LA 22/AGOSTO/2017

a) $2.\underbrace{\underbrace{(3+4)}_{7}}_{14}+\underbrace{5.6}_{30}$ = 44

$2.(3+4)+5.6 \rightarrow 2.(3+4)+30$

$2.7+5.6 \rightarrow 2.7+30$

$14+5.6 \rightarrow 14+30$

44

b) $\underbrace{\underbrace{2+3}_{5}+4}_{9}$

$2+3+4 \rightarrow 2+7$

$5+4 \rightarrow 9$

$2+3+4=2+7$
$=9$

a) $2.\underbrace{\underbrace{(3+4)}_{7}}_{14}+\underbrace{5.6}_{30}$ = 44

b) $\underbrace{\underbrace{2+3}_{5}+4}_{9}$

$2+3+4 \rightarrow 2+7$

$5+4 \rightarrow 9$

$2+3+4=2+7=9$

c) $2+3+4+5$

$2.(3+4)+5.6 \rightarrow 2.(3+4)+30$

$2(7)+5.6 \rightarrow 2.(7)+30$

$14+5.6 \rightarrow 14+30$

44

$2\cdot\underbrace{\underbrace{(3+4)}_{7}}_{14}+\underbrace{5.6}_{30}$ = 44

$2\cdot(3+4)+5.6 \rightarrow 2.(3+4)+30$

$2(7)+5.6 \rightarrow 2(7)+30$

$14+5.6 \rightarrow 14+30$

44

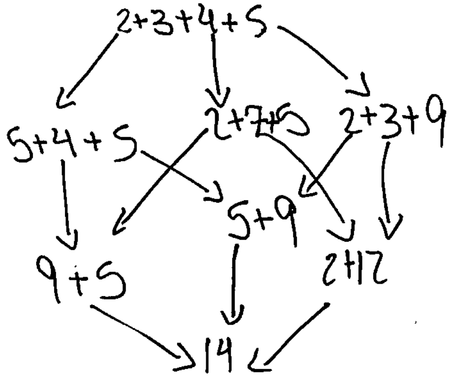
$\underbrace{\underbrace{2+3}_{5}+4}_{9}$

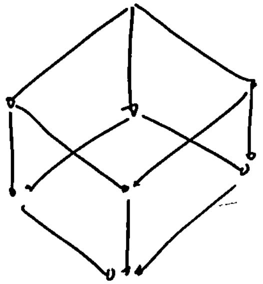
$2+3+4 \rightarrow 2+7$

$5+4 \rightarrow 9$

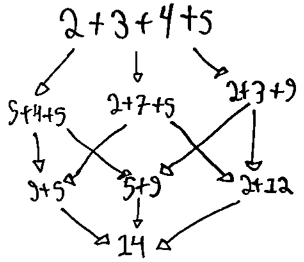
$\boxed{\text{LA 22/AGOSTO/2017}}$

c) $\underbrace{\underbrace{2+3}_{5}+\underbrace{4+5}_{9}}_{14}$

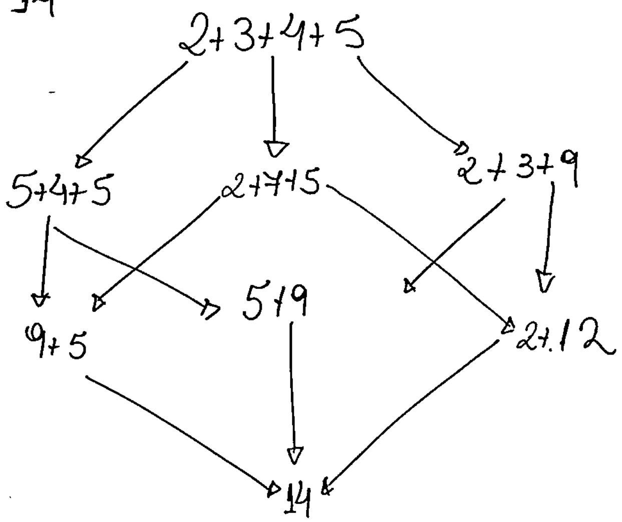




c) $\underbrace{\underbrace{2+3}_{5}+\underbrace{4+5}_{9}}_{14}$



$\underbrace{\underbrace{2+\underbrace{3+4}_{7}}_{9}+5}_{14}$



LA 22/AGOSTO/2017

O QUE ACONTECERIA SE A GENTE PERMITISSE ALGO COMO

$$\sum_{i \in A} f(i) ?$$

POR EXEMPLO,

$$\sum_{i \in \{2,3,5\}} i = ?$$

$$\underbrace{\underbrace{2+3}_{5}+5}_{10}$$

$$\sum_{i \in \{2,3,3,5\}} i = ?$$

$$\underbrace{\underbrace{2+3}_{5}+\underbrace{3+5}_{8}}_{13}$$

$\{2,3,5\} = \{2,3,3,5\}$

mas

$$\sum_{i \in \{2,3,5\}} i \neq \sum_{i \in \{2,3,3,5\}} i \quad !!$$

$$\sum_{i=2}^{5} i \longrightarrow \sum_{i \in \{2,3,4,5\}} i \longrightarrow 2+3+4+5$$

Exercícios:

a) $(\lambda a.\,10a)(2+3)$

b) $(\lambda a.\,10a)((\lambda b.\,b+4)(3))$

c) $((\lambda a.\,(\lambda b.\,10a+b))(3))(4)$

b) $(\lambda a.10a)((\lambda b.\,b+4)(3))$

$\downarrow$

$(\lambda a.10a)((b+4)[b:=3])$

$\downarrow$

$(\lambda a.10a)(3+4)$

Seja $h = (\lambda a.10a)$

$$\begin{array}{ccc} h(3+4) & \longrightarrow & h(7) \\ \downarrow & & \downarrow \\ (\lambda a.10a)(3+4) & \longrightarrow & (\lambda a.10a)(7) \\ \downarrow & & \downarrow \\ (10a)[a:=3+4] & \longrightarrow & (10a)[a:=7] \\ \downarrow & & \downarrow \\ 10(3+4) & \longrightarrow & 10.7 \\ & & \downarrow \\ & & 70 \end{array}$$

a) $(\lambda a.10a)(2+3)$

$$\begin{array}{ccc} h(2+3) & \longrightarrow & h(5) \\ \downarrow & & \downarrow \\ (\lambda a.10a)(2+3) & \longrightarrow & (\lambda a.10)(5) \\ \downarrow & & \downarrow \\ (10a)[a:=2+3] & \longrightarrow & (10a)[a:=5] \\ \downarrow & & \downarrow \\ (10.(2+3)) & \longrightarrow & 10.5 \\ & & \downarrow \\ & & 50 \end{array}$$

b) $$\underbrace{\underbrace{\underbrace{(10a)[a:=7]}_{}}_{10.7}}_{70} \quad (\lambda a.10a)(\underbrace{\underbrace{\underbrace{(\lambda b.b+4)(3)}_{(b+4)[b:=3]}}_{3+4}}_{7})$$

$$\underbrace{\underbrace{(\lambda a.10a)(\underbrace{\underbrace{(\lambda b.b+4)(3)}_{3+4}}_{7})}_{10.7}}_{70}$$

LA 22/AGOSTO/2017

O QUE ACONTECERIA SE A GENTE PERMITISSE ALGO COMO

$$\sum_{i \in A} f(i) \,?$$

POR EXEMPLO,

$$\sum_{i \in \{2,3,5\}} i = ?$$

$$\underbrace{\underbrace{2+3}_{5}+5}_{10}$$

$$\sum_{i \in \{2,3,3,5\}} i = ?$$

$$\underbrace{\underbrace{2+3}_{5}+\underbrace{3+5}_{8}}_{13}$$

$$\{2,3,5\} = \{2,3,3,5\}$$

MAS

$$\sum_{i \in \{2,3,5\}} i \neq \sum_{i \in \{2,3,3,5\}} i \;!!$$

$$\sum_{i=2}^{5} i \longrightarrow \sum_{i \in \{2,3,4,5\}} i \longrightarrow 2+3+4+5$$

EXERCÍCIOS:

a) $(\lambda a.\, 10a)(2+3)$

b) $(\lambda a.\, 10a)((\lambda b.\, b+4)(3))$

c) $((\lambda a.(\lambda b.\, 10a+b))(3))(4)$

d) $((\lambda f.(\lambda a.\, f(f(a)))(\lambda x.\, 10x))(7)$

c) $$\underbrace{\underbrace{\underbrace{\underbrace{(\underbrace{(\lambda a.(\lambda b.10a+b))(3)}) (4)}_{(\lambda b.\,10.3+b)(4)}}_{10.3+4}}_{30+4}}_{34}$$

d) $$(\underbrace{(\lambda f.(\lambda a.f(f(a)))(\lambda x.10x)})(7)$$

$$((\lambda f.(\lambda a.\ f\ (\ f\ (a))))(\lambda x.10x))(7)$$

$$((\lambda a.\ f\ (f\ (a)))\ (\lambda x.10x)[f := \lambda x.10x]$$

$$((\lambda a.(\lambda x.10x)\ ((\lambda x.10x)\ (a))[a := 7]$$

$$((\lambda x.10x)((\lambda x.10x)(7))$$

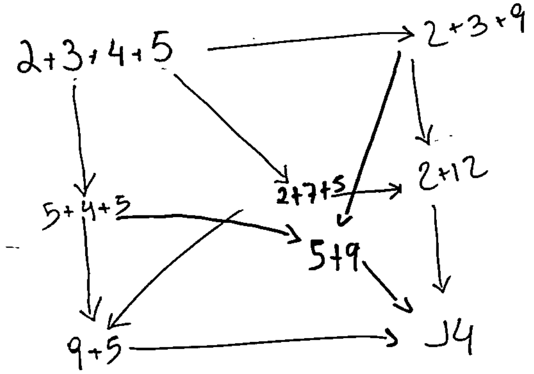
$$((\lambda x.10x)(10.7))$$

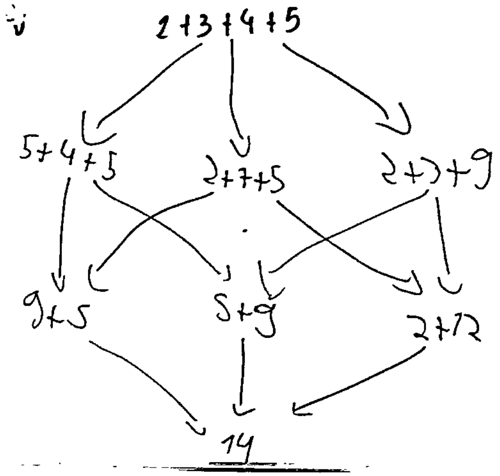
$$((\lambda x.10x)\ (70))$$

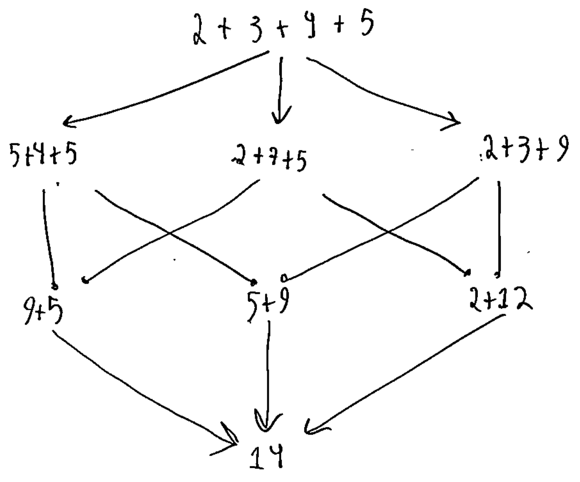
$$(10.70)$$

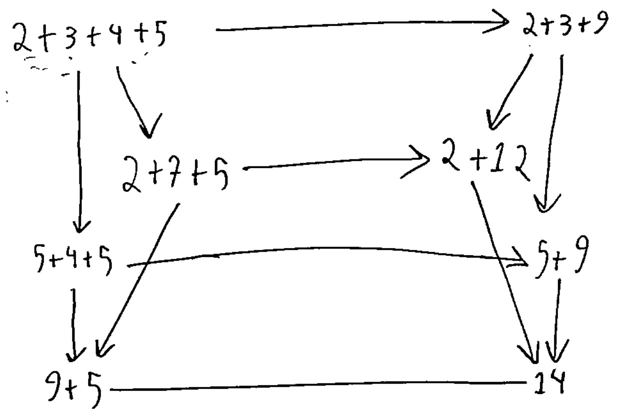
$$700$$

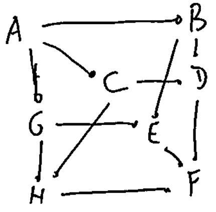
LA 29/AGO/2017











$\boxed{\text{LA 29/AGO/2017}}$

PRINCÍPIO:
TODAS AS SEQUÊNCIAS DE REDUÇÃO "CONVERGEM".

$(a+b)(a-b) \to a^2-b^2$

$(2+3)\cdot(4+5) \to$

45

ESSE PRINCÍPIO VAI VALER SEMPRE.

$$\sum_{i=2}^{5} i^3 \to 2^3+3^3+4^3+5^3 \to \dots$$

$$\sum_{i \text{ in } (2,3,4,5)} i^3$$

← IDEIA NOVA

$$\sum_{i\in\{2,3,4,5\}} i^3$$

$$\sum_{i\in\{2,3,3,4,5\}} i^3 \to 2^3+3^3+3^3+4^3+5^3 \to \dots$$

EXERCÍCIOS:

a) $(\lambda a.\,10a)(2+3)$

b) $\underbrace{(\lambda a.\,10a)}_{\alpha}\underbrace{((\underbrace{\lambda b.\,b+4}_{\beta})(3))}_{\gamma}$

c) $(\underbrace{(\underbrace{\lambda a.\,(\underbrace{\lambda b.\,10a+b}_{\beta})}_{\alpha})(3)}_{\gamma})(4)$

d) $(\underbrace{(\underbrace{\lambda f.\,\underbrace{(\lambda a.\,f(f(a)))}_{\alpha}}_{\beta})(\underbrace{\lambda x.\,10x}_{\gamma})}_{\delta})(7)$

C) $((\lambda a.\,(\lambda b.\,10a+b))(3))(4)$

$$(\underbrace{(\underbrace{\lambda a.\,(\underbrace{\lambda b.\,10a+b}_{\beta})}_{\alpha})(3)}_{\gamma})(4)$$

$$\begin{aligned}
\gamma(4) &= (\alpha(3))(4) \\
&= ((\lambda a.\,\beta)(3))(4) \\
&= (\beta[a:=3])(4) \\
&= ((\lambda b.\,10a+b)[a:=3])(4) \\
&= ((\lambda b.\,10\cdot 3+b))(4) \\
&= (\lambda b.\,30+b)(4) \\
&\overset{\text{ok}}{=} (30+b)[b:=4] \\
&\overset{\text{ok}}{=} (30+4) \\
&\overset{\text{ok}}{=} (34)
\end{aligned}$$

$\gamma(4) \to (\alpha(3))(4)$

LA 5/SET/2017

$A = \{1,2\}$

$B = \{3,4\}$

$C = \{30,40\}$

$D = \{10,20\}$

$f = \{(3,30),(4,40)\}$

$g = \{(1,10),(2,20)\}$

a) $A \times B = \{(1,3),(1,4),(2,3),(2,4)\}$

b) $A \times D = \{(1,10),(1,20),(2,10),(2,20)\}$

$A \to D = \{\{(1,10),(2,10)\},\{(1,10),(2,20)\},\{(1,20),(2,10)\},\{(1,20),(2,20)\}\}$

c) $p=(1,3)$ $\quad p=(1,4)$ $\quad p=(2,3)$ $\quad p=(2,4)$

$$\dfrac{\dfrac{p}{\pi p}\pi \quad \dfrac{\dfrac{p}{\pi' p}\pi' \quad f}{f(\pi' p)}\text{app}}{(\pi p, f(\pi' p))}\text{pair}$$

$$\dfrac{\dfrac{1,4}{1}\pi \quad \dfrac{\dfrac{1,4}{4}\pi' \quad f}{40}\text{app}}{(1,40)}\text{pair} \qquad \dfrac{\dfrac{(2,3)}{2}\pi \quad \dfrac{\dfrac{(2,3)}{3}\pi' \quad f}{30}\text{app}}{(2,30)}\text{pair} \qquad \dfrac{\dfrac{(2,4)}{2}\pi \quad \dfrac{\dfrac{(2,4)}{4}\pi' \quad f}{40}\text{app}}{(2,40)}\text{pair}$$

$(1,30)$

d) $(\lambda p : A\times B.(\pi p, f(\pi' p))) = \{((1,3),(1,30)),((1,4),(1,40)),((2,3),(2,30)),((2,4),(2,40))\}$ (IN, OUT)

$\lambda p : A \times B$

e) Yes!

$$\dfrac{\dfrac{p}{\pi p}\pi \quad \dfrac{\dfrac{p}{\pi' p}\pi' \quad f}{f(\pi' p)}\text{app}}{(\pi p, f(\pi' p))}\text{pair} \qquad \dfrac{\dfrac{(1,3)}{1}\pi \quad \dfrac{\dfrac{(1,3)}{3}\pi' \quad f}{30}\text{app}}{(1,30)}\text{pair}$$

$$\dfrac{\dfrac{\dfrac{p}{\pi p}\pi \quad g}{g(\pi p)} \qquad \dfrac{\dfrac{p}{\pi' p}\pi' \quad f}{f(\pi' p)}}{(g(\pi p), f(\pi' p))}\text{pair}$$

$A \times B = \{(1,3),(1,4),(2,3),(2,4)\}$

$A \to D = \{\{(1,10),(2,10)\},\{(1,10),(2,20)\},\{(1,20),(2,10)\},\{(1,20),(2,20)\}\}$

$(\pi p, f(\pi' p)) =$

$$\dfrac{\dfrac{(1,3)}{1}\pi \quad \dfrac{\dfrac{(1,3)}{3}\pi' \quad \{(3,30),(4,40)\}}{30}\text{app}}{(1,30)}\text{pair} \qquad \dfrac{\dfrac{(1,4)}{1}\pi \quad \dfrac{\dfrac{(1,4)}{4}\pi' \quad f}{40}\text{app}}{(1,40)}\text{pair}$$

$$\dfrac{\dfrac{p}{\pi p}\pi \quad \dfrac{\dfrac{p}{\pi' p}\pi' \quad f}{f(\pi' p)}\text{app}}{(\pi p, f(\pi' p))}\text{pair}$$

$$\dfrac{\dfrac{(2,3)}{2}\pi \quad \dfrac{\dfrac{(2,3)}{3}\pi' \quad f}{30}\text{app}}{(2,30)}\text{pair} \qquad \dfrac{\dfrac{(2,4)}{2}\pi \quad \dfrac{\dfrac{(2,4)}{4}\pi' \quad f}{40}\text{app}}{(2,40)}\text{pair}$$

$\boxed{\text{LA } 5/\text{set}/2017}$

$A = \{1, 2\}$

$B = \{3, 4\}$

$C = \{30, 40\}$

$D = \{10, 20\}$

$f = \{(3,30), (4,40)\}$

$g = \{(1,10), (2,20)\}$

$D \times C = \{(10,30), (10,40), (20,30), (20,40)\}$

a) $A \times B = \{(1,3), (1,4), (2,3), (2,4)\}$

b) $A \times D = \{(1,10), (1,20), (2,10), (2,20)\}$

$A \to D = \left\{ \begin{Bmatrix}(1,10)\\(2,10)\end{Bmatrix}, \begin{Bmatrix}(1,10)\\(2,20)\end{Bmatrix}, \begin{Bmatrix}(1,20)\\(2,10)\end{Bmatrix}, \begin{Bmatrix}(1,20)\\(2,20)\end{Bmatrix} \right\}$

$A \times D \to D \times C = \{$

$$\dfrac{\dfrac{p}{\pi p}\pi \qquad \dfrac{\dfrac{p}{\pi' p}\pi' \quad f}{f(\pi' p)}\text{app}}{(\pi p, f(\pi' p))}\text{pair}$$

$$\dfrac{\dfrac{(1,3)}{1}\pi \qquad \dfrac{\dfrac{(1,3)}{3}\pi' \quad f}{30}\text{app}}{(1,30)}\text{pair}$$

$$\dfrac{\dfrac{\dfrac{p}{\pi p}\pi \quad g}{g(\pi p)}\text{app} \qquad \dfrac{\dfrac{p}{\pi' p}\pi' \quad f}{f(\pi' p)}\text{app}}{(g(\pi p), f(\pi' p))}\text{pair}$$

$(20, 30)$

F

$$\dfrac{\dfrac{\dfrac{p}{\pi p}\pi \quad g}{g(\pi p)}\text{app} \qquad \dfrac{\dfrac{p}{(\pi' p)}\pi' \quad f}{f(\pi' p)}\text{app}}{(g(\pi p), f(\pi' p))}\text{pair}$$

$(10, 30)$

$p = (2,3)$

$$\dfrac{\dfrac{\dfrac{(2,3)}{2}\pi \quad g}{20}\text{app} \qquad \dfrac{\dfrac{(2,3)}{3}\pi' \quad f}{30}\text{app}}{(20,30)}\text{pair}$$

$p = (2,3)$

1,4

10,

$$\dfrac{\dfrac{(2,3)}{2}\pi \qquad \dfrac{\dfrac{(2,3)}{3}\pi' \quad f}{30}\text{app}}{(2,30)}\text{pair}$$

$p = (2,4)$

$$\dfrac{\dfrac{(2,4)}{2}\pi \qquad \dfrac{\dfrac{(2,4)}{4}\pi' \quad f}{40}\text{app}}{(2,40)}\text{pair}$$

H) $(\lambda p : A \times B . (g(\pi p), f(\pi' p)))$

$\begin{pmatrix} ((1,3),(10,30)), \\ ((1,4),(10,40)), \\ ((2,3),(20,30)), \\ ((2,4),(20,40)) \end{pmatrix}$

False

D) $(\lambda p : A \times B . (\pi p, f(\pi' p))) - \left\{ \begin{matrix} \text{in} \quad \text{out} \\ ((1,3),(1,30)), \\ ((1,4),(1,40)), \\ ((2,3),(2,30)), \\ ((2,4),(2,40)) \end{matrix} \right\}$

C) Yes!

$\lambda p : A \times B$

$A \times B = \{(1,3), (1,4), (2,3), (2,4)\}$

$A \to D = \left\{ \begin{Bmatrix}(1,10),\\(2,10)\end{Bmatrix}, \begin{Bmatrix}(1,10),\\(2,20)\end{Bmatrix}, \begin{Bmatrix}(1,20),\\(2,10)\end{Bmatrix}, \begin{Bmatrix}(1,20),\\(2,20)\end{Bmatrix} \right\}$

$(\pi p, f(\pi' p)) =$

$\lambda p : A \times B . (\pi p, f(\pi' p)) =$

$\left\{ \begin{matrix} ((1,3),(1,30)), \\ ((1,4),(1,40)), \\ ((2,3),(2,30)), \\ ((2,4),(2,40)) \end{matrix} \right\}$

$$\dfrac{\dfrac{p}{\pi p}\pi \qquad \dfrac{\dfrac{p}{\pi'}\pi' \quad f}{f(\pi' p)}\text{app}}{(\pi p, f(\pi' p))}\text{pair}$$

LA 5/SET/2017

$f : A \to B$
$g : B\times C \to D$
$h : B \to (C \to D)$
$k : D \to E$

(a) $$\underbrace{\lambda \underbrace{p}_{:A\times C} : A\times C . \underbrace{(\underbrace{f(\underbrace{\pi p}_{:A})}_{:B}, \underbrace{\pi' p}_{:C})}_{:B\times C}}_{A\times C \to B\times C}$$

(b) $$\underbrace{\lambda \underbrace{q}_{:B\times C} : B\times C . \underbrace{(\underbrace{h(\pi \underbrace{q}_{:B})}_{:C\to D})(\underbrace{\pi' q}_{:C})}_{:D}}_{:B\times C \to D}$$

(c) $$\underbrace{\lambda \underbrace{b}_{:B} : B . \underbrace{\lambda \underbrace{c}_{:C} : C . \underbrace{g\underbrace{(\underbrace{b}_{:B}, \underbrace{c}_{:C})}_{:B\times C}}_{:D}}_{:C \to D}}_{:B \to (C \to D)}$$

(d) $$\underbrace{\lambda \underbrace{p}_{:C\to D} : C \to D . \lambda \underbrace{c}_{:C} : C . \underbrace{\times(\varphi c)}_{:C\times E}}_{:(C\to D)\to C\times E}$$

$:C\to D$, $:C$, $:D$, $:D$, $:E$

$\varphi \quad \infty$

$2 \in \{2,3,4\}$
$2 \in \{1,2,3\}$

a) $$(\times c) f := \underbrace{\lambda \underbrace{p}_{A\times C} : A\times C . \underbrace{(\underbrace{\underbrace{f}_{A\to B}(\underbrace{\pi \underbrace{p}_{:A\times C}}_{:A})}_{:B}, \underbrace{\pi' \underbrace{p}_{:A\times C}}_{:C})}_{B\times C}}_{:A\times C \to B\times C}$$

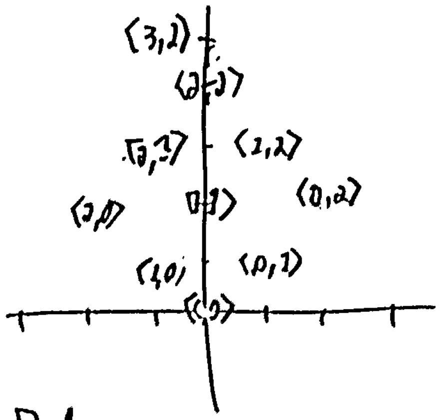
$$\frac{p : A\times C}{\pi p : A}$$

b) $$h^{\flat} := \underbrace{\lambda q : B\times C . \underbrace{(\underbrace{\underbrace{h}_{:B\to(C\to D)}(\underbrace{\pi \underbrace{q}_{:B\times C}}_{:B})}_{:C\to D})(\underbrace{\pi' \underbrace{q}_{:B\times C}}_{:C})}_{:D}}_{:B\times C \to D}$$

c) $$g^{\#} := \underbrace{\lambda \underbrace{b}_{:B} : B . \underbrace{\lambda \underbrace{c}_{:C} : C . \underbrace{\underbrace{g}_{:B\times C\to D}\underbrace{(\underbrace{b}_{:B}, \underbrace{c}_{:C})}_{:B\times C}}_{:D}}_{:C\to D}}_{:B \to (C \to D)}$$

LA 12/SET/2017

HOJE: VAMOS INTERROMPER A PROGRAMAÇÃO NORMAL (λ-CÁLCULO TIPADO) PRA COMEÇAR A VER A RELAÇÃO ENTRE λ-CÁLCULO E LÓGICA!

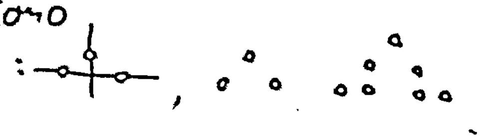


a) $\lambda l_n : B.l$

PLANAR HEYTING ALGEBRAS FOR CHILDREN
→ FIRST PAPER
→ SEÇÕES:

1. POSITIONAL NOTATIONS

ESCREVA COMO CONJUNTO:



2. ZDAGs

SEJA H = ⁘ .

REPRESENTE (H, BPM(H)) COMO GRAFO DIRECIONADO E COMO PAR DE CONJUNTOS.

3: LR-COORDINATES

PARA CADA UM DESTES PONTOS DÊ AS COORDENADAS (x,y) DELE E REPRESENTE-OS EM $\mathbb{Z}_2$.

⟨0,0⟩, ⟨1,0⟩, ⟨2,0⟩, ⟨0,1⟩, ⟨0,3⟩, ⟨1,3⟩, ⟨-1,0⟩, ⟨0,-1⟩, ⟨-1,-1⟩.

EXERCÍCIO (GRANDE):

SEJA $B = \begin{smallmatrix} & & & 32 & & & \\ & & & & 22 & & \\ & & 21 & & & 12 & \\ 20 & & & 11 & & & 02 \\ & 10 & & & 01 & & \\ & & 00 & & & & \end{smallmatrix}$

CALCULE, E REPRESENTE EM NOTAÇÃO POSICIONAL QUANDO POSSÍVEL:

a) $\lambda \ell r : B.\ \ell$
b) $\lambda \ell r : B.\ r$
c) $\lambda \ell r : B.\ (\ell \leq 1)$
d) $\lambda \ell r : B.\ (r \geq 1)$
e) $\lambda \ell r : B.\ \ell r \leq 11$
f) $\lambda \ell r : B.\ \ell r \& 12$
g) $\lambda \ell r : B.\ \mathrm{valid}(\langle \ell+1, r \rangle)$
h) $\lambda \ell r : B.\ \ell r$ leftof 11
i) $\lambda \ell r : B.\ \ell r$ leftof 12
j) $\lambda \ell r : B.\ \ell r$ above 11
k) $\lambda \ell r : B.\ \mathrm{ne}(\ell r)$
l) $\lambda \ell r : B.\ \mathrm{nw}(\ell r)$
m) $20 \multimap 11$
n) $02 \multimap 11$
o) $22 \multimap 11$
p) $00 \multimap 11$
q) $\lambda \ell r : B.\ \neg \ell r$
r) $\lambda \ell r : B.\ \neg\neg \ell r$
s) $\lambda \ell r : B.\ (\ell r = \neg\neg \ell r)$

ⓐ $\lambda \ell r : B.\ \ell$

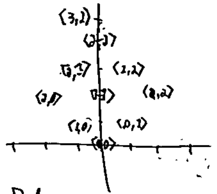
$\begin{smallmatrix} & & & 3 & & & \\ & & & & 2 & & \\ & & 2 & & & 1 & \\ 2 & & & 1 & & & 0 \\ & 1 & & & 0 & & \\ & & 0 & & & & \end{smallmatrix}$

ℓr	ℓ	r	$(\ell \leq 1)$	$(r \geq 1)$	$(\ell r \leq 11)$
00	0	0	1	0	1
01	0	1	1	0	1
02	0	2	1	1	0
10	1	0	1	0	1
11	1	1	1	0	1
12	1	2	1	1	0
20	2	0	0	0	0
21	2	1	0	0	0
22	2	2	0	1	0
32	3	2	0	1	0

LA 12/SET/2017

lr	l	r	l ≤ 1	r ≥ 1	lr ≤ 11
00	0	0	1	0	1
10	1	0	1	0	1
01	0	1	1	1	1
20	2	0	0	0	0
11	1	1	1	1	1
02	0	2	1	1	0
21	2	1	0	1	0
12	1	2	1	1	0
22	2	2	0	1	0
32	3	2	0	1	0

LR & 12	valid(⟨l+1, r⟩)	leftof 11
		10
00	1	10
10	1	11
01	1	20
20	0	20
11	1	11
12	1	11
12	0	21
12	1	11
	1	21
	0	31



a) λlr : B.l

b)

c)

d)

E)

F)

G)

h)

EXERCÍCIO (GRANDE):

SEJA B = {32, 22, 21, 12, 20, 11, 02, 10, 01, 00}

CALCULE, E REPRESENTE EM NOTAÇÃO POSICIONAL QUANDO POSSÍVEL:

a) $\lambda lr{:}B.\ l$
b) $\lambda lr{:}B.\ r$
c) $\lambda lr{:}B.\ (l \leq 1)$
d) $\lambda lr{:}B.\ (r \geq 1)$
e) $\lambda lr{:}B.\ lr \leq 11$
f) $\lambda lr{:}B.\ lr \& 12$
g) $\lambda lr{:}B.\ \mathrm{valid}(\langle l+1, r\rangle)$
h) $\lambda lr{:}B.\ lr$ leftof 11
i) $\lambda lr{:}B.\ lr$ leftof 12
j) $\lambda lr{:}B.\ lr$ above 11
k) $\lambda lr{:}B.\ \mathrm{ne}(lr)$
l) $\lambda lr{:}B.\ \mathrm{nw}(lr)$
m) $20 \to 11$
n) $02 \to 11$
o) $22 \to 11$
p) $00 \to 11$
q) $\lambda lr{:}B.\ \neg lr$
r) $\lambda lr{:}B.\ \neg\neg lr$
s) $\lambda lr{:}B.\ (lr = \neg\neg lr)$

00 · 12

& 00

&

lr	l	r	lr leftof 11	valid(⟨l+1, r⟩)
00	0	0	0	1
01	0	1	0	1
02	0	2	0	1
10	1	0	1	1
11	1	1	1	1
12	1	2	0	1
20	2	0	1	0
21	2	1	1	0
22	2	2	0	1
32	3	2	0	0

$\Omega = B$

a) $\lambda lr : B.\ l$

b) $\lambda lr : B.\ r$

c) $\lambda lr : B.\ (l \leq 1)$

d) $\lambda lr : B\ (r \geq 1)$

e) $\lambda lr : B.\ lr \leq 11$

f) $\lambda lr : B.\ lr \& 12$

g) $\lambda lr : B.\ \mathrm{valid}(\langle l+1, r\rangle)$

h) $\lambda lr : B.\ lr$ leftof 11

$l \geq l'$ & $r \leq r'$