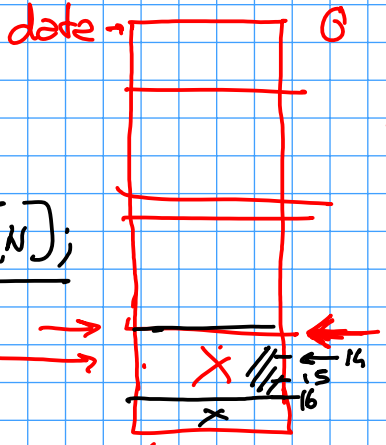
VECTORIZATION

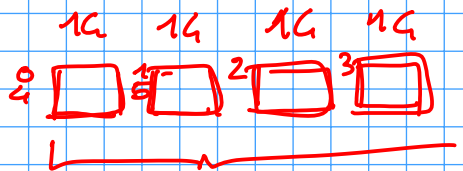
1) determinate loops
2) avoid function calls (inlining)
3) avoid dependencies $\left(x[i] = f(x[i-10])\right)$
4) be "kind" with memory
   - ↳ avoid strides
   - ↳ ensure alignment

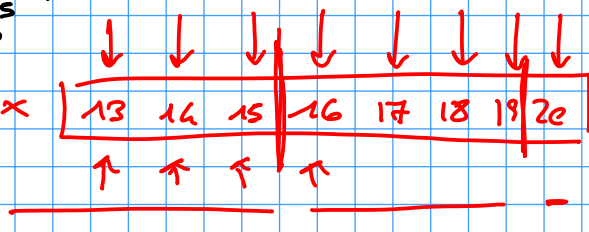
$$\begin{pmatrix} a \\ e \\ m \\ n \end{pmatrix} = \begin{pmatrix} b \\ f \\ \cdot \\ \cdot \end{pmatrix} * \begin{pmatrix} c \\ g \\ \cdot \\ \cdot \end{pmatrix} + \begin{pmatrix} d \\ h \\ \cdot \\ \cdot \end{pmatrix}$$

`float x[N];`

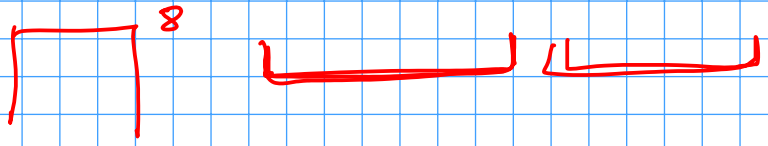
`__declspec(align(8)) float x[N];`








```
for(i=0; i<N; i++)
    x[i] = ....
```



#pragma ivdep
for( )

#pragma loop count (1024 / n)
for( )

#pragma always
for( )

#pragma novector
for( )

restrict

float f(float* x, float* y)

float f(restrict float* x, restrict float* y) {
}

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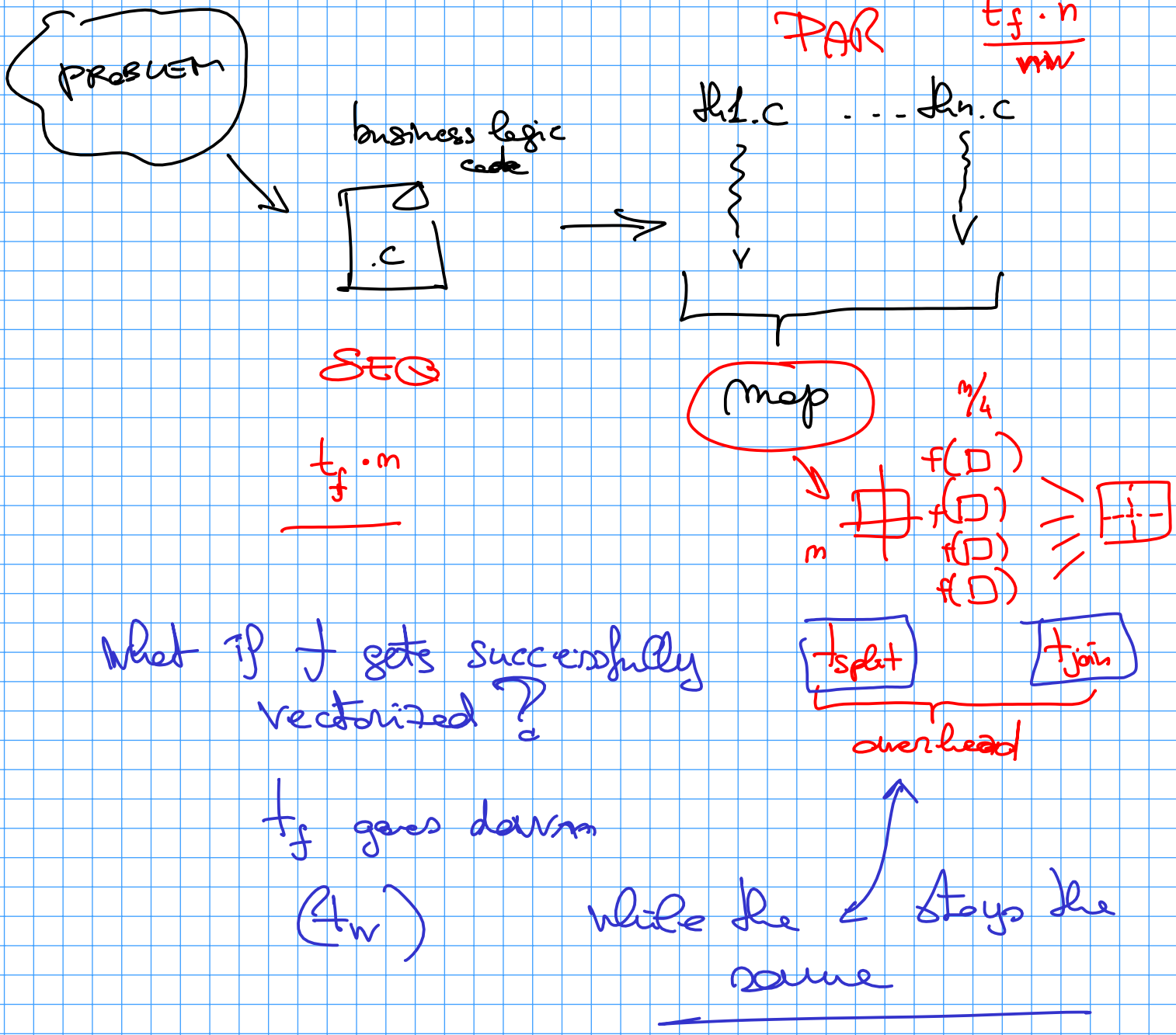

What if f gets successfully vectorized?

t_f goes down (t_w)

while the overhead stays the same