

CSE 4001

PARALLEL AND DISTRIBUTED COMPUTING



Lab CAT (Midterm Test)

L27+L28 | PLBG04

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by

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PDC Lab CAT/Midterm

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problem-2

AIM: To develop a C program using OpenMP components for parallelizing the asked operations of the barcode.

ALGORITHM:

```
if (Barcode length is 12)
{
    for ODD positions of Barcode
    {
        Sum it and Multiply by 3
    }
    for Even positions
    {
        Sum it and Add it to the previous sum
    }
    if (Final sum's Last digit is 0, then 0 is the
        check digit)
    if (check digit is Equal to Barcode's Last digit)
        PRINT Validated.
    else
        PRINT Error in Barcode
    else
        PRINT cannot be processed.
```

Question 2: The Barcode Parallelization Problem

Code:

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

int main()
{
    printf("\nSharadindu Adhikari, 19BCE2105 \n");
    printf("\n \n"); //for some space

    char UGC[13]; //user given character
    double stime, ftime, time;
    stime = omp_get_wtime();

    printf("Enter the barcode: ");
    scanf("%s", &UGC);

    if (strlen(UGC) == 12)
    {
        int sum = 0;

#pragma omp for
        for (int i = 0; i < 11; i += 2)
            sum += (UGC[i] - '0');
        sum *= 3;

        printf("\nSum of digits in odd positions multiplied by 3 is %d\n",
sum); //printing the sum

#pragma omp for
        for (int i = 1; i < 11; i += 2)
            sum += (UGC[i] - '0');

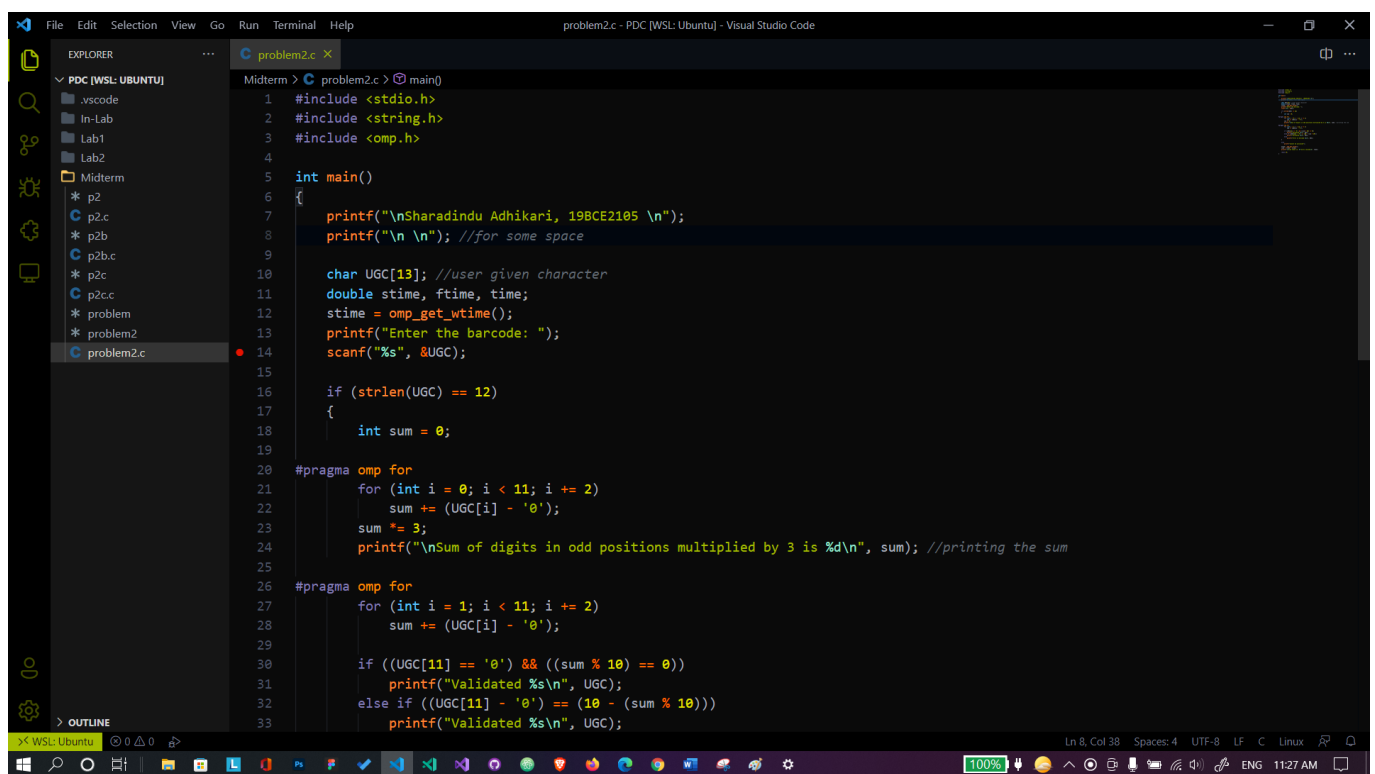
        if ((UGC[11] == '0') && ((sum % 10) == 0))
            printf("Validated %s\n", UGC);
        else if ((UGC[11] - '0') == (10 - (sum % 10)))
            printf("Validated %s\n", UGC);
        else
            printf("Error in barcode %s\n", UGC);
    }
}
```

```
else
    printf("Cannot be processed");

ftime = omp_get_wtime();
time = ftime - stime;
printf("\nTime taken is: %f milli seconds\n", time);

return 0;
}
```

Screenshots:



```
problem2.c - PDC [WSL: Ubuntu] - Visual Studio Code
Midterm > C problem2.c > main()
1  #include <stdio.h>
2  #include <string.h>
3  #include <omp.h>
4
5  int main()
6  {
7      printf("\nSharadindu Adhikari, 19BCE2105 \n");
8      printf("\n \n"); //for some space
9
10     char UGC[13]; //user given character
11     double stime, ftime, time;
12     stime = omp_get_wtime();
13     printf("Enter the barcode: ");
14     scanf("%s", &UGC);
15
16     if (strlen(UGC) == 12)
17     {
18         int sum = 0;
19
20         #pragma omp for
21         for (int i = 0; i < 11; i += 2)
22             sum += (UGC[i] - '0');
23         sum *= 3;
24         printf("\nSum of digits in odd positions multiplied by 3 is %d\n", sum); //printing the sum
25
26         #pragma omp for
27         for (int i = 1; i < 11; i += 2)
28             sum += (UGC[i] - '0');
29
30         if ((UGC[11] == '0') && ((sum % 10) == 0))
31             printf("Validated %s\n", UGC);
32         else if ((UGC[11] - '0') == (10 - (sum % 10)))
33             printf("Validated %s\n", UGC);
34     }
```

```

33     printf("Validated %s\n", UGC);
34     else
35         printf("Error in barcode %s\n", UGC);
36     }
37
38     else
39         printf("Cannot be processed");
40
41     ftime = omp_get_wtime();
42     time = ftime - stime;
43     printf("\nTime taken is: %f milli seconds\n", time);
44
45     return 0;
46 }

```

OUTPUT:

```

shara-d@Rohans-Workstation:~/PDC$ cd Midterm
shara-d@Rohans-Workstation:~/PDC/Midterm$ gcc -o problem2 -fopenmp problem2.c
problem2.c:14:13: warning: format '%s' expects argument of type 'char *', but argument 2 has type 'char (*)[13]' [-Wformat=]
14 |     scanf("%s", &UGC);
    |             ^
    |             |
    |             char (*)[13]
    |             char *
shara-d@Rohans-Workstation:~/PDC/Midterm$ ./problem2
Sharadindu Adhikari, 19BCE2105

Enter the barcode: 678104
Cannot be processed
Time taken is: 6.006246 milli seconds
shara-d@Rohans-Workstation:~/PDC/Midterm$ ./problem2
Sharadindu Adhikari, 19BCE2105

Enter the barcode: 988765432157
Sum of digits in odd positions multiplied by 3 is 102
Error in barcode 988765432157

Time taken is: 14.052108 milli seconds
shara-d@Rohans-Workstation:~/PDC/Midterm$ ./problem2
Sharadindu Adhikari, 19BCE2105

Enter the barcode: 012345678912
Sum of digits in odd positions multiplied by 3 is 63
Validated 012345678912

Time taken is: 23.393815 milli seconds

```