

Propositional Logic – Exercises for Week 1

1. Give at least two different interpretations of these ambiguous sentences:

- i. Jeremy Fisher went to the bank.
- ii. Ich bin ein Berliner.
- iii. They can fish.
- iv. Bush is dangerous and mad or just plain stupid.
- v. This is a pretty little girl's dress.
- vi. Angela's sister sleeps with her husband.
- vii. You'll only find free-range eggs in Marks & Spencer sandwiches.
- viii. Tweedledum and Tweedledee couldn't fit through the door.
- ix. All the children visited a seaside town.
- x. At least two gunmen fired at least three bullets.
- xi. Sorry, I thought you were someone else.
- xii. You shouldn't tease simpletons because they can't understand you.
- xiii. I'm looking for a girl with a pair of binoculars.
- xiv. Richards drives wide of mid-off.
- xv. Hertford must have the worst food in Oxford.

2. Write out truth-tables for these formulae:

- i. $[P \wedge Q]$
- ii. $[P \vee Q]$
- iii. $[P \vee P]$
- iv. $\neg[P \wedge Q]$
- v. $\neg[P \vee Q]$
- vi. $[\neg P \wedge Q]$
- vii. $[P \vee \neg Q]$
- viii. $\neg[P \vee \neg P]$
- ix. $[P \wedge [Q \vee R]]$
- x. $[[P \wedge Q] \vee R]$

(Remember that the symbols \neg , \wedge , and \vee are read respectively as *not*, *and*, and *or*. You may find §§16-17 of Hodges helpful, but don't worry about reading them thoroughly just yet.)

3. How might Alice reply to Brian in the following situations?

- i. ALICE: You can only graduate if you've paid your library fines.
BRIAN: So I can graduate if I've paid my library fines but not taken any exams!
- ii. BRIAN: It's wet because it's raining.
ALICE: Don't be silly, it isn't raining.
BRIAN: I didn't say it was!
- iii. BRIAN: I can prove that the past is finite! Suppose the past is infinite. Then all days have a day before them; or in other words, there's a day before all days. This day before all days must be the first day, so the past is finite.