Laboratorio No.3

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1 Ejercicio 1

$$[s(s(s(s(0))))] \oplus [s(s(s(0)))]$$
$$[s(s(s(s(s(0)))))] \oplus [s(s(0))]$$
$$[s(s(s(s(s(s(0)))))))] \oplus [s(0)]$$
$$[s(s(s(s(s(s(s(0)))))))] \oplus 0$$
$$[s(s(s(s(s(s(s(0 \oplus 0)))))))]$$
$$[s(s(s(s(s(s(s(0)))))))]$$

2 Ejercicio 2

$$n \otimes m := \begin{cases} 0 & \text{si } n = o \\ 0 & \text{si } m = o \\ m & \text{si } n = 1 \\ n & \text{si } m = 1 \\ s(i) \otimes s(j) & \text{si } s(i) \oplus (s(i) \otimes j) \end{cases}$$

3 Ejercicio 3

- $s(s(s(0))) \otimes 0$

  0

- $s(s(s(0))) \otimes s(0)$

  $s(s(s(0))) \otimes 1$

  s(s(s(0)))

- $s(s(s(0))) \otimes s(s(0))$

  $s(s(s(0))) \oplus [s(s(s(0))) \otimes s(0)]$

  $s(s(s(0))) \oplus (s(s(s(0))))$

  $s(s(s(s(0)))) \oplus (s(s(0)))$

  $s(s(s(s(s(0))))) \oplus (s(0))$

  $s(s(s(s(s(s(0)))))) \oplus 0$

  $s(s(s(s(s(s(0 + 0))))))$

  $s(s(s(s(s(s(0))))))$

4 Ejercicio 4

- $a \oplus s(s(0)) = s(s(a))$

  Caso base a=0

  $0 \oplus s(s(0)) = s(s(0))$

  $s(s(0 \oplus 0)) = s(s(0))$

  $s(s(0)) = s(s(0))$

  Caso inductivo a= s(i)

  $s(i) \oplus s(s(0)) = s(s(s(i)))$

  $s(s(i)) \oplus s(0) = s(s(s(i)))$

  $s(s(s(i \oplus 0))) = s(s(s(i)))$

  $s(s(s(i))) = s(s(s(i)))$

- $a \otimes b = b \otimes a$

  Caso base a = 0

  $0 \otimes b = b \otimes 0$

  $0 = 0$

  Caso Inductivo a = s(i)

  $s(i) \otimes b = b \otimes s(i)$

  $s(i) \oplus (s(i) \otimes b) = (b \otimes s(i)) \oplus s(i)$

  $s(i) \oplus (s(i) \otimes b) = s(i) \oplus (s(i) \otimes b)$

- $a \otimes (b \otimes c) = (a \otimes b) \otimes c$

  Caso Base c= 0

  $a \otimes (b \otimes 0) = (a \otimes b) \otimes 0$

  $a \otimes 0 = (ab) \otimes 0$

  $0 = 0$

  Caso Inductivo a= s(i)

  $s(i) \otimes (b \otimes c) = (s(i) \otimes b) \otimes c$

$s(i) \oplus (s(i) \otimes (b \otimes c)) = (s(i) \oplus (s(i) \otimes b)) \otimes c$

$s(i) \oplus (s(i) \otimes (b \otimes c)) = s(i) \oplus (s(i) \otimes (b \otimes c))$

- $(a \oplus b) \otimes c = (a \otimes c) \oplus (b \otimes c)$

  Caso base c = 0

  $(a \oplus b) \otimes 0 = (a \otimes 0) \oplus (b \otimes 0)$

  $(a \oplus b) \otimes 0 = 0 \oplus 0$

  $0 = 0$

  Caso Inductivo c= s(i)

  $(a \oplus b) \otimes s(i) = (a \otimes s(i)) \oplus (b \otimes s(i))$

  $(a \otimes s(i)) \oplus (b \otimes s(i)) = (a \otimes s(i)) \oplus (b \otimes s(i))$

  $(s(i) \oplus (s(i) \otimes a)) \oplus (s(i) \oplus (s(i) \otimes b)) = (s(i) \oplus (s(i) \otimes a)) \oplus (s(i) \oplus (s(i) \otimes b))$