Special instructions: 
Predicated instructions, SIMD


[SGL09] Benjamin Schlegel, Rainer Gemulla, Wolfgang Lehner. *k-ary search on modern processors*. 
5th International Workshop on Data Management on New Hardware (DaMoN), 52-60, 2009.

*FAST: fast architecture sensitive tree search on modern CPUs and GPUs*. 
Conditional instruction: cmovge

```c
for (int i=0; i<100; i++)
if (X[i]>50) large+=7;
```

L6:
```
cmpl  $51, (%edi,%eax,4)
leal  7(%edx), %ecx
cmovge %ecx, %edx
addl  $1, %eax
```
```
cmpl  $100, %eax
jne   L6
```
Super Scalar Sample Sort

t := \langle \frac{s_k}{2}, \frac{s_k}{4}, \frac{s_{3k}}{4}, \frac{s_k}{8}, s_{3k}/8, \frac{s_{5k}}{8}, s_{7k}/8, \ldots \rangle

for i := 1 to n do  // locate each element
    j := 1  // current tree node := root
    repeat \log k times  // will be unrolled
        j := 2j + (a_i > t_j)  // left or right?
    j := j − k + 1  // bucket index
    |b_j|++  // count bucket size
    o(i) := j  // remember oracle

for i := 1 to n do  a'_{B[o(i)]++} := a_i

Multiway Comparisons
SIMD (Single instruction, multiple data)

[K+10] FAST: fast architecture sensitive tree search on modern CPUs and GPUs. SIGMOD 2010.