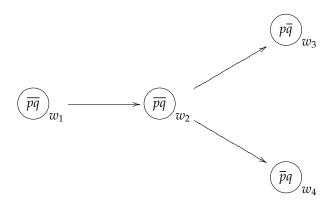


Amsterdam University College

Logic, Information flow and Argumentation

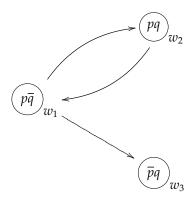
Homework exercises, Week 11, part b (due Tuesday 24 April).

1. Evaluate whether the following modal formulas are true or false in this model (as on the slides: p,q,... signifies that the proposition is true at a node, and $\overline{p},\overline{q},...$ signifies that it is not true.)



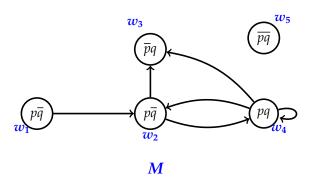
- (a) $w_4 \models \Diamond (p \lor \neg p)$
- (b) $w_4 \models \neg p \rightarrow \Box q$
- (c) $w_3 \models \Box(p \leftrightarrow q)$
- (d) $w_3 \models \neg \diamondsuit (p \rightarrow \neg p) \rightarrow \neg q$
- (e) $w_2 \models \neg \Box (p \rightarrow q)$
- (f) $w_2 \models \Diamond (\neg p \leftrightarrow \neg q)$
- (g) $w_1 \models \neg p \rightarrow \Diamond (q \lor \Diamond (p \land \Box q))$
- (h) $w_1 \models \Diamond \Box (p \land \neg q)$

2. Do the same in the following model.



- (a) $w_3 \models q \rightarrow \neg \neg p$
- (b) $w_3 \models \neg \diamondsuit (p \land \neg q)$
- (c) $w_2 \models \Box \neg \Box (p \rightarrow q)$
- (d) $w_2 \models \Diamond \Diamond \neg \Box \neg \Diamond \neg p$
- (e) $w_1 \models \Box\Box(\neg p \land \neg q)$
- (f) $w_1 \models q \lor \Box(p \to \Box \diamondsuit p)$

3.



For each world in the model, provide **three** formulas that are true only in that world and false in all the others.

4. Try to answer the following question: is there a modal formula that distinguishes the following two models (i.e., it is true in one but false in the other)?

