Laboratory for Parallel Programming
Prof. Dr. Felix Wolf

TECHNISCHE UNIVERSITÄT DARMSTADT

Aamer Shah, shah@cs.tu-darmstadt.de

Large-Scale Parallel Computing (WS 15/16)

Exercise 1

A solution will be presented on October 27th, 2015. Attendance is optional. The exercise solutions will not be corrected and graded.

Task 1

Fibonacci sequence is a popular number series constructed by adding the last two numbers of the sequence to get the next number. The first and the second numbers are fixed as 0 and 1. The series we get is: `0 1 1 2 3 5 8 13 21 ...` Write a C program that prints the Fibonacci series till the n^{th} place. The program should take the input value n on the command line and print an error if it is negative.

a) First, write a program that uses **loops** to generate the sequence.

b) Second, write the same program again such that it uses only **recursion** to generate the sequence.

c) Which implementation of the program is more efficient with respect to execution time and memory.

Task 2

Write a C program that reads a file containing two matrices and writes their sum back to a new file. The input file should be named `input.dat`. The first line of the file should describe the number of rows and columns of the matrices. The rest of the file should contain the two matrics, one after the other. The output file should be named `output.dat` and should have the same format, i.e; the first line describing the dimensions, followed by the sum of the matrices. The program should internally store the matrices as two dimensional arrays. The matrices can be assumed to be of integer data type.

a) Implement the program, and use a function that takes the two matrices as input and calculates their sum.

b) Re-implement the function such that it still takes the two matrices as input, but does not use pointers for passing the input matrices (Don't use structs or any other derived data types). **Hint:** There is a difference between int `**array`, `int *array[N]` and `int array[N][M]`.

c) Is a solution to part (b) possible in C++?