Lab Session 03

Pre-Home exercises

If you did not gather 10 points at lab 2 you can show the remaining exercises as homework for lab 3 and the points for lab 2 will be changed accordingly. **This is an exception and it will not be repeated for other labs.**

Home exercises

1. **[5p]** Build a program with two threads
   - Each thread performs the operation ***a=a+2*** for 100 times
   - ***a*** is set to be a global variable
   - After the threads finished executing print the value of ***a***
   - What is the smallest value that can be displayed by the program?
   - You will need to find the execution flow on paper, as it can take some time to prove it by simply running the program.
2. **[5p]** Write the following program with two threads
   - Thread one sets ***a*** to ***5*** and then adds ***7*** to ***a***
   - Thread two sets ***a*** to ***3*** and adds ***2*** to the value of ***a***.
   - After the threads finished executing print the value of ***a***
   - Make sure the value printed is always ***14***, by using only barriers

Lab Exercises

1. **[10p]** Parallelize the ***multiplyMatrices*** code by splitting the outer loop.
2. **[10p]** Perform **sanity check**, **stress test** and **scalability measurements**.
3. **[10p]** Parallelize the same code by splitting the second nested loop.
4. **[10p]** Perform **sanity check**, **stress test** and **scalability measurements**.
5. **[10p]** Parallelize the same code by splitting the inner loop.
6. **[10p]** Perform **sanity check**, **stress test** and **scalability measurements**.
7. **[20p]** Parallelize the matrix multiplication using the Strassen's algorithm.
    - You might need to use multiple thread functions and barriers for this one.
    - You might find it easier to follow the formulas from the Strassen Algorithm on wikipedia.
8. **[10p]** Perform **sanity check**, **stress test** and **scalability measurements**.