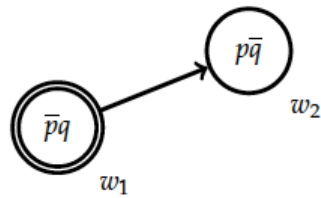


Homework exercises, Week 11, part a (due Friday 20 April).

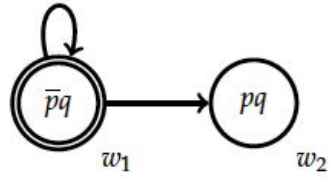
Evaluate the formulas on the models given below. Justify your answer.

1. Model:



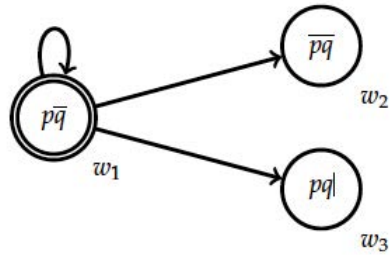
- (a) $w_1 \models p \vee (q \rightarrow \neg p)$
- (b) $w_1 \models \Box q$
- (c) $w_1 \models \Box(q \rightarrow p)$
- (d) $w_1 \models q \rightarrow \Box p$
- (e) $w_1 \models \Box(p \vee q)$

2. Model:



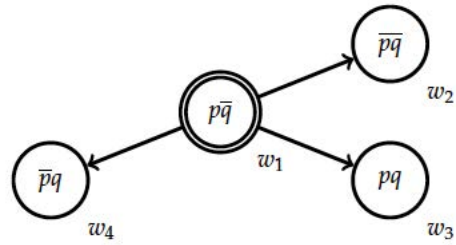
- (a) $w_1 \models \Diamond p$
- (b) $w_1 \models \Box p$
- (c) $w_1 \models \Diamond p \wedge \Diamond \neg p$
- (d) $w_1 \models \neg p \rightarrow \Diamond p$
- (e) $w_1 \models \Diamond \Diamond \Diamond p$

3. Model:



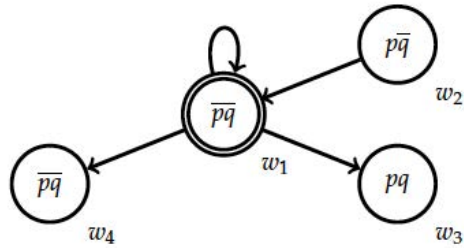
- (a) $w_1 \models \neg \Box (p \rightarrow q)$
- (b) $w_1 \models \Diamond \neg \Box (p \rightarrow q)$
- (c) $w_1 \models \Box \Box (q \rightarrow p)$
- (d) $w_1 \models \neg p \vee \Box \Diamond p$
- (e) $w_1 \models \Diamond q \wedge \Diamond \neg q$

4. Model:



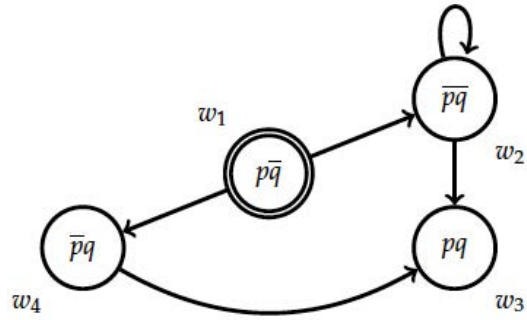
- (a) $w_1 \models \diamond(\neg p \wedge \neg q)$
- (b) $w_1 \models \Box(p \rightarrow q)$
- (c) $w_1 \models \diamond(p \wedge \neg q)$
- (d) $w_1 \models p \rightarrow \diamond\Box\neg p$
- (e) $w_1 \models \diamond\neg\Box(p \wedge q)$

5. Model:



- (a) $w_1 \models \neg p \wedge \diamond\diamond\neg p$
- (b) $w_1 \models \diamond\Box(p \wedge \neg q)$
- (c) $w_1 \models \neg\diamond\Box(p \vee q)$
- (d) $w_1 \models \neg\Box(p \rightarrow q)$
- (e) $w_1 \models \diamond\Box(p \wedge \neg p)$

6. Model:



- (a) $w_1 \models \Box \Diamond (p \wedge q)$
- (b) $w_1 \models \Diamond \Box \Diamond (p \wedge q)$
- (c) $w_1 \models \Box \Diamond \neg p$
- (d) $w_1 \models \Diamond q \wedge \Diamond (\neg q \wedge \Diamond q)$
- (e) $w_1 \models \neg q \rightarrow \Box q$