

Database Management Systems

Assignment 1

Due date: Sep 15, 2021

To verify the effect of data organization on I/O time we want to have a practical test. To avoid optimizations by the compiler we will use raw file I/O function `fread/fwrite` in C.

Create a text file on the hard disk of your computer. Your file should have 100,000 records. Each record should be of 1024 bytes. You may define the record format using a struct as:

```
struct MyRecord
{
    int ID;
    char Name[1020];
};
```

Create a variable of type `MyRecord`, copy some string into the `Name` field.

Now create a file in binary mode (`wb`) and write this record into it 100,000 times, put the loop variable in the `ID` field of the variable. *We use binary mode to have the same length for records inside the file.*

Close the file, and open it in read/write mode (`r+b`).

Case 1:

Start timer, read all 100,000 blocks. What was the total time?

Case 2:

Start timer, in a loop that repeats 100,000 times, generate random numbers, read the block. What was the total time?

Hint: to read block n , you can use `fseek` function to go to the block then read it. Use $(n-1)*1024$ to find the offset of the block from the beginning of the file

Repeat Case 1 and Case 2. Do you get different timings? Why?

Deliverable:

Write a report about your experiments. Put your code in the report. Discuss your results and findings. Save your report in pdf format, and submit it through BB.