DAT060 EXERCISE WEEK 1

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Problem 1

1.1 If the sun shines, Emmy and Kurt eat ice cream.
Propositional atoms:
p : the sun shines
q : Emmy and Kurt eats ice cream
Expressed with propositional logic: $p \rightarrow p$

1.2 Exactly one out of Ada, Haskell, and Bertrand doesnt like cats.
Propositional atoms:
p : Ada don't like cats
q : Haskell don't like cats
r : Bertrand don't like cats
Expressed with propositional logic: $(p \wedge \neg(q \vee r)) \vee ((q \wedge \neg(p \vee r)) \vee ((r \wedge \neg(p \vee q))$

Problem 2

(1) $p \wedge (q \wedge r) \vdash (p \wedge q) \wedge r$
   proof:
   (a) $p \wedge (q \wedge r)$ $premise$
   (b) p $\wedge e_1$ 1
   (c) $q \wedge r$ $\wedge e_2$ 1
   (d) q $\wedge e_1$ 3
   (e) r $\wedge e_2$ 3
   (f) $p \wedge q$ $\wedge i$ 2, 4
   (g) $(p \wedge q) \wedge r$ $\wedge i$ 6, 5