**Lab Assignment 9**

**Title:** Matrix Operation

**Problem statement:**

Write a parallel program using OpenMP to Matrix-Vector multiplication

**Code:**

#include <stdio.h>

#include <omp.h>

#include <sys/time.h>

#define N 10 // Define the matrix size (N x N)

int main()

{

struct timeval tv1, tv2;

struct timezone tz;

double elapsed;

int A[N][N], B[N], C[N];

int i, j;

// Initialize matrix A and vector B

for (i = 0; i < N; i++)

{

for (j = 0; j < N; j++)

{

A[i][j] = i + j;

}

B[i] = i;

C[i] = 0; // Initialize the result vector C

}

gettimeofday(&tv1, &tz);

// Perform Matrix-Vector multiplication using OpenMP parallel for

#pragma omp parallel for shared(A, B, C) private(i, j)

for (i = 0; i < N; i++)

{

for (j = 0; j < N; j++)

{

C[i] += A[i][j] \* B[j];

}

}

gettimeofday(&tv2, &tz);

elapsed = (double) (tv2.tv\_sec-tv1.tv\_sec) + (double)(tv2.tv\_usec-tv1.tv\_usec) \* 1.e-6;

printf("elapsed time = %f seconds.\n", elapsed);

// Print the result vector C

printf("Result Vector C:\n");

for (i = 0; i < N; i++)

{

printf("C[%d] = ",i);

printf("%d", C[i]);

printf("\n");

}

return 0;

}

**Output:**