

CPSC 406

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Abstract

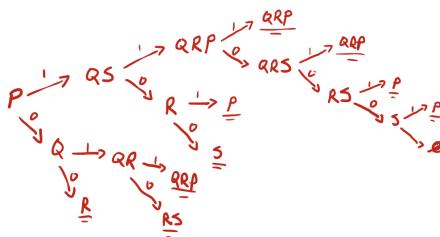
A very short introduction to typesetting in LaTeX for my courses “Programming Languages”, “Compiler Construction” and “Algorithm Analysis”.

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1 Homework

1.1 HW 1



NFA2DFA In order to convert the provided NFA to DFA I considered each possible combination of P, Q, R, and S, and considered each possible combination its own state. The included figure details every possible state the NFA/DFA may find itself in.

State	0	1
P	Q	QS
R	S	P
Q	R	QR
S	\emptyset	P
QS	R	QRP
QR	RS	QRP
RS	S	P
QRP	QRS	QRP
QRS	RS	QRP

1.2 HW 2

Question 1:

$$1. f(X, f(X, Y)) \stackrel{?}{=} f(f(Y, a), f(U, b))$$

$$X \stackrel{?}{=} f(Y, a) \quad f(X, Y) \stackrel{?}{=} f(U, b)$$

$$\sigma_1 = \frac{f(Y, a)}{X} \quad X = U \quad Y = b$$

$$\sigma_2 = \frac{U}{X} \quad \sigma_3 = \frac{b}{Y}$$

$$\sigma = \left[\frac{f(Y, a)}{X}, \frac{U}{X}, \frac{b}{Y} \right]$$

$$2. f(g(U), f(X, Y)) \stackrel{?}{=} f(X, f(Y, U))$$

$$g(U) \stackrel{?}{=} X \quad f(X, Y) \stackrel{?}{=} f(Y, U)$$

$$X \stackrel{?}{=} Y \quad Y \stackrel{?}{=} U$$

$$X \stackrel{?}{=} U$$

$$\sigma = \frac{g(X)}{X} \quad \text{Fail}$$

$$3. h(U, f(g(V), W), g(W)) \stackrel{?}{=} h(f(X, b), U, Z)$$

$$U \stackrel{?}{=} f(X, b) \quad f(g(V), W) \stackrel{?}{=} U \quad g(W) \stackrel{?}{=} Z$$

$$f(g(V), W) \stackrel{?}{=} f(X, b) \quad \sigma_3 = \frac{g(W)}{Z}$$

$$g(V) \stackrel{?}{=} X \quad W \stackrel{?}{=} b$$

$$\sigma_1 = \frac{g(V)}{X} \quad \sigma_2 = \frac{b}{W}$$

$$\sigma = \sigma_1 \circ \sigma_2 \circ \sigma_3 = \left[\frac{g(V)}{X}, \frac{b}{W}, \frac{g(W)}{Z} \right]$$

Question 2:

?- conn(W, a), conn(a, W)

?- addr(W, a), addr(a, Z), serv(Z), addr(Z, W) ?- twoway(W, a)

?- conn(W, a), conn(a, W)

?- addr(W, a), addr(a, Z), serv(Z), addr(Z, W)

1.3 HW 6

1. $p \vee \neg p$

p	$\neg p$	*
0	1	1
1	0	1

✓ Pass

2. $(p \rightarrow q) \rightarrow (\neg q \rightarrow \neg p)$

p	q	$\neg p$	$\neg q$	$p \rightarrow q$	$\neg q \rightarrow \neg p$	*
0	0	1	1	1	1	1
0	1	1	0	0	1	1
1	0	0	1	0	0	0
1	1	0	0	1	1	1

✓ Pass

3. $p \rightarrow (q \rightarrow p)$

p	q	$q \rightarrow p$	*
0	0	1	1
0	1	0	0
1	0	1	1
1	1	1	1

✓ Pass

4. $(p \rightarrow q) \vee (q \rightarrow p)$

p	q	$p \rightarrow q$	$q \rightarrow p$	*
0	0	1	1	1
0	1	0	1	1
1	0	0	1	1
1	1	1	1	1

✓ Pass

5. $((p \rightarrow q) \rightarrow p) \rightarrow p$

p	q	$p \rightarrow q$	$(p \rightarrow q) \rightarrow p$	*
0	0	1	0	0
0	1	0	0	0
1	0	0	0	0
1	1	1	1	1

✓ Pass

6. $(p \vee q) \wedge (\neg p \vee \neg q) \rightarrow q \vee r$

p	q	r	$s: p \vee q$	$z: \neg p \vee \neg q$	$y: s \wedge z$	$x: q \vee r$	$y \rightarrow x$	*
0	0	0	0	1	0	0	0	0
0	0	1	0	1	0	1	0	0
0	1	0	1	0	0	1	1	1
0	1	1	1	0	0	1	1	1
1	0	0	1	1	1	0	0	0
1	0	1	1	1	1	1	1	1
1	1	0	1	0	0	1	1	1
1	1	1	1	0	0	1	1	1

✓ Pass

7. $(p \vee q) \rightarrow (p \wedge q)$

p	q	$x: p \vee q$	$y: p \wedge q$	$x \rightarrow y$	*
0	0	0	0	1	1
0	1	1	0	0	0
1	0	1	0	0	0
1	1	1	1	1	1

✗ Fail

8. $(p \rightarrow q) \rightarrow (\neg p \rightarrow \neg q)$

p	q	$x: p \rightarrow q$	$y: \neg p \rightarrow \neg q$	$x \rightarrow y$	*
0	0	1	1	1	1
0	1	1	0	0	0
1	0	0	1	0	0
1	1	1	1	1	1

✗ Fail

2 Conclusions

In this document, to help you getting started, I gave a first succinct example of typesetting in Latex.

References

[ALG] [Algorithm Analysis](#), Chapman University, 2023.