

1. Preveri pravilnost sklepov.

- (a) $p \vee t, t \vee u \Rightarrow r \vee s, t \Rightarrow \neg s \models p,$
- (b) $p \vee t, t \vee u \Rightarrow r \vee s, t \Rightarrow \neg s \models p \vee r,$
- (c) $t \Rightarrow p, t \vee q \vee r, r \Rightarrow (p \vee t) \models p,$
- (d) $t \Rightarrow p, t \vee q \vee r, r \Rightarrow (p \vee t) \models p \vee q,$
- (e) $(r \wedge t) \vee q, r \vee \neg t \Rightarrow \neg p \wedge s \models q,$
- (f) $(r \wedge t) \vee q, r \vee \neg t \Rightarrow \neg p \wedge s \models p \Rightarrow q,$
- (g) $p \vee s \Rightarrow \neg t \wedge u, t \vee (u \Rightarrow p), p \wedge q \Rightarrow r \vee \neg u \models q \Rightarrow p \wedge r,$
- (h) $p \Rightarrow t \vee r, q \Rightarrow t \vee s, r \Rightarrow \neg s \models p \wedge q \Rightarrow t,$
- (i) $r \vee t \Rightarrow q \wedge s, \neg t \vee u \Rightarrow r, s \Leftrightarrow p \models \neg r \Rightarrow p,$
- (j) $\neg p \Rightarrow r \wedge t, t \vee s \Rightarrow \neg q \models p \vee \neg q,$
- (k) $p \wedge q \Rightarrow \neg t, s \vee t, q \wedge r \models p \Rightarrow r \wedge s,$
- (l) $p \Rightarrow (q \Rightarrow s), p \Rightarrow (r \Rightarrow t), \neg t \vee \neg s \models p \Rightarrow (\neg r \vee \neg q).$

2. Odloči, kateri od parov spodnjih izjavnih formul so enakovredni. Enakovrednost utemelji z zakoni predikatnega računa, za neenakovredne pare pa poišči interpretacije, ki ovržejo enakovrednost.

$$\neg \forall x \exists y (P(x) \Rightarrow Q(y)), \exists x \forall y (P(x) \wedge \neg Q(y)), \exists x \forall y (\neg P(x) \Rightarrow \neg Q(y)).$$

3. Ali so katere izmed spodnjih izjavnih formul med sabo enakovredne?

$$\exists x (P(x) \Leftrightarrow Q(x)), \forall x (P(x) \vee Q(x)) \Rightarrow \exists x (P(x) \wedge Q(x)), \exists x P(x) \Leftrightarrow \exists x Q(x).$$

4. Zapiši izjavno formulo v preneksni normalni obliki.

- (a) $\forall x P(x) \Rightarrow \forall x Q(x)$
- (b) $\forall x \forall y (P(x, y) \Rightarrow \exists z (P(x, z) \wedge P(y, z)))$
- (c) $\forall x (\exists y P(x, y) \Rightarrow \forall y R(y, x) \vee \exists x T(x))$
- (d) $\neg \forall x (P(x) \vee \exists z Q(x, z)) \vee \exists z (P(z) \Rightarrow \forall x Q(x, z))$
- (e) $\forall t \neg \forall x (P(x) \vee \exists z Q(x, z)) \vee \exists z (\forall x Q(x, z) \Rightarrow P(z))$

5. Dane so množice $A = \{1, 2, 3\}$, $B = \{2, 3, 4\}$ in $C = \{0, 1, 4, 5\}$. Določi spodnje množice (naštej njihove elemente).

(a) $(B \setminus A) \cap C$,

(b) $C + (A \cup C)$,

(c) $C + (A \cup B)$,

(d) $A \cup (B \cap C)$,

(e) $\mathcal{P}(A \cap B) \setminus C$,

(f) $\mathcal{P}(A \cap C) + \mathcal{P}(B \cap C)$,

(g) $\mathcal{P}(A \cap C) + \mathcal{P}(A)$.