COMP 681 Formal Methods Spring 2009 Recitation 1—Solutions

1. Translate the following into propositional logic. First define the meaning of the identifiers you use for the prime constituents.

Bill and Ed work Tuesdays and Wednesdays unless Tom is working, in which case only Bill works.

Answer

Let

p = Bill is working.
q = Ed is working.
r = It is Tuesday.
s = It is Wednesday.
t = Tom is working.

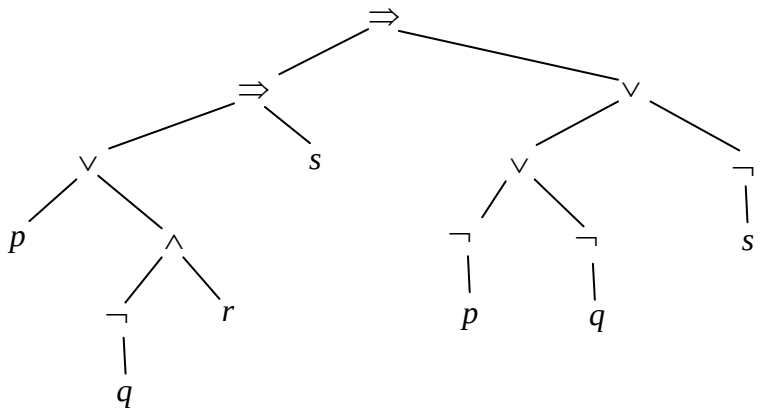
Then

$r \vee s \Rightarrow ((\neg t \Rightarrow p \wedge q) \wedge (t \Rightarrow p \wedge \neg q))$

2. Draw the parse tree for the following propositional logic wff and give the truth table for it.

$p \vee \neg q \wedge r \Rightarrow s \Rightarrow \neg p \vee \neg q \vee \neg s$

Answer



p	q	r	s	$\neg p$	$\neg q$	$\neg s$	$\neg q \wedge r$	$p \vee \neg q \wedge r$ (1)	(1) $\Rightarrow s$ (2)	$\neg p \vee \neg q$ (3)	(3) $\vee \neg s$ (4)	(2) $\Rightarrow$ (4)
T	T	T	T	F	F	F	F	T	T	F	F	F
T	T	T	F	F	F	T	F	T	F	F	T	T
T	T	F	T	F	F	F	F	T	T	F	F	F
T	T	F	F	F	F	T	F	T	F	F	T	T
T	F	T	T	F	T	F	T	T	T	T	T	T
T	F	T	F	F	T	T	T	T	F	T	T	T
T	F	F	T	F	T	F	F	T	T	T	T	T
T	F	F	F	F	T	T	F	T	F	T	T	T
F	T	T	T	T	F	F	F	F	T	T	T	T
F	T	T	F	T	F	T	F	F	T	T	T	T
F	T	F	T	T	F	F	F	F	T	T	T	T
F	T	F	F	T	F	T	F	F	T	T	T	T
F	F	T	T	T	T	F	T	T	T	T	T	T
F	F	T	F	T	T	T	T	T	F	T	T	T
F	F	F	T	T	T	F	F	F	T	T	T	T
F	F	F	F	T	T	T	F	F	T	T	T	T