## Function Ackermann

$$A(1,2) = A(1-1, A(1,2-1))$$

$$= A(0, A(1,1))$$

$$= A(0, A(0,2))$$

$$= A(0,3)$$

$$= 3+1$$

$$= 4$$

$$A(x,y) = \begin{cases} y+1, & x=0 \\ A(x-1,1), & y=0 \\ A(x-1,A(x,y-1)) \\ & \text{otherwise} \end{cases}$$

$$\frac{A(1,0)}{= A(1,1)} = \frac{A(1,1)}{= A(1-1,A(1,1-1))}$$

$$= A(0,1) = A(0, A(1,0))$$

$$= 1+1=2 = A(0,2)$$

$$= 2+1=3$$

$$A(2,1) = A(2-1, A(2, 1-1))$$
  
=  $A(1, A(2,0))$   
=  $A(1,3)$   
=  $A(1-1, A(1,3-1))$ 

$$A(x,y) = \begin{cases} y+1, & x=0 \\ A(x-1,1), & y=0 \end{cases}$$
  
 $A(x-1,A(x,y-1))$   
otherwise

$$= A(1-1, A(1,3-1))$$

$$= A(0, A(1,2)) = A(1-1,1) = A(2-1,1)$$

$$= A(0,4) = A(0,1) = A(1,1)$$

$$= A(1-1,A(1-1,A(1-1))$$

$$= A(0,A(1-1,A(1-1))$$

$$= A(0,A(1-1))$$

$$= A(1,1)$$

$$= A(1-1,A(1,1-1))$$

$$= A(0,A(1,0))$$

$$= A(0,2)$$

$$= 3$$