Databasesystems 2

Forum: https://forum-db.informatik.uni-tuebingen.de/c/ss18-db2

Assignment 6 (05.06.2018)

Submission: Tuesday, 12.06.2018, 10:00 AM

Please note that students currently have the opportunity to **evaluate lectures**. Please help us to improve **your** courses by providing precious feedback. Check your Mailbox now and participate **today**.

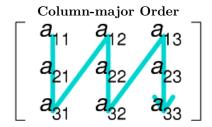
1. [15 Points] Loop Swapping Optimization

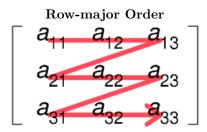
Processing a wide table stored as C array, the order of processing can have significant impact on performance. Consider the following table tbl of random integers stored *row-wise* in an C array:

```
unsigned int *tbl;

/* initialize table row-by-row with random values */
for (r = 0; r < rows; r++)
    for (c = 0; c < cols; c++)
        tbl[r * cols + c] = (unsigned int) random();</pre>
```

If we want to add up all elements of the table, we can process the elements following two different traversal strategies:





The choice of loop order has significant impact on performance:

- (a) Extend the program in loop-swapping.c to compute and print the overall sum of all cells in table tbl in two different ways: Using two nested loops processing array tbl
 - i. in row-major order and
 - ii. in *column-major* order.
- (b) Further extend your program to measure and print the execution time of both variants.
- (c) Compile the program with flag -02 and run a test with 1,000,000 rows and 100 columns. Describe the results and explain the difference in performance of both variants.

2. [15 Points] Logical Conjunction

In the lecture we discussed how a MAL program would apply logical disjunction found in SQL queries (see slide 9 of slideset 8). Your task is to write the following SQL query using **logical conjunction** as a MAL program:

```
SELECT t.a, t.b

FROM ternary AS t

WHERE t.a % 2 = 0 AND t.c < 1;
```

The table used in this query is defined as ternary (a int NOT NULL, b text NOT NULL, c float). We provided you with an incomplete MAL file conjuction.mal which you should complete for this task.