Lab 3 - Vítor Gonçalves

Question 2

References: [1] https://www.ibm.com/docs/en/zos/2.3.0?topic=processing-pragma-omp-parallel

[2] https://docs.microsoft.com/en-us/cpp/parallel/openmp/reference/openmp-clauses?view=msvc-170

- When executing the program with 'a' as firstprivate, at the end of the loop a = initial value. This is because each thread must have its own instance of 'a'. Therefore, each thread will initialize with the original value, and at the end of the execution the value will be the original one.
- When executing the program with 'a' as private, at the end of the loop 'a' is also equal to the initial value. In this kind of execution the variable is seen as local, therefore after all threads execution the value remains as in the beginning.
- On lastprivate execution, 'a' will have the value as in the last execution of the "biggest numbered" thread.
- On shared, 'a' will be the value of the last loop execution.
- When there's no data sharing, the value will be the latest accessed.

`//1. try to change it to random number and notice how it works`

As we are expecting, 'a' will have the value of the last interaction of the last numbered thread.

`//2. What happens when we disable locks?`

Since there's no blocking operations from threads when acessing 'a', it may happen that 'a' is not the value of the last iteration.

`// 3. What is the value of "a" after several runs?`

Since there's no blocking operations from threads when acessing 'a', it may happen that 'a' is not the value of the last iteration.

`4. What is the default data scope without any clauses?`

Shared.

Question 3

Check ex3.c

Question 4

- Dynamic default

```
Thread 3, index 0, a = 25000
Thread 3, index 4, a = 6250
Thread 3, index 5, a = 3125
Thread 3, index 6, a = 1562
Thread 3, index 7, a = 781
Thread 3, index 8, a = 390
Thread 3, index 9, a = 195
Thread 3, index 10, a = 97
Thread 3, index 11, a = 48
Thread 3, index 12, a = 24
Thread 3, index 13, a = 12
Thread 3, index 14, a = 6
Thread 1, index 2, a = 25000
Thread 0, index 3, a = 12500
Thread 2, index 1, a = 25000
After execution of iterations 'a' = 6
```

- Static default

```
Thread 3, index 12, a = 25000
Thread 3, index 13, a = 3125
Thread 3, index 14, a = 1562
Thread 2, index 8, a = 6250
Thread 2, index 9, a = 781
Thread 2, index 10, a = 390
Thread 2, index 11, a = 195
Thread 1, index 4, a = 25000
Thread 1, index 5, a = 97
Thread 1, index 6, a = 48
Thread 1, index 7, a = 24
Thread 0, index 0, a = 12500
Thread 0, index 1, a = 12
Thread 0, index 2, a = 6
Thread 0, index 3, a = 3
After execution of iterations 'a' = 3
```

- Dynamic, chunk_size 3

```
Thread 2, index 0, a = 25000
Thread 2, index 1, a = 3125
Thread 2, index 2, a = 1562
Thread 2, index 12, a = 781
Thread 2, index 13, a = 390
Thread 2, index 14, a = 195
Thread 0, index 6, a = 12500
Thread 0, index 7, a = 97
Thread 0, index 8, a = 48
Thread 3, index 3, a = 25000
Thread 3, index 4, a = 24
Thread 3, index 5, a = 12
Thread 1, index 9, a = 6250
Thread 1, index 10, a = 6
Thread 1, index 11, a = 3
After execution of iterations 'a' = 3
```

- Static, chunk_size 3

```
Thread 3, index 9, a = 25000
Thread 3, index 10, a = 6250
Thread 3, index 11, a = 3125
Thread 0, index 0, a = 1562
Thread 0, index 1, a = 781
Thread 0, index 2, a = 390
Thread 0, index 12, a = 195
Thread 0, index 13, a = 97
Thread 0, index 14, a = 48
Thread 2, index 6, a = 25000
Thread 2, index 7, a = 24
Thread 2, index 8, a = 12
Thread 1, index 3, a = 12500
Thread 1, index 4, a = 6
Thread 1, index 5, a = 3
After execution of iterations 'a' = 3
```

Question 5

Check ex5.c

Final times:

- static 3 - 0.023438s
- static default - 0.011719s
- dynamic default - 0.011719s
- dynamic 3 - 0.027344s

Taking into account the results obtained we can say that the best chunk size is the default value. Regarding dynamic or static option, they were the same during the execution, so I'd say they are very similar and wouldn'b be many differences regarding the choice.