CS225 Assignment 1.1 Jason Dorweiler

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5:02 PM

Section 1.1 #2, 14, 24, 32, 36

2.

a) Do not pass go.

not a proposition

b) What time is it?

not a proposition

c) There are no black flies in Maine.

A Proposition. Value = True

14. Let p, q, and r be the propositions
p :You get an A on the final exam.
q :You do every exercise in this book.
r :You get an A in this class.
Write these propositions using p, q, and r and logical connectives (including negations).

a) You get an A in this class, but you do not do every exercise in this book.

$r \wedge \neg q$

b) You get anA on the final, you do every exercise in this book, and you get an A in this class.

$p \wedge q \wedge r$

c) To get anA in this class, it is necessary for you to get an A on the final.

$r \rightarrow p$

d) You get an A on the final, but you don't do every exercise in this book; nevertheless, you get an A in this class.

$p \wedge \neg q \wedge r$

e) Getting an A on the final and doing every exercise in this book is sufficient for getting an A in this class.

$(p \wedge q) \rightarrow r$

f) You will get anA in this class if and only if you either do every exercise in this book or you get an A on the final.

$(p \vee q) \leftrightarrow r$

24. Write each of these statements in the form "if p, then q" in English. [Hint: Refer to the list of common ways to express conditional statements provided in this section.]

a) I will remember to send you the address only if you send me an e-mail message.

If I sent you the address, then you sent me an email message

b) To be a citizen of this country, it is sufficient that you were born in the United States.

If you were born in the United States, then you are a citizen of this country.

c) If you keep your textbook, it will be a useful reference in your future courses.

If you keep your textbook, then it will be a useful reference in your future courses

d) The RedWings will win the Stanley Cup if their goalie plays well.

If their goalie plays well, then the RedWings will win the Stanley Cup

e) That you get the job implies that you had the best credentials.

If you get the job, then you had the best credentials

f) The beach erodes whenever there is a storm.

If there is a storm, then the beach erodes

g) It is necessary to have a valid password to log on to the server.

If you want to log into the server, then you need a password

h) You will reach the summit unless you begin your climb too late.

If you begin your climb too late, then you will not reach the summit.

32. Construct a truth table for each of these compound propositions.

a) $p \rightarrow \neg p$

p	$\neg p$	$p \rightarrow \neg p$
T	F	F
F	T	T

b) $p \leftrightarrow \neg p$

p	$\neg p$	$p \leftrightarrow \neg p$
T	F	F
F	T	F

c) $p \oplus (p \vee q)$

p	q	$(p \vee q)$	$p \oplus (p \vee q)$
T	T	T	F
T	F	T	F
F	T	T	T
F	F	F	F

F	T	T	T
F	F	F	F

d)

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

e) $(p \rightarrow \neg p) \leftrightarrow (p \leftrightarrow q)$

p	q	$\neg p$	$(p \rightarrow \neg p)$	$(p \leftrightarrow q)$	$(p \rightarrow \neg p) \leftrightarrow (p \leftrightarrow q)$
T	T	F	F	T	F
T	F	F	F	F	T
F	T	T	T	F	F
F	F	T	T	T	T

f) $(p \leftrightarrow q) \oplus (p \leftrightarrow \neg q)$

p	q	$\neg q$	$(p \leftrightarrow q)$	$(p \leftrightarrow \neg q)$	$(p \leftrightarrow q) \oplus (p \leftrightarrow \neg q)$
T	T	F	T	F	T
T	F	T	F	T	T
F	T	F	F	T	T
F	F	T	T	F	T

36. Construct a truth table for each of these compound propositions.

a) $(p \vee q) \vee r$

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

b) $(p \vee q) \wedge r$

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

b) $(P \vee Q) \wedge R$

P	Q	R	$P \vee Q$	$(P \vee Q) \wedge R$
T	T	T	T	T
T	T	F	T	F
T	F	T	T	T
T	F	F	T	F
F	T	T	T	T
F	T	F	T	F
F	F	T	F	F
F	F	F	F	F

c) $(P \wedge Q) \vee R$

P	Q	R	$(P \wedge Q)$	$(P \wedge Q) \vee R$
T	T	T	T	T
T	T	F	T	T
T	F	T	F	T
T	F	F	F	F
F	T	T	F	T
F	T	F	F	F
F	F	T	F	T
F	F	F	F	F

d) $(P \wedge Q) \wedge R$

P	Q	R	$(P \wedge Q)$	$(P \wedge Q) \wedge R$
T	T	T	T	T
T	T	F	T	F
T	F	T	F	F
T	F	F	F	F
F	T	T	F	F
F	T	F	F	F
F	F	T	F	F
F	F	F	F	F

e) $(P \vee Q) \wedge \neg R$

P	Q	$\neg R$	$(P \vee Q)$	$(P \vee Q) \wedge \neg R$
T	T	F	T	F
T	T	T	T	T
T	F	F	T	F
T	F	T	T	T
F	T	F	T	F
F	T	T	T	T
F	F	T	F	F
F	F	F	F	F

F	T	F	T	T
F	F	T	F	F
F	F		F	F

f) $(P \wedge Q) \vee \neg r$

P	Q	$\neg r$	$(P \wedge Q)$	$(P \wedge Q) \vee \neg r$
T	T	F	T	T
T	T	T	T	T
T	F	F	F	F
T	F	T	F	T
F	T	F	F	F
F	T	T	F	T
F	F	F	F	F
F	F	T	F	T