CS441 – Discrete Structures for Computer Science

Instructor: Dr.Litman

Problems from Chapter 1.1

18. a) The necessary condition is the conclusion: If you get promoted, then you wash the boss's car.

b) If the winds are from the south, then there will be a spring thaw.

c) The sufficient condition is the hypothesis: If you bought the computer less than a year ago, then the warranty is good.

d) If Willy cheats, then he gets caught.

e) The "only if" condition is the conclusion: If you access the website, then you must pay a subscription fee.

f) If you know the right people, then you will be elected.

g) If Carol is on a boat, then she gets seasick.

32. For parts **(a)** and **(b)**, we have

p	q	r	$p \vee q$	$(p \vee q) \vee r$	$(p \vee q) \wedge r$
T	T	T	T	T	T
T	T	F	T	T	F
T	F	T	T	T	T
T	F	F	T	T	F
F	T	T	T	T	T
F	T	F	T	T	F
F	F	T	F	T	F
F	F	F	F	F	F

For parts **(c)** and **(d)**, we have

p	q	r	$p \wedge q$	$(p \wedge q) \vee r$	$(p \wedge q) \wedge r$
T	T	T	T	T	T
T	T	F	T	T	F
T	F	T	F	T	F
T	F	F	F	F	F
F	T	T	F	T	F
F	T	F	F	F	F
F	F	T	F	T	F
F	F	F	F	F	F

Finally, for parts **(e)** and **(f)** we have

p	q	r	$\neg r$	$p \vee q$	$(p \vee q) \wedge \neg r$	$p \wedge q$	$(p \wedge q) \vee \neg r$
T	T	T	F	T	F	T	T
T	T	F	T	T	T	T	T
T	F	T	F	T	F	F	F
T	F	F	T	T	T	F	T
F	T	T	F	T	F	F	F
F	T	F	T	T	T	F	T
F	F	T	F	F	F	F	F
F	F	F	T	F	F	F	T