

Math 322

Q13

12.2 #13

use only $+$, $-$

by DeMorgan's

$$x \cdot y = \overline{\overline{x + y}}$$

(13b)

$$x + (\overline{y \cdot (\overline{x + z})})$$

$$= x + \overline{y + (\overline{x + z})}$$

$$\overline{\overline{y}} \cdot \overline{\overline{x + z}} = \overline{\overline{y}} + \overline{\overline{x + z}}$$

$$= y + \overline{\overline{x + z}}$$

(ex)

$$x \cdot (\overline{y + z})$$

only use \downarrow

$$= (x \downarrow x) \downarrow ((\overline{y + z}) \downarrow (\overline{y + z}))$$

$$\overline{a} = a \downarrow a$$

$$a + b = (a \downarrow a) \downarrow (b \downarrow b)$$

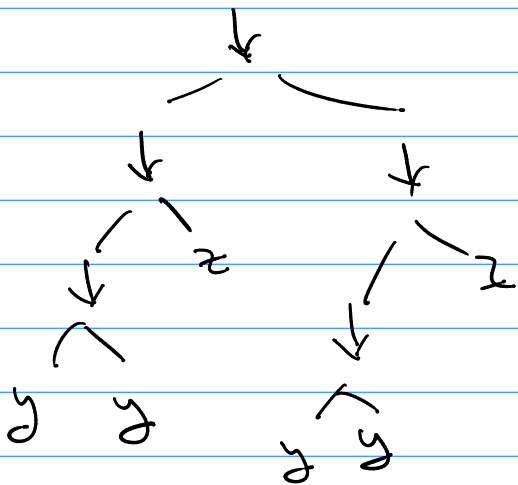
$$a \cdot b = (a \downarrow a) \downarrow (b \downarrow b)$$

$$\overline{y + z} = (\overline{y + z}) \downarrow (\overline{y + z})$$

$$= ((y \downarrow y) \downarrow z) \downarrow ((y \downarrow y) \downarrow z)$$

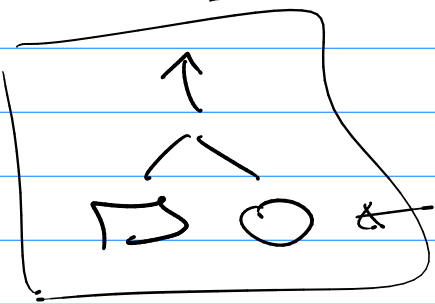
(ex) $((y \downarrow y) \downarrow z) \downarrow ((y \downarrow y) \downarrow z) \rightarrow \text{tree?}$

Postfix: $y, y, \downarrow, z, \downarrow, y, y, \downarrow, z, \downarrow, \downarrow$



Ex

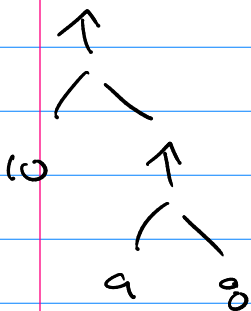
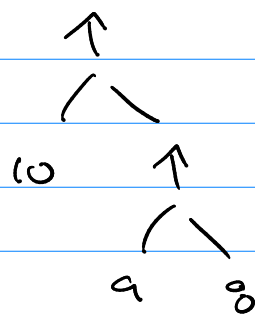
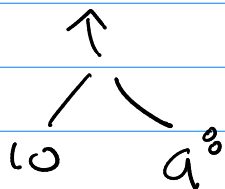
$\square^0 \rightarrow$ infix: $\square \uparrow 0$



power, sub., div.
children have order

Ex

$10(a^8)$



"Standard": 10^{a^8}

prefix: $\uparrow, 10, \uparrow, a, 8$

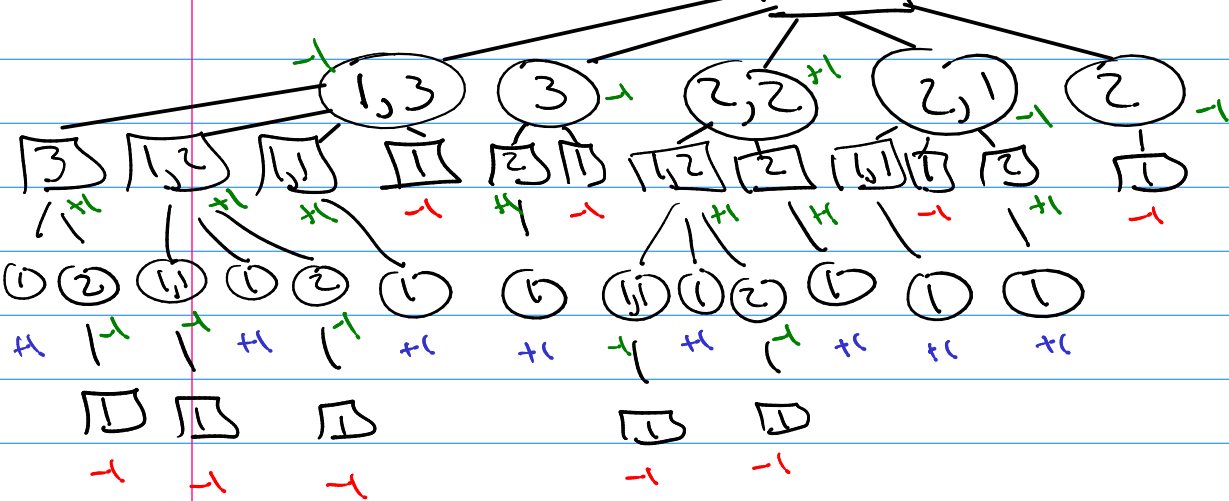
postfix: $10, a, 8, \uparrow, \uparrow$

infix: $10, \uparrow, (a \uparrow, 8)$

11.2 #33

Nim

$2, 3$



Exam 3	12 probs @ 10pts 110pts = 100%
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11.1 Trees (2 probs)

① Word Problem that says ...

$$n = i + l$$

$$n = n_i + l$$

$$l \leq M^h$$

$$h \geq \lceil \log_M l \rceil$$

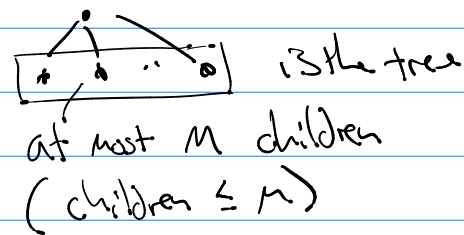
$$|E| = n - 1 = \# \text{ children}$$

② Prove $l \leq M^h$ in an M -ary tree of height h by induction.

Basis: I'm ok with $h=0$

• is the tree

I'm ok with $h=1$

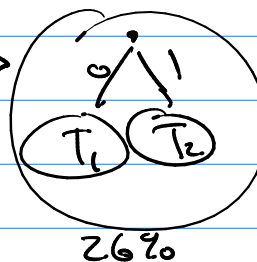


11.2 Applications (4 probs)

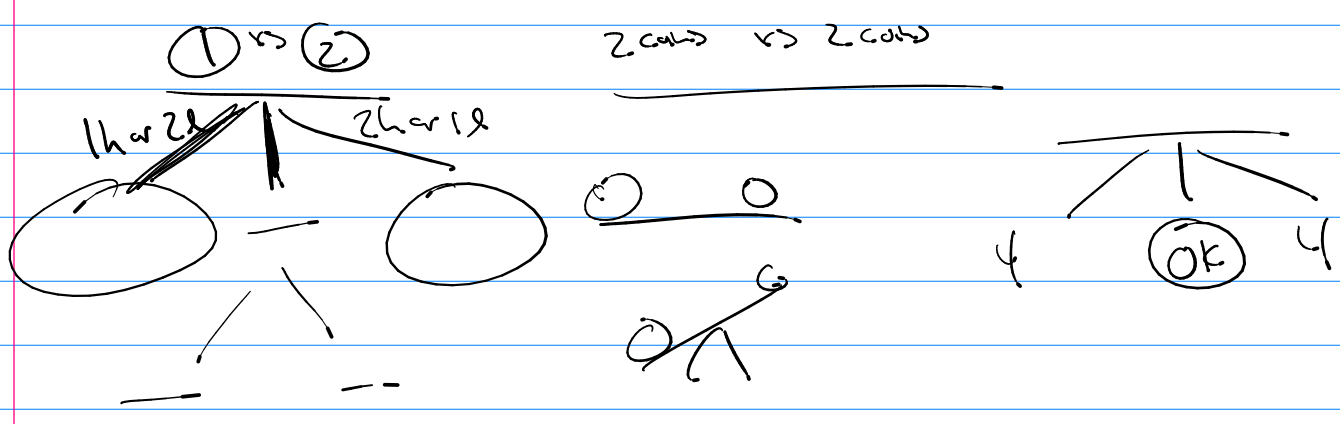
→ pick 4 from: Scale decision tree, Sorting decision tree, game tree & Nim, game tree of ticktacktoe or Huffman code

ex) Subtree 1
12%

Subtree 2
14%

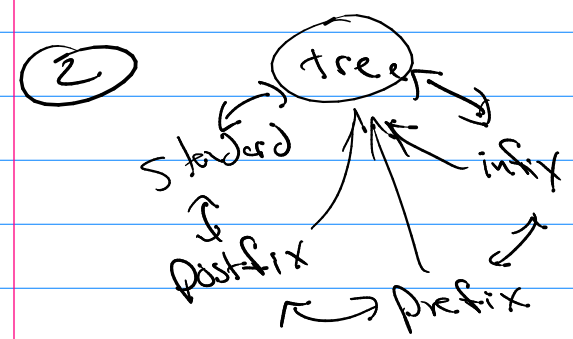


9 outcomes: (1L), (1R), (2L), (2R), (3L), (3R), (4L), (4R), (OK)
 $h \geq \lceil \log_3 9 \rceil = 2$
 3ary

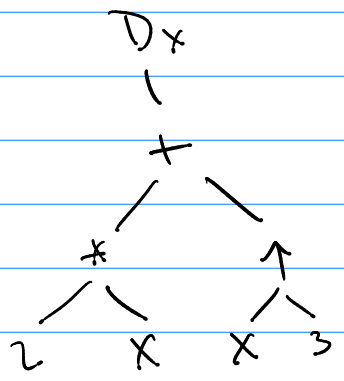


11.3 traversals 2 probs

① tree \rightarrow traversals



$$D_x [2x + x^3]$$



2, x, x, x, 3, +, +, D_x

Ch 12 Boolean Algebra (4 probs)

① Using only 5 laws of a Boolean Algebra verify some other law

② given boundary functions \rightarrow give tables.

③ Sum of Product expansion

④ Product of Sum expansion