Database Systems on Modern CPU Architectures

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Chair of Data Science and Engineering
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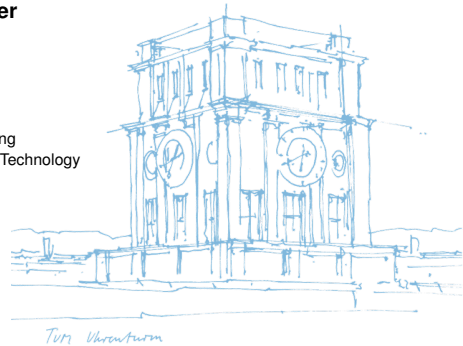

Hashing

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30	Schmidt	011110
18	Krause	010010
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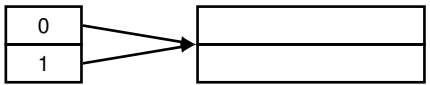
45	Kaufmann	101101



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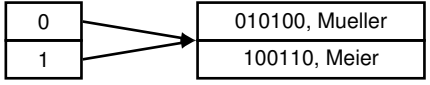

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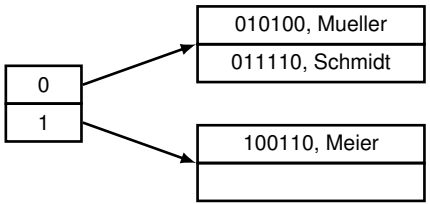

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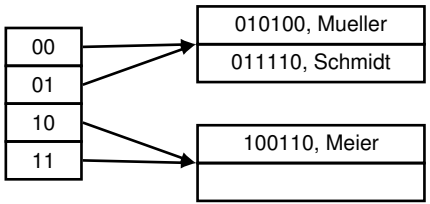

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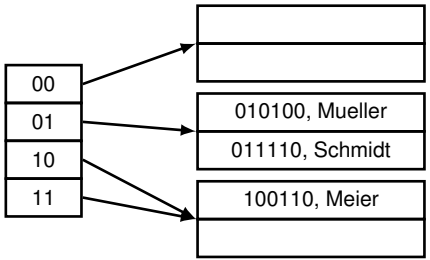

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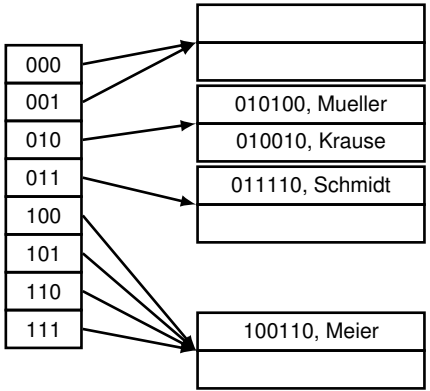

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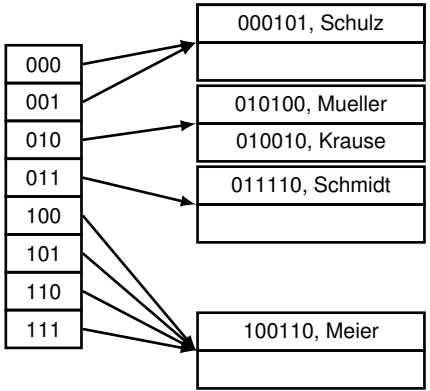

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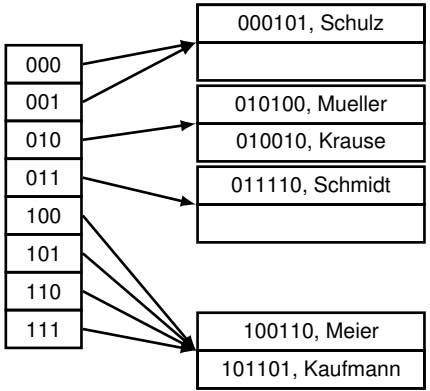
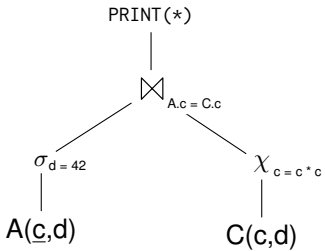


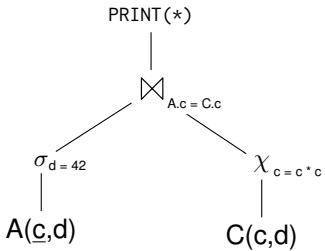
Data-Centric Query Execution

Generate (pseudo-)code for the following operator tree using the push model.



Exchange Parallelism

Parallelize the given query plan by introducing `XchgHashSplit(n:m)` and `Xchg(n:m)` operators for **2 threads** as necessary.



Recoverability

Which properties does this history fulfill?

$$w_1(x), r_2(y), w_3(y), w_2(x), w_3(z), c_3, w_1(z), c_2, c_1$$

LLVM

Reconstruct the arithmetic expression from the given LLVM function:

```
define i64 @meaningful_function_name(ptr %0) {
    entry:
    %1 = getelementptr double, ptr %0, i64 1
    %2 = load double, ptr %1, align 8
    %3 = fadd double 4.200000e+01, %2
    %4 = getelementptr double, ptr %0, i64 0
    %5 = load double, ptr %4, align 8
    %6 = fsub double 2.100000e+01, %5
    %7 = fsub double %3, %6
    %8 = fptosi double %7 to i64
    %9 = getelementptr i64, ptr %0, i64 2
    %10 = load i64, ptr %9, align 4
    %11 = add i64 %8, %10
    %12 = add i64 %11, 100
    ret i64 %12
}
```

Data-Centric Query Execution II

Draw the operator tree for the given code which was generated by the push model.

```
ht1 = Hashtable()
ht2 = Hashtable()

for c in C:
    if ht1.contains(c.x)
        ht1[c.x] += c.d
    else:
        ht1[c.x] = c.d

for (key, value) in ht1.entries()
    ht2.insert(value, key)

for a in A:
    if a.d == 42:
        if ht2.contains(a.c)
            c = ht2.lookup(a.c)
            print(...)
```

Questions?