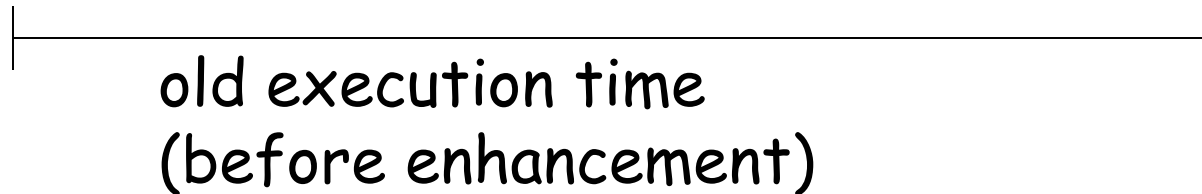


Consider improvements to our **code** to *increase performance*.

time program:



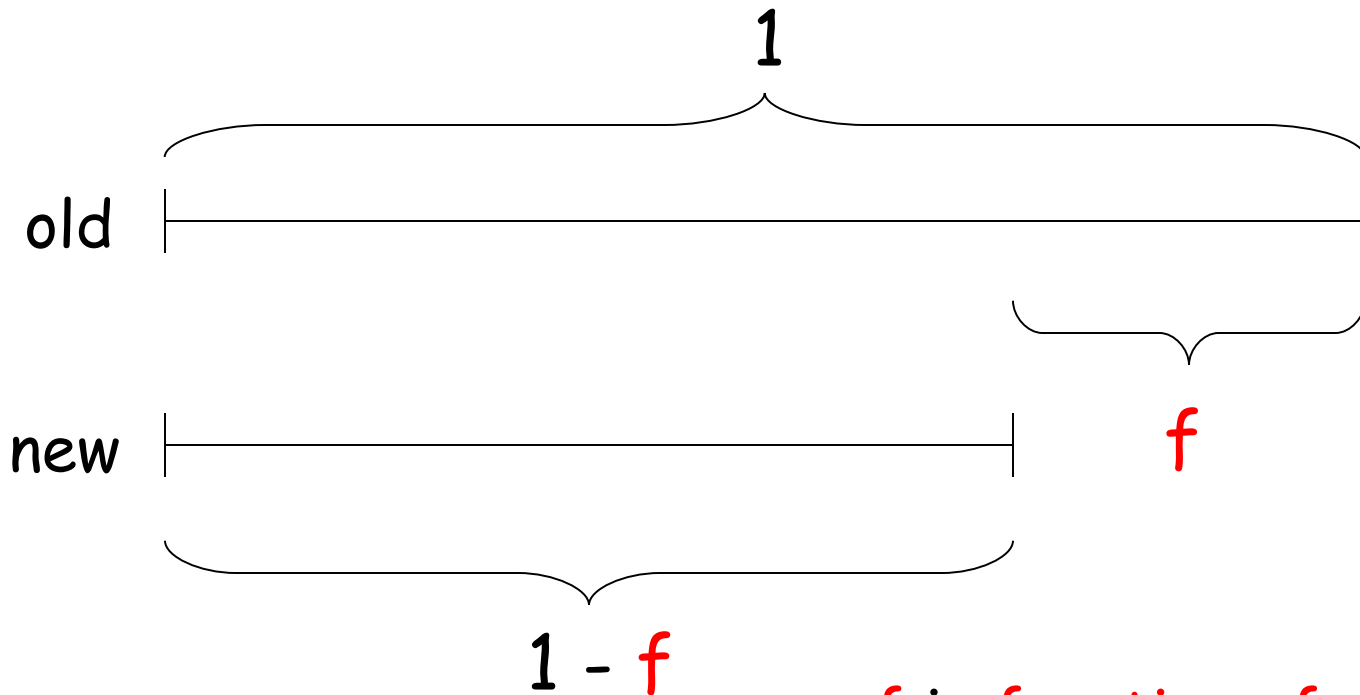
improve program, and re-time:



define **speedup** = $\frac{\text{old execution time}}{\text{new execution time}}$

- If $\text{speedup} > 1$,
then the enhancement improved
performance !
- If $\text{speedup} == 2$,
and all instructions take the same amount
of time to execute, *what does this tell us ?*

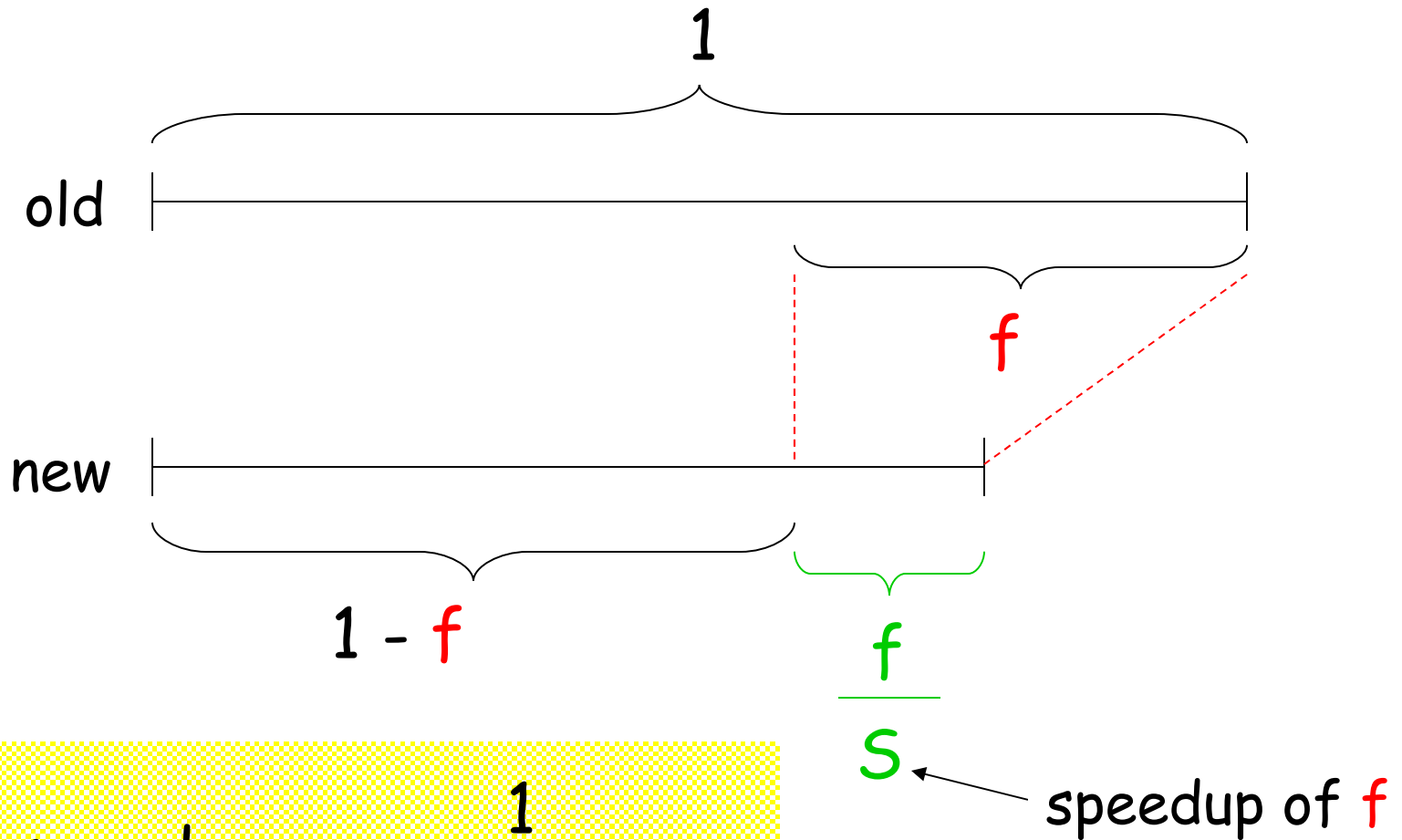
To predict speedup, scale such that old execution time is 1.



f is fraction of code execution time that goes away. . .

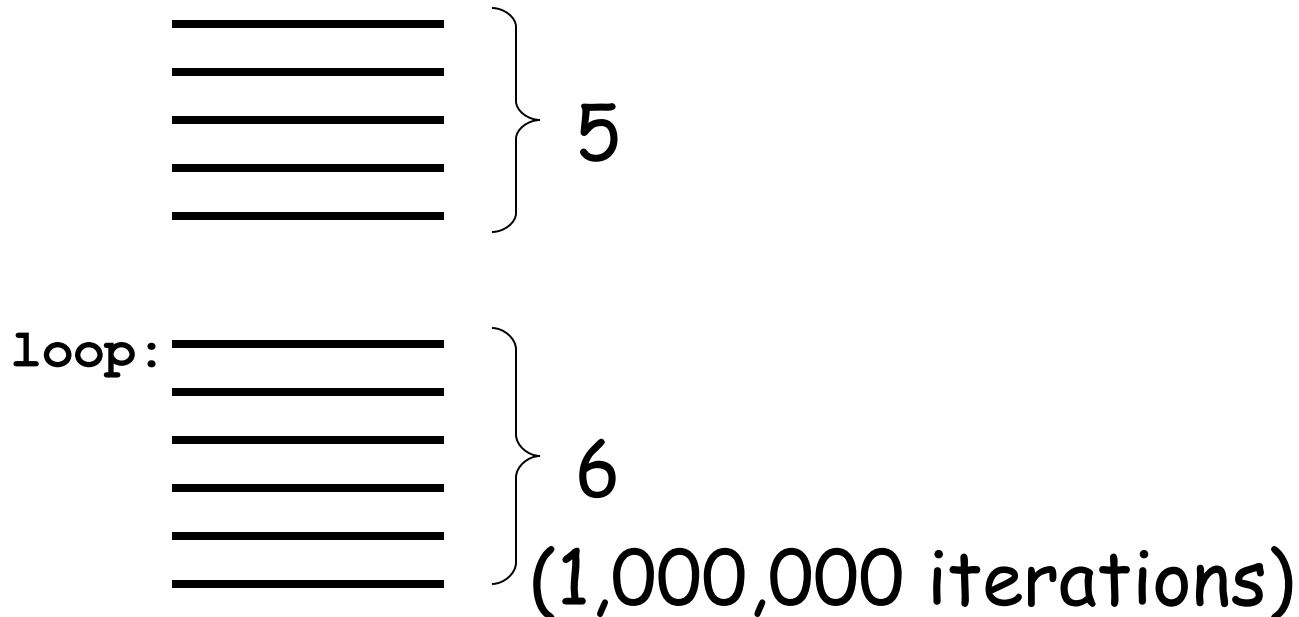
$$\text{speedup} = \frac{1}{1 - f}$$

if f is improved, but not eliminated . . .

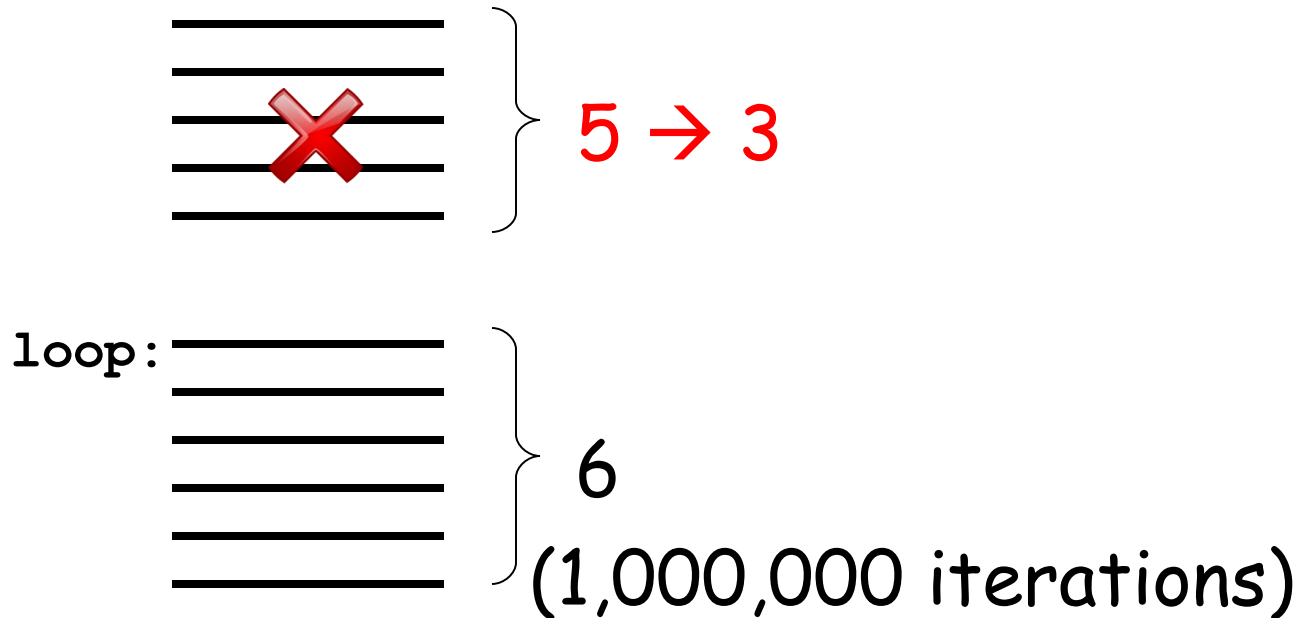


$$\text{speedup} = \frac{1}{(1 - f) + \frac{f}{S}}$$

Assume we have the following code that we want to improve. Each line is an assembly language instruction.



What is speedup ?



What is speedup ?

