

Introduction

CSS Selectors & HTML trees

(X)(HT)ML:

<body>

<h1 class="title" id="theTitle">Title </h1>

<div class="container">

<p> Welcome to this presentation :) </p>

<p> Hopefully you will learn at least <i> something </i>
about CSS selectors and Boolean
Algebras ! </p>

</div>

</body>

Abstract tree

Selectors

body > div > p > a[href]

.container > p

body & body

div > p + p

i ~ b

Vertical

Horizontal

Immediate $\Delta=1$

Distant $\Delta \geq 1$

technically a space
in CSS

Observations

Can add more **attributes**: div.container.special [title]
but not more **elements**, since a node has only
one element type: div and p never overlap.

Can match more things with , commas

Can negate a selector: :not (div > p)

Other pseudo-classes & elements : hover ::selection
Always: * never: :not(*)

Excluded Middle: $\text{tt} = \text{a} \parallel \text{not a}$

Introduction (continued)

Boolean Algebra

everywhere in language
and mathematics

data Bool = T | F

B

Boolean Algebra Bool where

$\text{tt} = \text{T}$, $\text{ff} = \text{F}$, $\text{not T} = \text{F}$, $\text{not F} = \text{T}$ $\text{tt} = \text{not ff}$
 $\text{not not} = \text{id}$

$\text{T} \& \& \text{T} = \text{T}$, $\text{-} \& \& \text{-} = \text{F}$ "conjunction"

$\text{F} \parallel \text{F} = \text{F}$, $\text{-} \parallel \text{-} = \text{T}$ "disjunction"

Lift over Tuple as expected.

Even predicates: $\forall a, b. \text{Bool} \rightarrow \text{Bool}$

e.g. isKeyword = (eq "let") \parallel (eq "in") \parallel (eq "where") \parallel ...
isOperator = (eq " \Rightarrow ") \parallel (eq " \Rightarrow ") \parallel ...

classify = isKeyword $\&\&$ isOperator

$(\&\& \&) ::= \lambda abc. (a \Rightarrow b) \rightarrow (a \Rightarrow c) \rightarrow (a \Rightarrow \text{Tuple } b c)$

Properties:

Conjunction forms a idempotent, commutative monoid
with tt as identity, f as annihilator.

Disjunction: similar story, tt and ff swap roles.

Distributivity: $(a \& \& b) \parallel c = (a \parallel c) \& \& (b \parallel c)$
 $(a \parallel b) \& \& c = (a \& \& c) \parallel (b \& \& c)$

De Morgan: $\text{not } (a \& \& b) = \text{not } a \parallel \text{not } b$
 $\text{not } (a \parallel b) = \text{not } a \& \& \text{not } b$

Big Reveal... (Disjunctive) Normal Form

DNF := clause | clause \parallel DNF

clause := term | term $\& \&$ clause

term := 'not' var | var

var := 'a' - 'z'

actually, this is
whatever datatype.

newtype DNF var = Set (Map var Boolean)

set of
disjoined
clauses

each variable may appear
negated or unnegated
in a conjunctive clause

Conflating

CSS & Boolean Algebra

lets start with some simple examples:

`div && container`

`div || container`

`div && not div`

`div && body`

`(div || span) && container && :hover`

`div container`

`div, * container`

~~`div:not(div)`~~ forget it

`ff - :not(*)`

`div container :hover,`

`span container :hover`

`(div || span) && not(container && :hover)`

`div :not(container),`

`div :not(:hover),`

`span :not(:hover),`

`span :not(container)`

apply

bind

Monad Plus?

nr forget?

cartesian product

2×2

$= 4$

(igh)

Hm... $(.a \neq b) \&\& (.c \neq d)$ $a.c \neq .b.d$

$a > b + c > d \&\& e + f + g > h$ $a > e + b.f + c.g > h$

$\neg a \sim b \&\& c \sim d + e$ uh-oh, cases ... :shock:

same → same
2D levels
focus: eb

0: because d is immediately next to e, a cannot go in between

1: d and a can be the same: $c \sim a d + e$

2: c and d can be far apart, a in btwn: $c \sim a - d + e$

3: c and a can be the same: $a c \sim d + e$

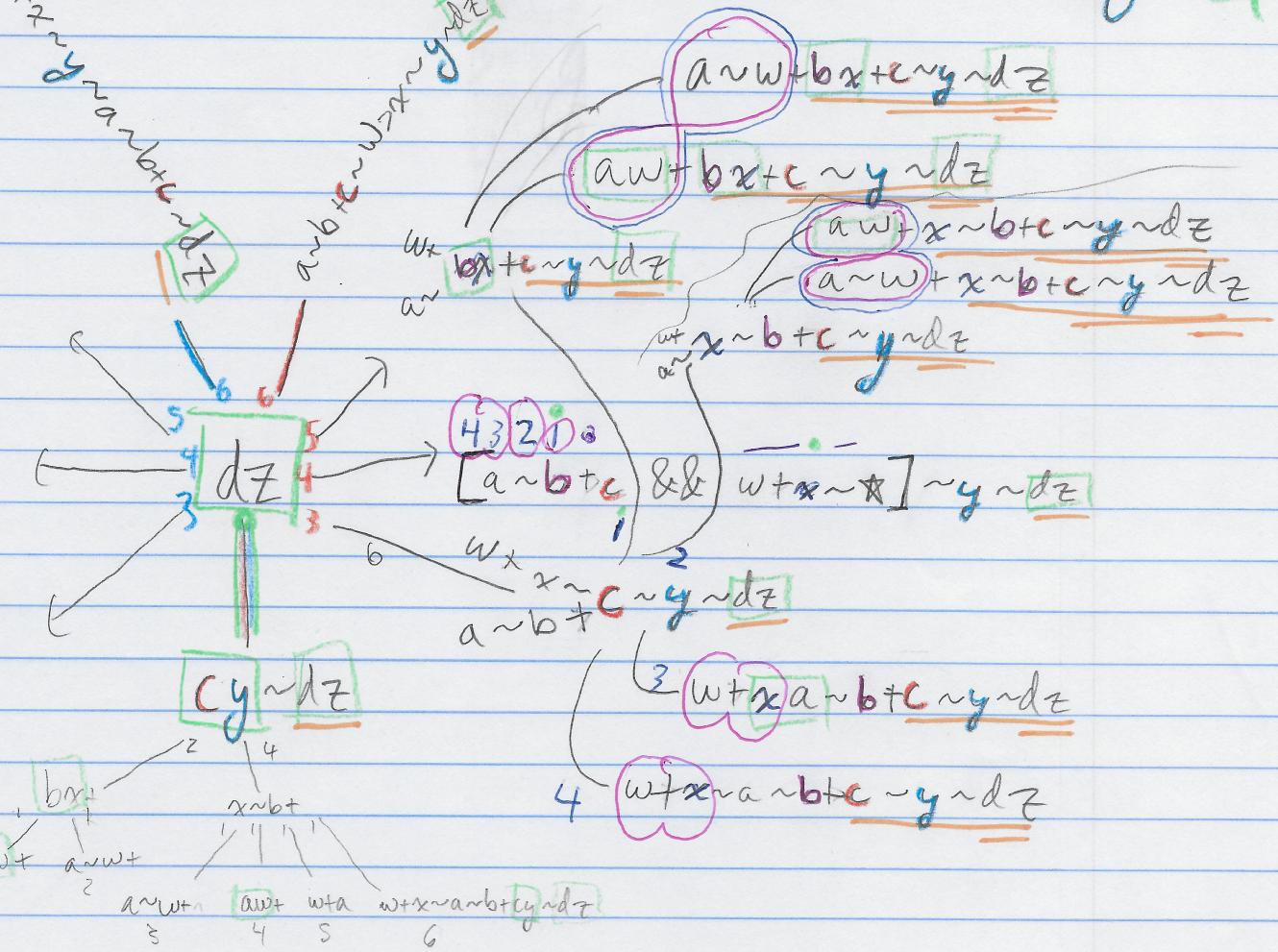
4: a can be far away from c even: $a \sim c \sim d + e$

$$a \sim b \&\& a + b = a \sim b$$

Horizontal Selector

Oh boy here we go Case analysis for Conjunction

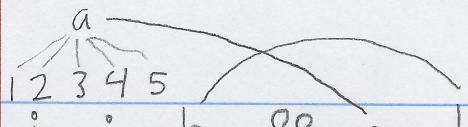
What is $y: \underset{\#=4}{(6\ 5\ 4\ 3)} \cdot \underset{\#4}{\cancel{xx}}$ $a \sim b + c \sim d \quad 8\& \quad \underset{\#4}{(6\ 5\ 4\ 3)} \underset{\#4}{\cancel{xx}} \quad w+x \sim y \sim z$



$w+x \sim y \sim z \sim d \rightarrow w+x \sim c \sim y \sim z \sim d \rightarrow$ $a \sim b + c \sim y \sim z \sim d \rightarrow$ $a \sim b + c \sim y \sim z \sim d \rightarrow$ $a \sim b + c \sim y \sim z \sim d$

decide c is between x and y

$\backslash m \rightarrow$ More (More in true i) true j] trace (k&&b)



(*)~i~j~k

combine H (*) (One a) <#> $\backslash m \rightarrow$ More in true

(i ~ *)~j~k

combine H (i ~ *) " sum.

(i ~ j ~ *)~k

combine H (i ~ j ~ *) " <#> $\backslash m \rightarrow$ More in true (k&&b)

i,j > (k || .b)

i,j > -k || i,j > -b