Göktuğ Ekinci
23803L3

for $0 \leq n \leq 2$

if $n = 0 \longrightarrow$ $f(0) = 1$
$2^n = 1$

$f_0 \leq 2^0$

if $n = 1 \longrightarrow$ $f(1) = 2$
$2^1 = 2$

$f_1 \leq 2^1$

if $n = 2 \longrightarrow$ $f(2) = 3$
$2^2 = 4$

$f_2 \leq 2^2$

for $n \geq 3$

if $n = 3 \longrightarrow$ $f(3) = \underset{3}{f(2)} + \underset{2}{f(1)} + \underset{1}{f(0)}$
$2^3 = 8$

$\underset{6}{\overset{\shortparallel}{f_3}} \leq \underset{8}{\overset{\shortparallel}{2^3}}$

for $k$ $f_k \leq 2^k$ assume

$f_{k-1} + f_{k-2} + f_{k-3} \leq 2^k$

for $k+1$ $f_{k+1} \leq 2^{k+1}$ assume

$f_k + f_{k-1} + f_{k-2} \leq 2^k \cdot 2$

$$f_{k-1} + f_{k-2} + f_{k-3} + f_{k-1} + f_{k-2} \leq 2^k \cdot 2$$

$$2 \cdot (f_{k-1} + f_{k-2}) + f_{k-3} \leq 2^k \cdot 2$$

$$f_{k-1} + f_{k-2} + f_{k-3} \leq 2^k$$

end of proof