

CS 278 HW 4

1.7.1) ① $\forall x (Q(x) \vee P(3))$ proposition, true

② $\exists x (Q(x) \wedge P(x))$ proposition, false

1.7.2 ① All students enrolled in the class took the test
 $\forall x (E(x) \rightarrow T(x))$

② At least one student who is enrolled in the class did not take the test
 $\exists x (E(x) \rightarrow \neg T(x))$

1.7.3 ① Everyone got a large bonus
 $\forall x (B(x))$

② Someone who is not on the executive team received a large bonus
 $\exists x (\neg T(x) \wedge B(x))$

1.7.4 ① Everyone who was sick yesterday did not go to work.
 $\forall x (S(x) \rightarrow \neg W(x))$

(d) Yesterday someone was sick and went to work.

$$\exists x (S(x) \wedge W(x))$$

(e) Everyone who did not go to work yesterday was sick

$$\forall x (\neg W(x) \rightarrow S(x))$$

(f) Someone other than Ingrid was sick yesterday.

$$\exists x (S(x) \wedge \neg S(\text{Ingrid}))$$

(g) Everyone besides Ingrid was sick yesterday

$$\forall x, x \neq \text{Ingrid} (S(x))$$