Formal Languages Homework 10

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1 Problem 9.1.1

What strings are:

1.1 w_{37}?

37 in binary is 100101. then $1w = 100101$, so $w = 00101$.

1.2 w_{100}?

100 in binary is 1100100. then $1w = 1100100$, so $w = 100100$.

2 Problem 9.2.1

Show that the halting problem, the set of (M, w) pairs such that M halts (with or without accepting) when given input w is r.e. but not recursive

3 Problem 9.2.2

Using *Ackermann's function*:

1. $A(0, y) = 1$ for any $y \geq 0$
2. $A(1, 0) = 2$
3. $A(x, 0) = x + 2$ for $x \geq 2$
4. $A(x + 1, y + 1) = A(A(x, y + 1), y)$ for any $x \geq 0$, and $y \geq 0$

3.1 a). Evaluate $A(2, 1)$

3.2 b). What function of x is $A(x, 2)$?

3.3 c). Evaluate $A(4, 3)$