}, x))$ Premis
② $\forall y . ((\exists x . \text{dog}(x) \wedge \text{own}(y, x)) \rightarrow \text{lover}(y))$ Premis
③ $\forall x . (\text{lover}(x) \rightarrow (\forall y . \text{animal}(y) \rightarrow \text{kill}(x, y)))$ Premis
④ kill(john, tuna) ∨ kill(curiosity, tuna) Premis
⑤ cat(tuna) premis
⑥ $\forall x . (\text{cat}(x) \rightarrow \text{animal}(x))$ Premis
⑦ $(\exists x . \text{dog}(x) \wedge \text{own}(\text{john}, x)) \rightarrow \text{lover}(\text{john})$ UI 2
⑧ dog(doggy) ∧ own(john, doggy) EI 1
⑨ dog(doggy) ∧ own(john, doggy)) → lover(john) EI 7
⑩ cat(tuna) → animal(tuna) UI 6
⑪ lover(john) MP 8, 9
⑫ animal(tuna) MP 5, 11
⑬ lover(john) → (animal(tuna) → ¬kill(john, tuna)) UI 3
⑭ animal(tuna) → ¬kill(john, tuna) MP 10, 13
⑮ ¬kill(john, tuna) MP 12, 14
⑯ kill(curiosity, tuna) SD 4, 15

→ Terbukti curiosity membunuh tuna.

3. a.) Terdapat suatu makanan yang disukai semua mahasiswa
b.) Semua mahasiswa menyukai makanan tertentu.

4. ① $\forall x.\ (hungry(x) \rightarrow caterpillar(x))$ — Premis
② $\forall x.\ (caterpillar(x) \rightarrow 42legs(x))$ — Premis
③ $hungry(Edward)$ — Premis
④ $hungry(Edward) \rightarrow caterpillar(Edward)$ — UI 1
⑤ $caterpillar(Edward) \rightarrow 42legs(Edward)$ — UI 1
⑥ $hungry(Edward) \rightarrow 42legs(Edward)$ — SH 4,5
⑦ $42legs(Edward)$ — MP 3,6

5. 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. 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 $P(a) \rightarrow q(a)$ — HS 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.