

Calculation of Fish number 5

Made by Pochi

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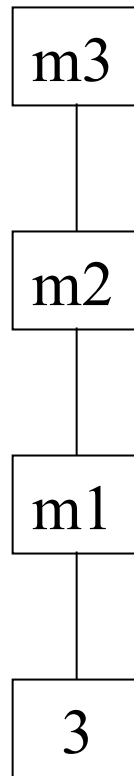
Fish function 5 = Hardy Function

- $H[1] = m_1$
- $H[\omega] = m_2 m_1$
- $H[\hat{\omega} \omega] = m_3 m_2 m_1$

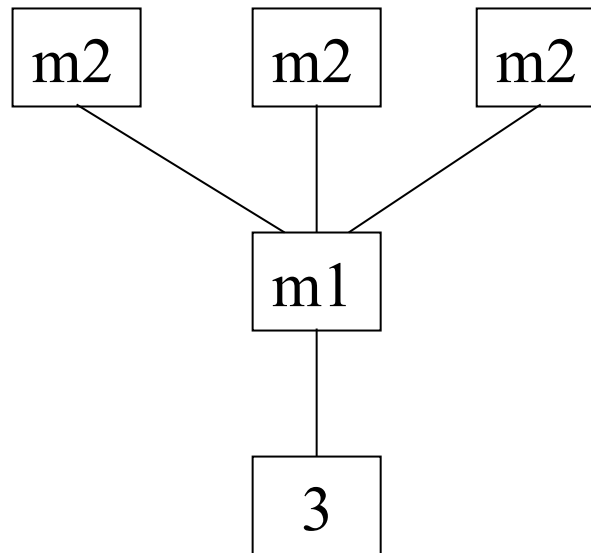
$$m_{\{n+1\}} f_n = f_n \hat{n}$$

→ Changing $\hat{\omega} \dots \hat{\omega}$ to $\hat{\omega} \dots \hat{n}$

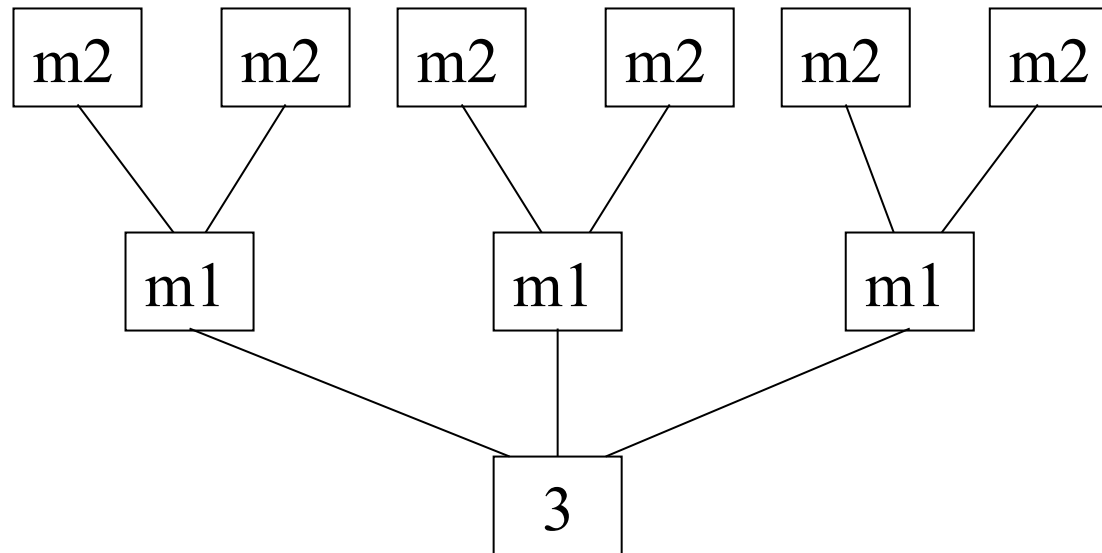
Calculation procedure



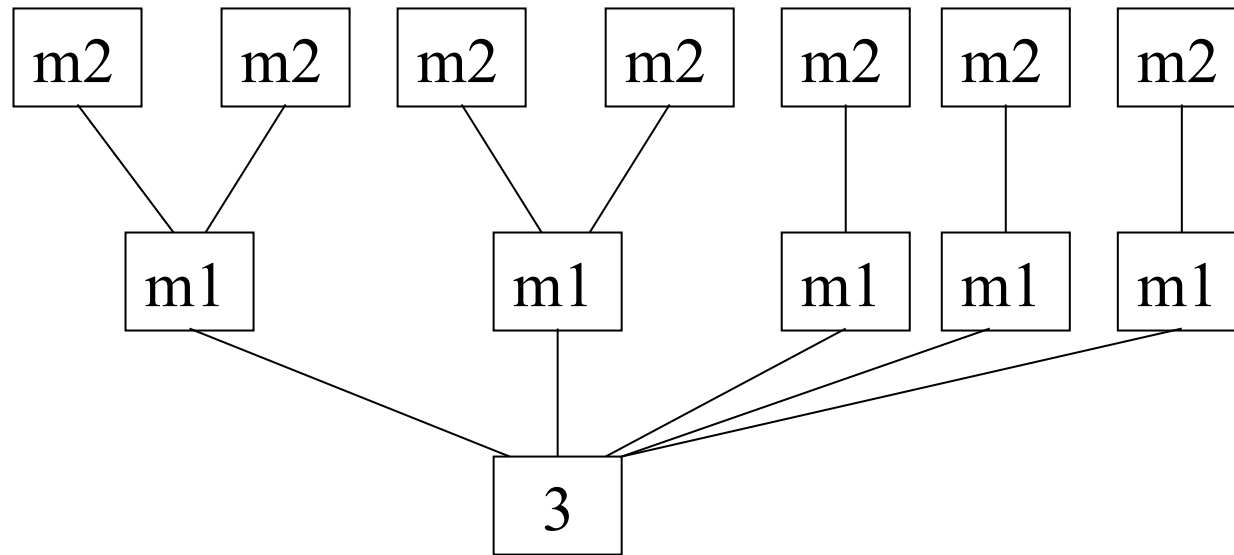
Calculation procedure



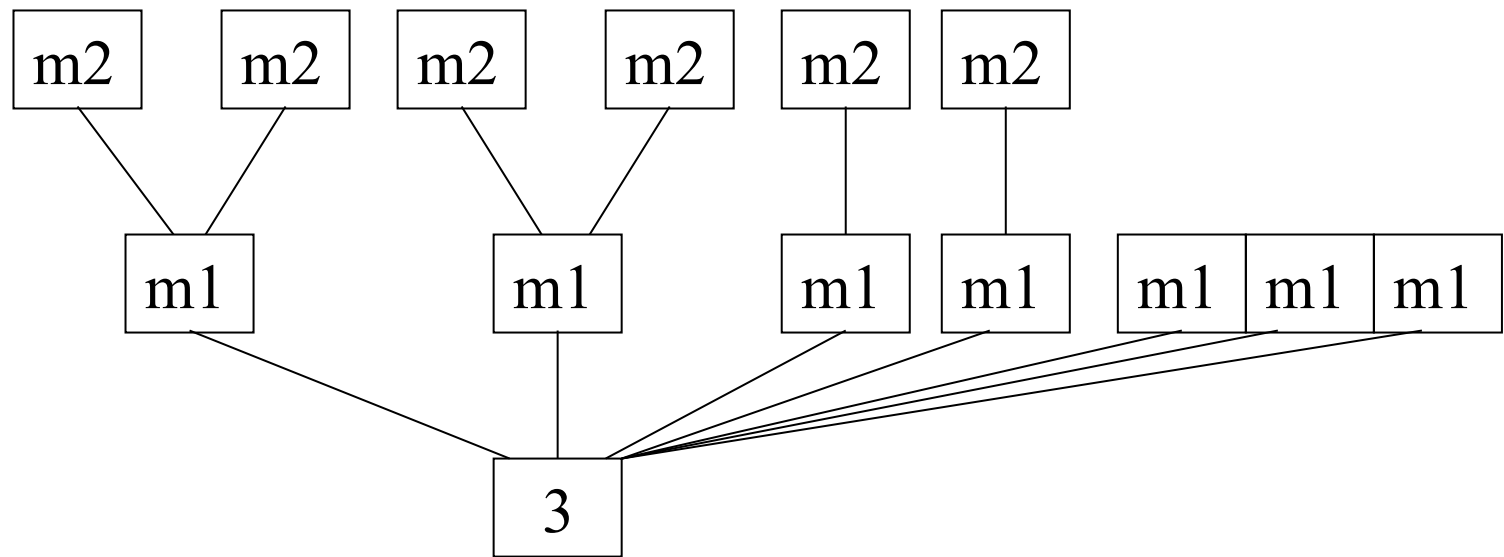
Calculation procedure



Calculation procedure

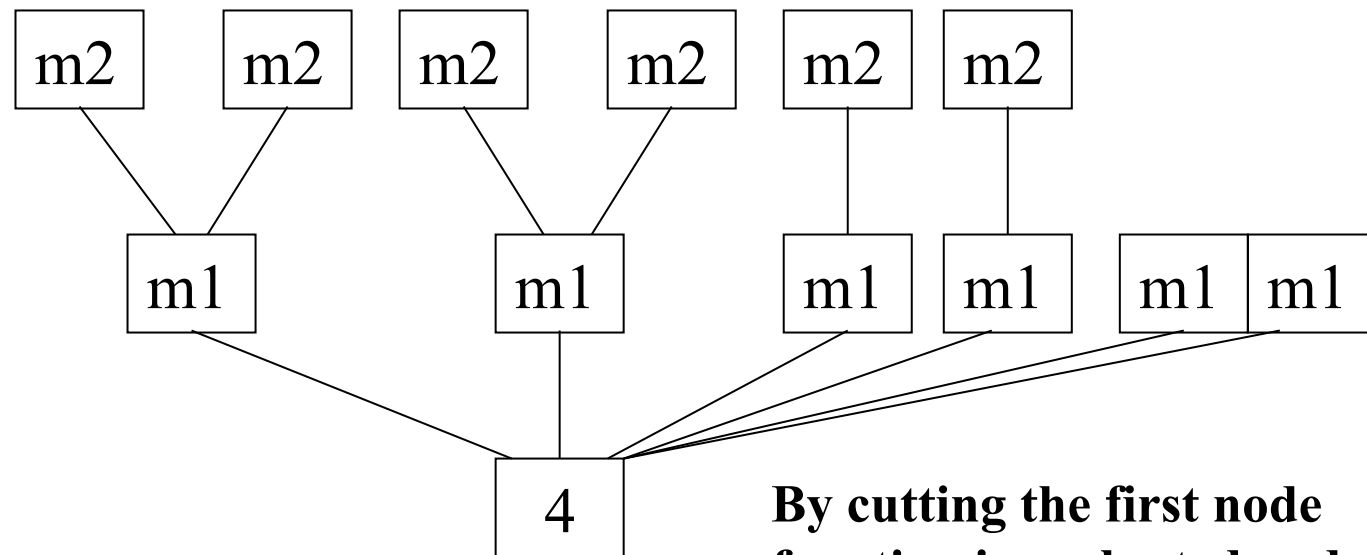


Calculation procedure



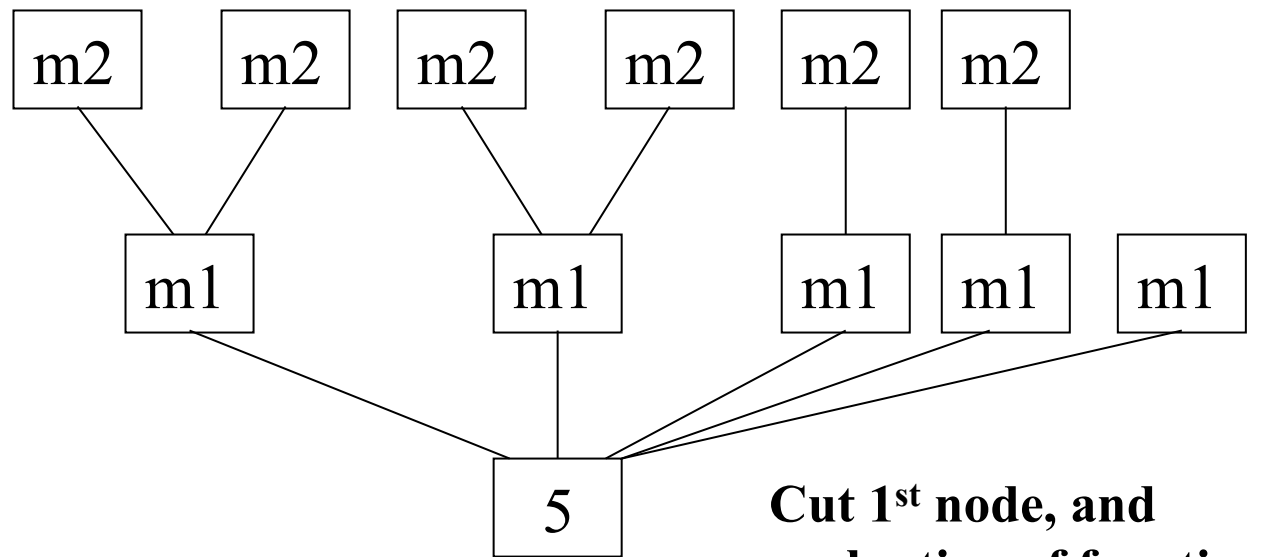
Calculation procedure

Note: Definition of F5 uses $m(1)(x)=x^x$, but here $m(1)(x)=x+1$ is used, just to show procedure.



**By cutting the first node
function is evaluated and
the root number increases.**

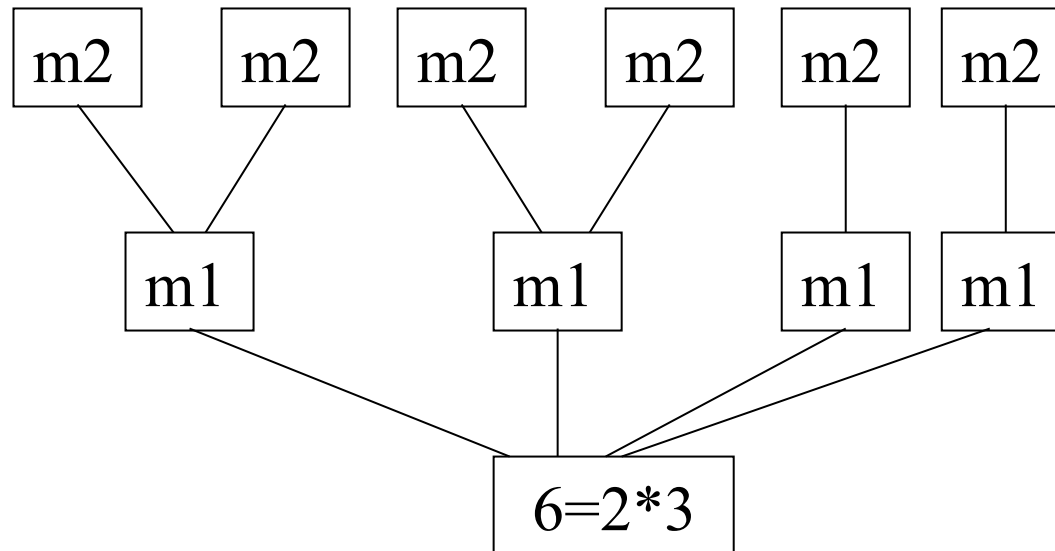
Calculation procedure



**Cut 1st node, and
evaluation of function
repeats.**

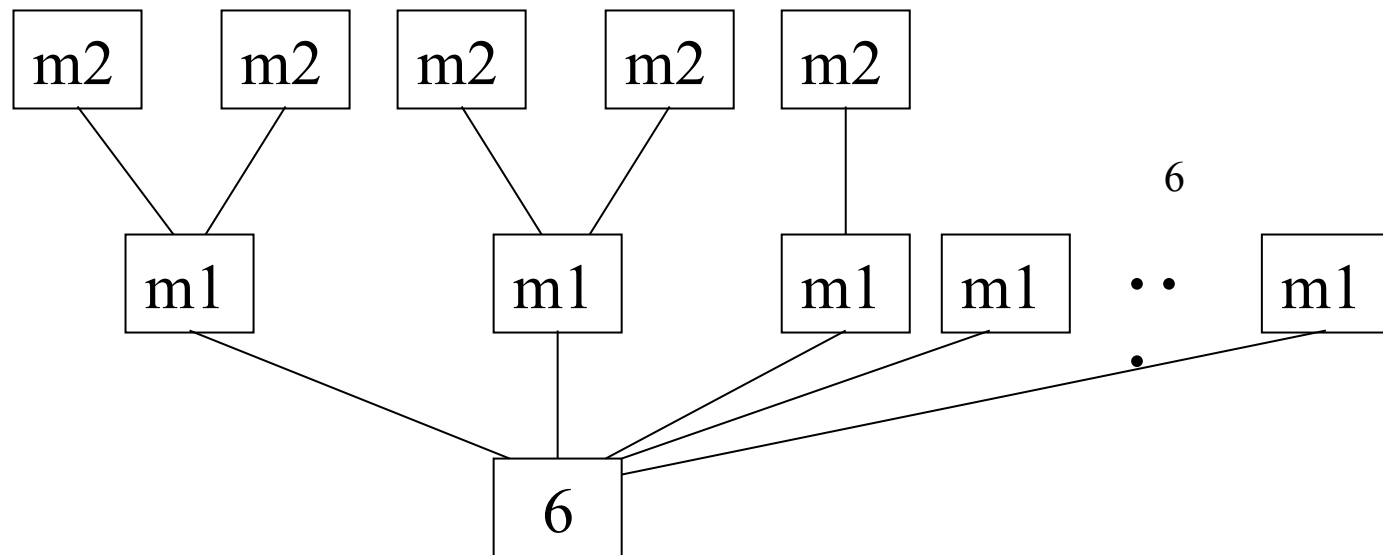
Calculation procedure

Now, when we cut the second node ...



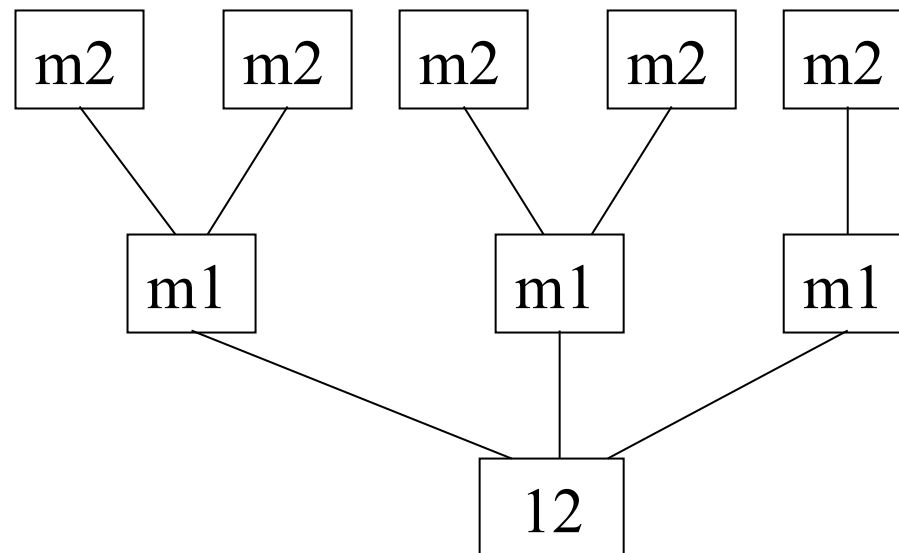
Calculation procedure

We have $2 \times 3 = 6$ head of m1 hydra



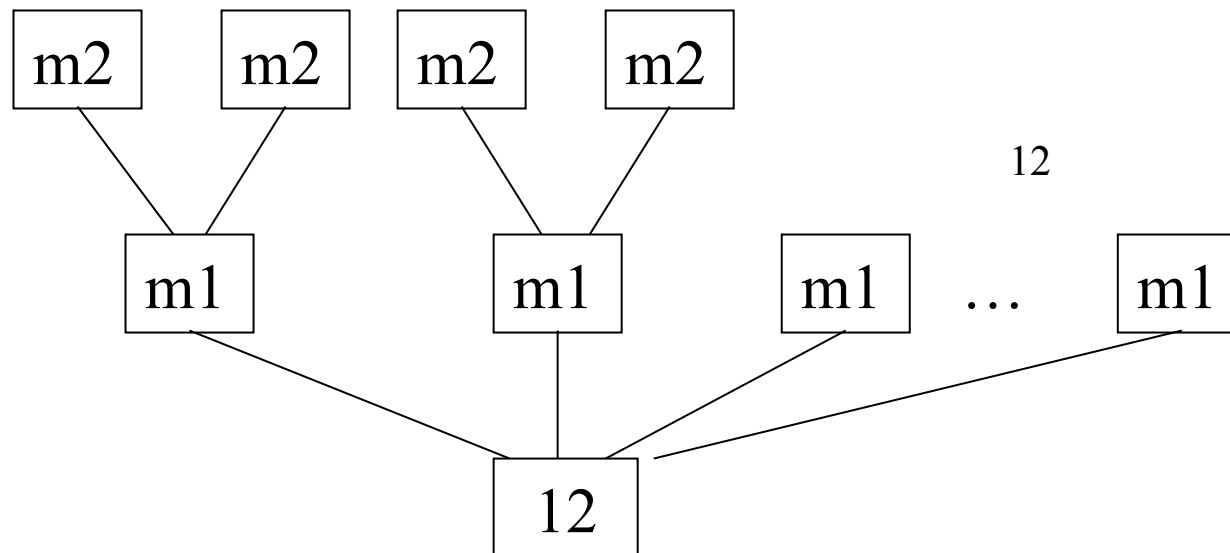
Calculation procedure

Now, when we cut the new m2 head, and ...



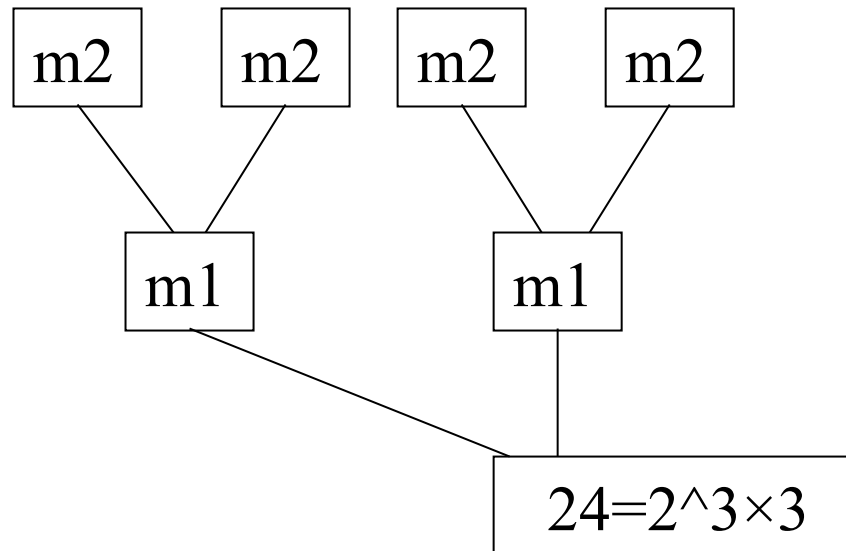
Calculation procedure

$2 \times 2 \times 3 = 12$ heads are produced



Calculation producedure

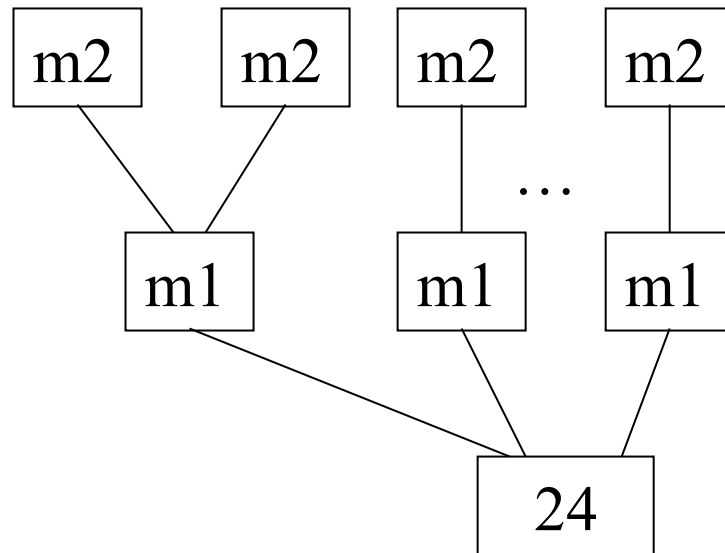
Now we cut one of the m2 again



Calculation procedure

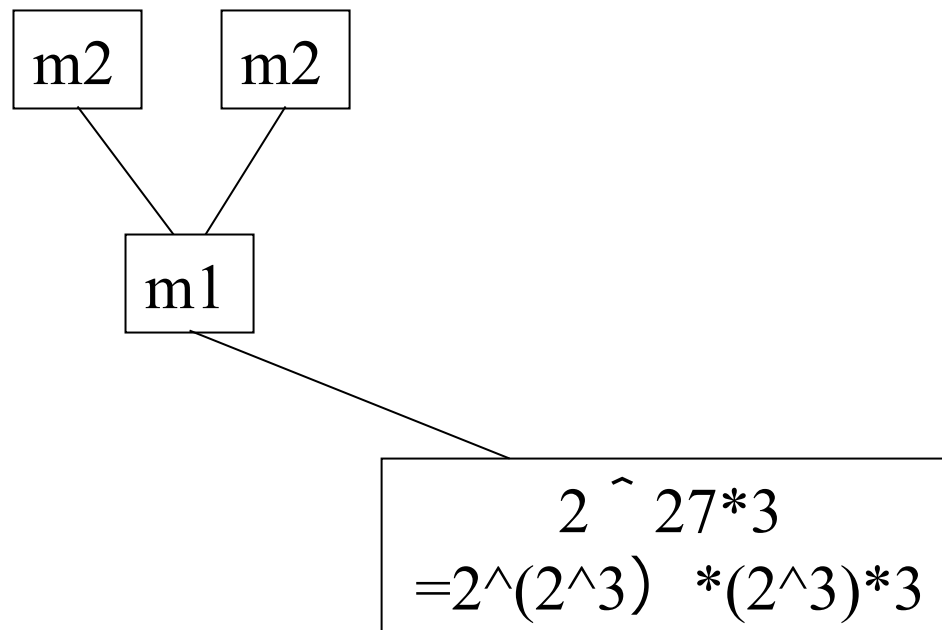
24 heads of height 2 is produced

Cutting the 24 heads increases the numbers, and



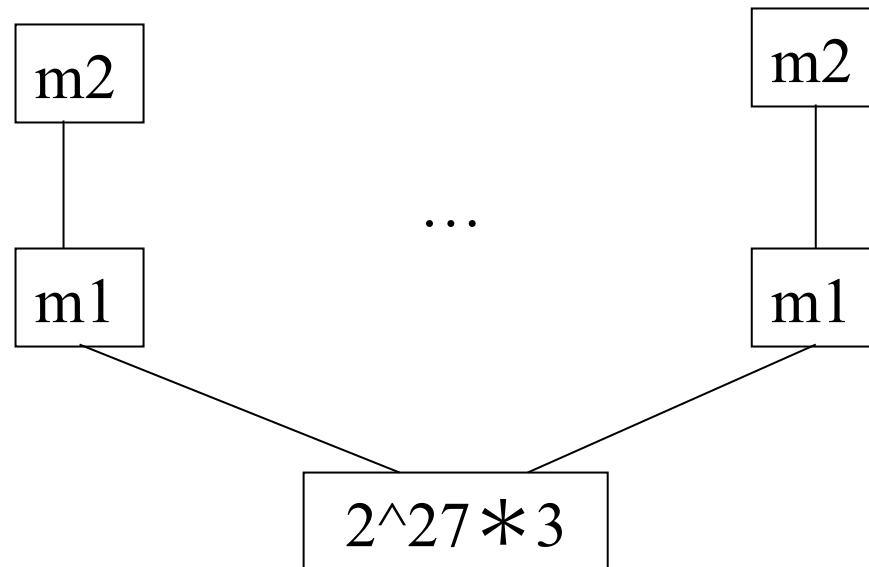
Calculation procedure

Again cutting one of the m2 tree, and...



Calculation procedure

$2^{27 \cdot 3}$ heads are produced !



Calculation procedure

F5 (3) (modified)

$$=2^{2^{(2^3*3)*2^3*3}} + 2^{(2^3*3)*2^3*3}$$