National University of Computer and Emerging Sciences, Lahore Campus

Course:	Parallel and Distributed Computing	Course Code:	CS-3006
Program:	BSCS & BSDS	Semester:	Spring 2024
Duration:	7 Days	Total Marks:	22
Submit Date:	21-Mar-2024	Weight	1.25%
Type:	Announced	Page(s):	3
Exam:	Assignment 02	Section:	

Name & Roll No:

Submission Mode & Time: Handwritten solutions on A4 papers to be submitted during the lecture. You must have to write all the steps involved in the solution. State your answers in the readable handwriting and with the help of diagrams, where necessary.

Question # 1: **[4 marks, CLO # 2]**

Write an OpenMP program that should create 8 threads to run in parallel and display thread id of each created thread.

Question # 2: **[6 marks, CLO # 2]**

Show the output of the following program:

`#include <iostream>`
`#include <omp.h>`
`using namespace std;`
 	
`int main() {`
`  int nums[10] = { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 };`
`  omp_set_num_threads(3);`
 	
`#pragma omp parallel for schedule(static, 3)`
 	
`  for (int j = 0; j < 10; j++) {`
`  nums[j] *= (j+3);`
`  int x = omp_get_thread_num();`
`  cout << "At thread: " << x << " iteration: ";`
`  cout << j << endl;`
`  }`
 	
`  for (int i = 0; i < 10; i++) {`
`  cout << nums[i] << " ";`
`  }`
 	
`  cout << endl;`
`  return 0;`
`}`
	Output:

Question # 3: **[2 + 2 marks, CLO # 2]**

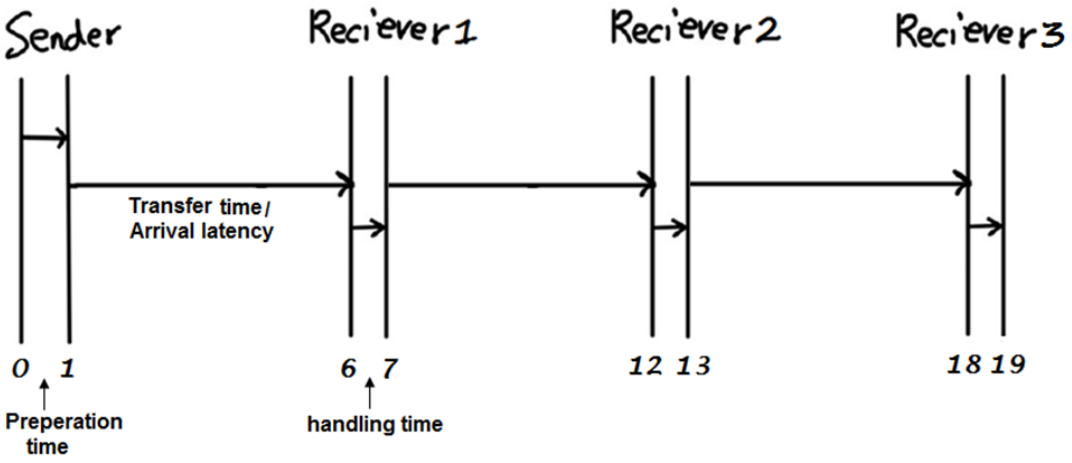
Can you describe the use of the following terms or clauses in OpenMP:

a. **lastprivate(var)**

b. **schedule(static, 4)**

Question # 4: **[2 + 2 + 2 + 2 marks, CLO # 3]**

Calculate the total communication cost required to transfer 400 mbits of data from Sender to Receiver3. Bandwidth of the link is 10 mbits/s.



(a) **Calculate total communication cost in case of store and forward routing.**

(b) **Calculate total communication cost in case of packet routing.**

(c) **Calculate total communication cost in case of cut through routing where t_w is equal to 0.01.**

(d) **Calculate total communication cost in case of simplified cost model where t_h is equal to 0 and t_w remains 0.01.**