CS3234 Logic and Formal Systems

Assignment 05:
Modal Logic I (Paper part)

Submission on A-4 paper (use as many sheets as you want), to the box provided
by the office COM2, 03-51. Staple or tie your sheets together and write your
name and matriculation number on the top of the front page.
Latest submission: Thursday, 14/10/09, 10:30am.

1. (8 marks, Exercise 1) For each of the following formulas, give an example
   for a Kripke model, in which the formula holds in all worlds of the model.

   - $\Diamond p \wedge \neg \Box p$
   - $\Diamond \top$
   - $\Box \bot$
   - $\Diamond p \wedge \Diamond q \rightarrow \Diamond(p \wedge q)$

2. (5 marks, Exercise 2) Prove the distributivity of $\Diamond$ over $\vee$ using the defi-
   nition of $\models$.

3. (5 marks, Exercise 4) Prove that $\Box \bot$ corresponds to $R = \emptyset$.

4. (2 marks, Exercise 5) Find a property of R that corresponds to the formula
   $\Diamond \top$.