Group 12

(Basics of Parallel Computing)

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Exercise 1

1. ‘a’ is the id of the threads

2.

case/a	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
static	2	0	1	0	1	0	1	0	1	0	1	0	1	0	1
static 1	2	0	1	2	0	2	1	0	2	2	1	0	2	2	0
static 3	1	0	2	2	1	0	2	2	0	1	0	2	2	0	2
dynamic 1	2	1	2	1	2	3	2	1	3	2	3	2	1	3	2
dynamic 5	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2
guided 2	2	0	0	2	2	0	2	0	2	0	2	0	2	0	2

3. If the thread id is larger than the size of the array. The indexing will be out of scope

Exercise 2.

The first problem is that count_odd was not initialised for each thread so it will be undefined and that can be solved by using firstprivate().
Even after this count_odd will be private to each thread and won't be accessed after the for loop.

Possible fix is to make count_odd shared and use critical clause when updating it.

```
int omp_odd_counter(int *a, int n) {
    int i;
    int count_odd=0;
    int c=0;

#pragma omp parallel for shared(a) shared(count_odd)


for (int i = 0; i < n; ++i) {
        printf("%d\n",a[i]);
#pragma omp critical
        if (a[i] %2 ==1) {
            count_odd++;
        }
    }
    return count_odd;
}
```

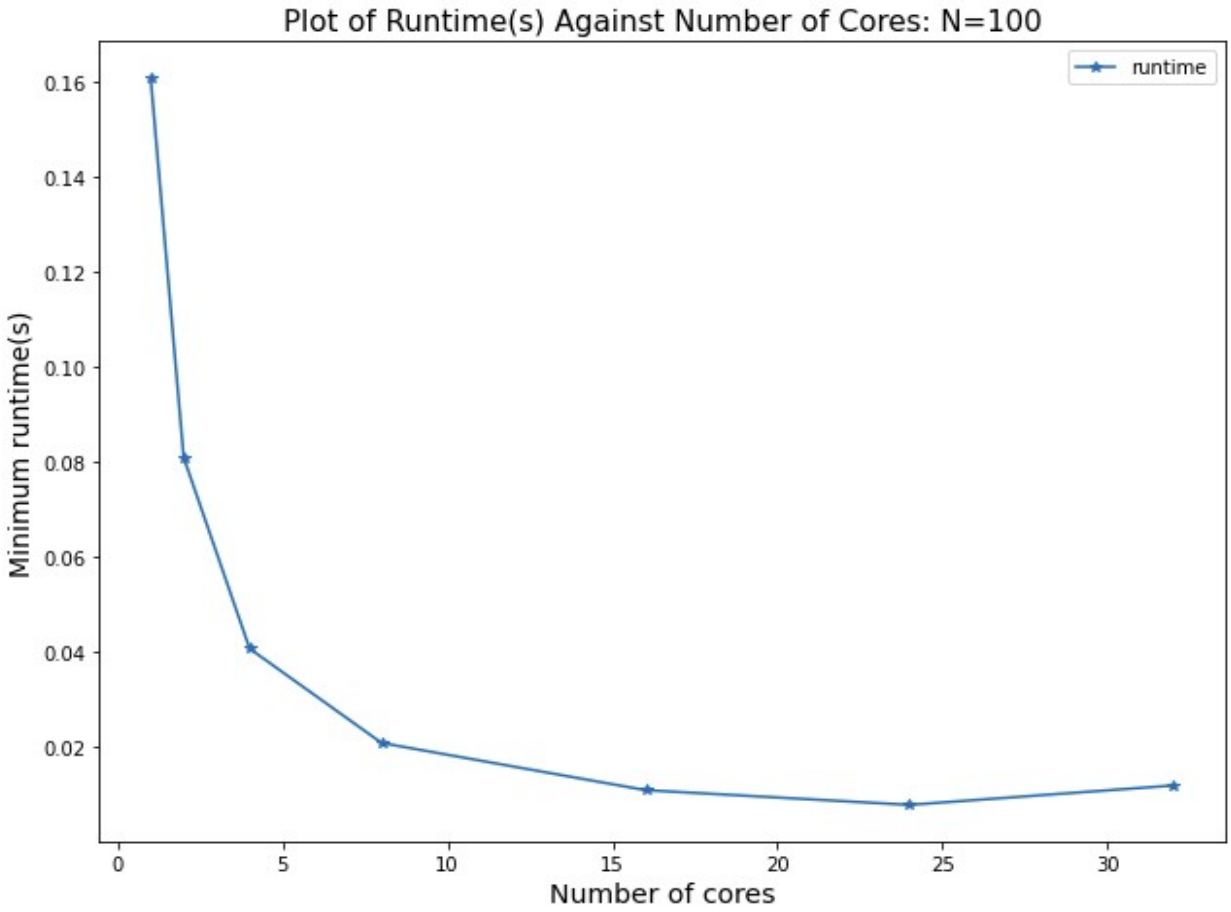
Exercise 3.
1)
Listing 2: version A
output: res=5

Listing 3: version B
output: res=5

Listing 4: version C
output: res=5

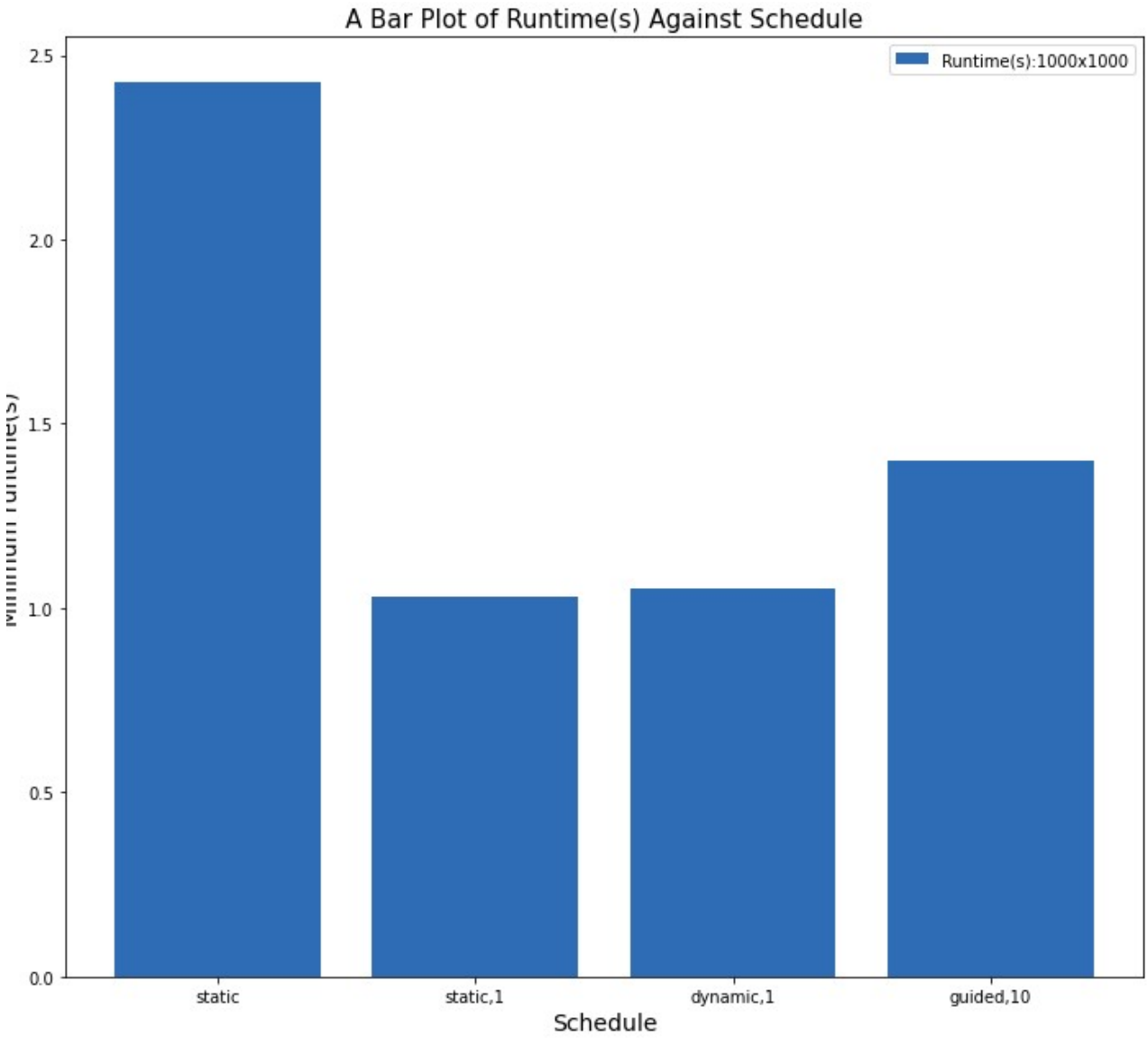
2)
version A – 1 time
Version B – 4 times
Version C = 1 time

Exercise 4.
1)



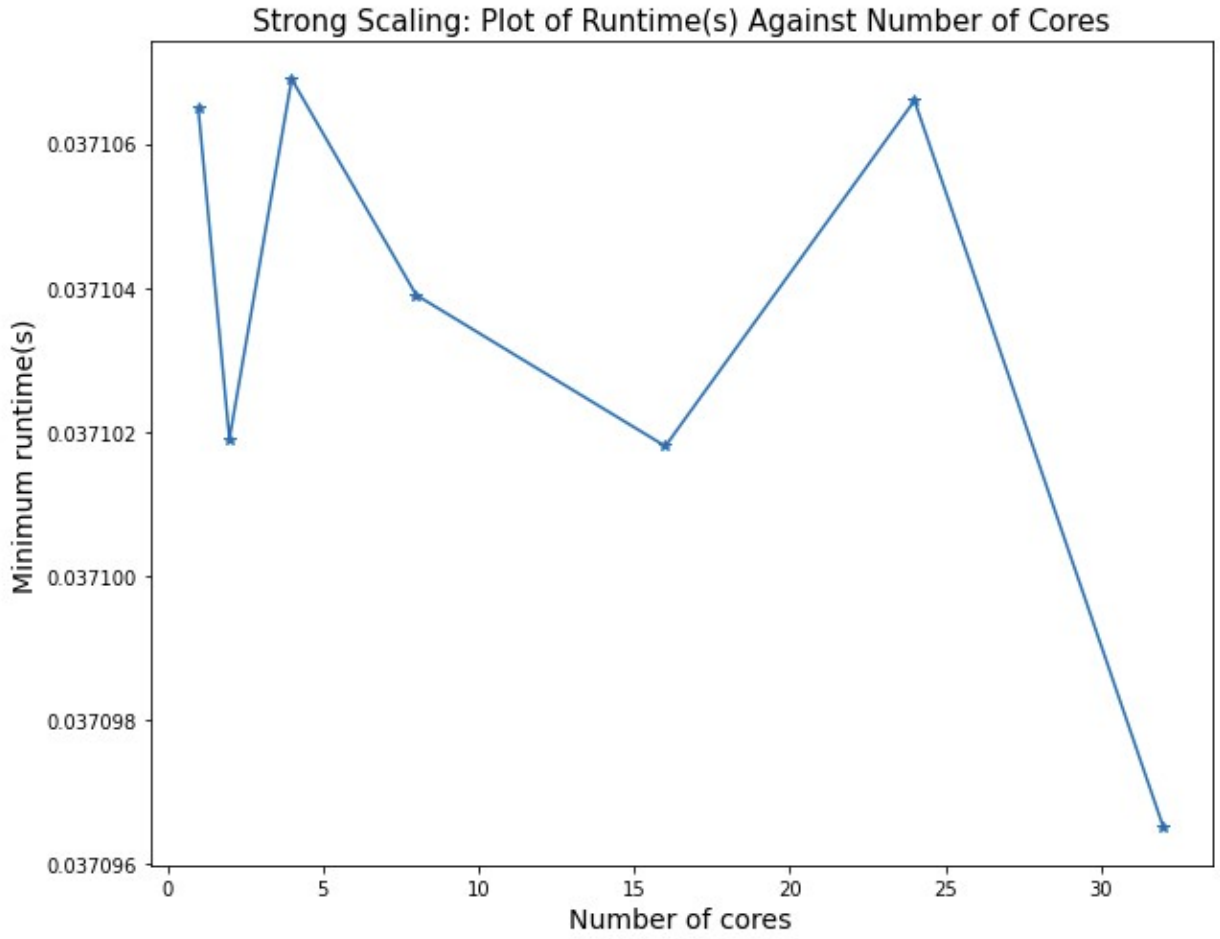
It can be seen that the runtime decreases which means that speed up inreases as the number of cores increases.

2)



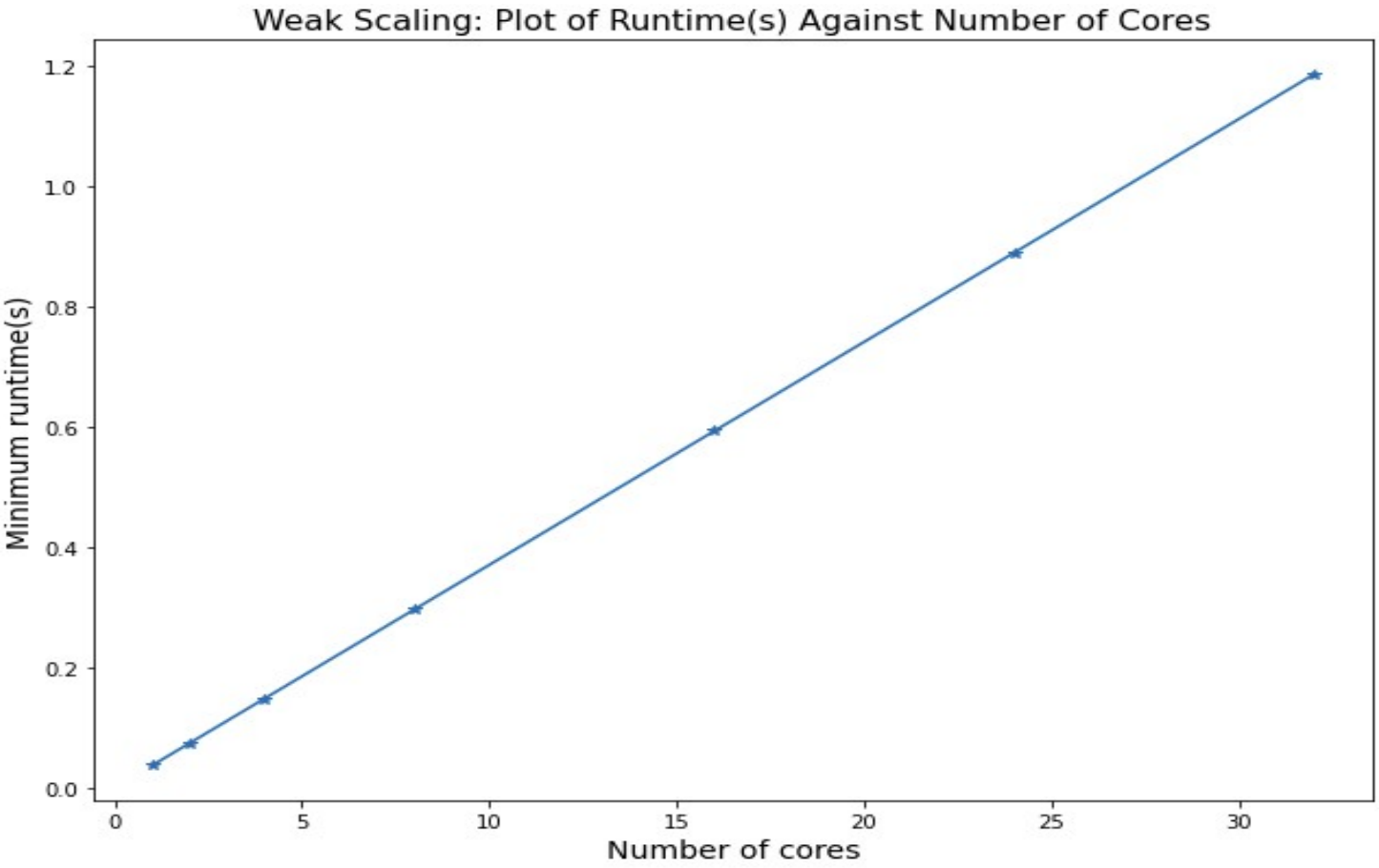
From the above bar chat it is evitdent that the static schedule is slower compared to the others and there is relatively no differene between static,1 and dynamic,1 schedules.

Exercise 5.
1)



As can be seen the speed up of the process increases as the number of cores increases since the problem size is fixed and there is an increase in resources

2)



Since the problem size is proportional to the resources we can clearly see a linear graph between the runtime and number of cores for the weak scaling