Lab Assignment - 2

Using OpenMP, Design, develop and run a multi-threaded program to perform sum of N elements (N=100) using Loop work Sharing with different schedule clause. Write your observation from the execution.

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BASIC CODE for static clause

CODE

```
#include <omp.h>
#include <stdio.h>
#include <stdlib.h>
int main(int argc, char *argv[])
{
  int sum = 0;
  int a[100];
  double start;
  double end;
  start = omp_get_wtime();
  for (int i = 0; i < 100; i++)
     a[i] = i + 1;
#pragma omp parallel reduction(+: sum)
  {
#pragma omp for schedule(static)
     for (int i = 0; i < 100; i++)
     {
        sum = sum + a[i];
     }
  }
  printf("The total sum is %d\n\n\n", sum);

  end = omp_get_wtime();
  printf("Work took %f seconds\n", end - start);
}
```

THE code was modified for static, dynamic, auto ,guided , runtime and the outputs have been shown as follows

static

```
arshdeep@arshdeep-HP-Laptop-14s-cr1xxx:~/Desktop/pdc-lab/da2$ ./1
The total sum is 5050


Work took 0.067916 seconds
```

dynamic

```
arshdeep@arshdeep-HP-Laptop-14s-cr1xxx:~/Desktop/pdc-lab/da2$ ./1
The total sum is 5050


Work took 0.070573 seconds
```

guided

```
arshdeep@arshdeep-HP-Laptop-14s-cr1xxx:~/Desktop/pdc-lab/da2$ ./1
The total sum is 5050


Work took 0.044879 seconds
```

runtime

```
arshdeep@arshdeep-HP-Laptop-14s-cr1xxx:~/Desktop/pdc-lab/da2$ ./1
The total sum is 5050


Work took 0.063054 seconds
```

auto

```
arshdeep@arshdeep-HP-Laptop-14s-cr1xxx:~/Desktop/pdc-lab/da2$ ./1
The total sum is 5050


Work took 0.000720 seconds
arshdeep@arshdeep-HP-Laptop-14s-cr1xxx:~/Desktop/pdc-lab/da2$ ./1
The total sum is 5050


Work took 0.000722 seconds
```

THE code was modified for static, dynamic ,guided with CHUNKS 25 and the outputs have been shown as follows

Static

```
arshdeep@arshdeep-HP-Laptop-14s-cr1xxx:~/Desktop/pdc-lab/da2$ ./1
The total sum is 5050


Work took 0.001127 seconds
```

Dynamic

```
arshdeep@arshdeep-HP-Laptop-14s-cr1xxx:~/Desktop/pdc-lab/da2$ ./1
The total sum is 5050


Work took 0.069006 seconds
```

Guided

```
arshdeep@arshdeep-HP-Laptop-14s-cr1xxx:~/Desktop/pdc-lab/da2$ ./1
The total sum is 5050


Work took 0.018287 seconds
```

OBSERVATIONS

- Overall, in this scenario auto seems to perform best as the time is very less and is relatively large for runtime.
- Most significant amount of improvement was seen when static clause was run with 25 chunks.
- Guided also has a good amount of improvement when run with 25 chunks
- Static Schedule executes in linear time while guided and dynamic depend on contention of the programme.