

CSE4001 - Parallel and Distributed Computing, Fall 2019
Vellore Institute of Technology
Instructor: Prof Deebak B D - SCOPE

Lab report

Title of Lab: Work Sharing OpenMP

Assessment #: 4

Date: 19|08|2019

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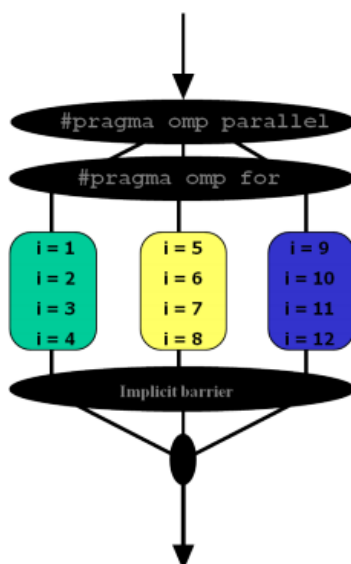
Lab section: Friday L59 + L60

SCENARIO

Write a simple OpenMP program to employ a '*Work Sharing*' clause to assign each thread an independent set of iterations. In order to explore its practical use, you are advised to read and understand the following statements.

1. Assign each thread an independent set of iterations;
2. Threads must wait at the end
3. Can combine the directives:
4. `#pragma omp parallel for`
5. Only simple kinds of for loops:
 - a. Only one signed integer variable
 - b. Initialization: `var=init`
 - c. Comparison: `var op last op: , <=, >=`
 - d. Increment: `var++`, `var--`, `var+=incr`, `var-=incr`, etc.

Execution Scenario:

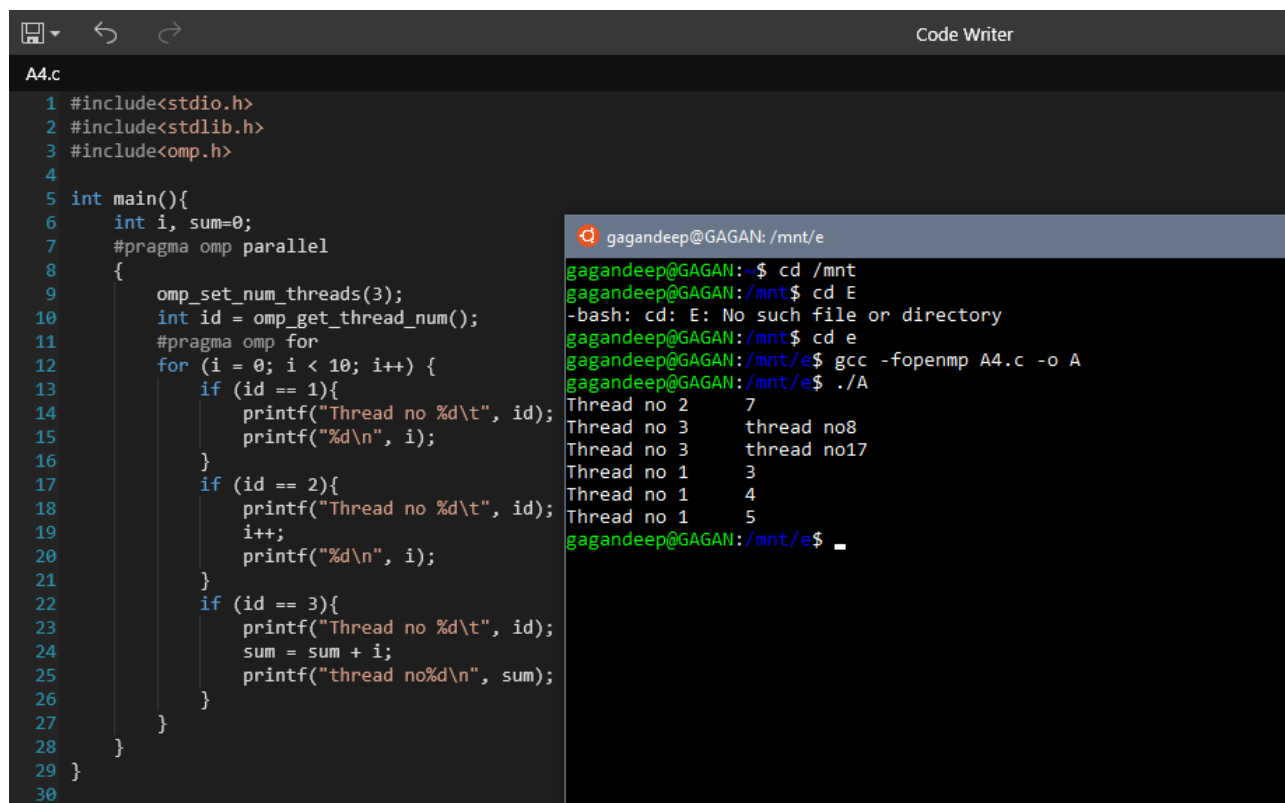


SOURCE CODE:

```
#include<stdio.h>
#include<stdlib.h>
#include<omp.h>

int main(){
    int i, sum=0;
    #pragma omp parallel
    {
        omp_set_num_threads(3);
        int id = omp_get_thread_num();
        #pragma omp for
        for (i = 0; i < 10; i++) {
            if (id == 1){
                printf("Thread no %d\t", id);
                printf("%d\n", i);
            }
            if (id == 2){
                printf("Thread no %d\t", id);
                i++;
                printf("%d\n", i);
            }
            if (id == 3){
                printf("Thread no %d\t", id);
                sum = sum + i;
                printf("thread no%d\n", sum);
            }
        }
    }
}
```

EXECUTION:



The screenshot shows a Code Writer IDE with two panes. The left pane displays the source code of a C program named A4.c, which is a parallel program using OpenMP. The right pane shows the terminal output of the program's execution.

Source Code (A4.c):

```
1 #include<stdio.h>
2 #include<stdlib.h>
3 #include<omp.h>
4
5 int main(){
6     int i, sum=0;
7     #pragma omp parallel
8     {
9         omp_set_num_threads(3);
10        int id = omp_get_thread_num();
11        #pragma omp for
12        for (i = 0; i < 10; i++) {
13            if (id == 1){
14                printf("Thread no %d\t", id);
15                printf("%d\n", i);
16            }
17            if (id == 2){
18                printf("Thread no %d\t", id);
19                i++;
20                printf("%d\n", i);
21            }
22            if (id == 3){
23                printf("Thread no %d\t", id);
24                sum = sum + i;
25                printf("thread no%d\n", sum);
26            }
27        }
28    }
29 }
30
```

Terminal Output:

```
gagandeep@GAGAN: /mnt/e
gagandeep@GAGAN:~$ cd /mnt
gagandeep@GAGAN:/mnt$ cd E
-bash: cd: E: No such file or directory
gagandeep@GAGAN:/mnt$ cd e
gagandeep@GAGAN:/mnt/e$ gcc -fopenmp A4.c -o A
gagandeep@GAGAN:/mnt/e$ ./A
Thread no 2      7
Thread no 3      thread no8
Thread no 3      thread no17
Thread no 1      3
Thread no 1      4
Thread no 1      5
gagandeep@GAGAN:/mnt/e$
```