**Technological Institute of the Philippines**

**938 Aurora Blvd. Cubao, Quezon City**

**College of Computer Studies**

**CS 007 - Parallel and Distributed Computing**

**Prelim Period**

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| Program / Section: BSCS / CS33S1 | Instructor: Ma’am Janice Capule |
| Define the following key terms. Please follow the sample below in defining each term. (20 points)   1. Parallel Algorithm   In computer science, a parallel algorithm is a procedure that breaks a problem down into smaller issues, solves each one at the same time on several processors, and then combines the answers to create the ultimate solution [1]. This method improves computing efficiency and speed, especially for complicated and large-scale issues [2].   1. Concurrent Processing   Concurrent processing boosts system performance and resource usage by enabling several jobs or processes to run concurrently within a computing system [3]. Through the use of techniques like multitasking, multithreading, and multiprocessing, it permits overlapping execution, which enhances responsiveness and performance while managing challenging computing tasks [4].   1. Multiprocessors   Computer systems having two or more central processing units (CPUs) that cooperate to share memory and carry out tasks more quickly are known as multiprocessors [5]. These systems are made to carry out several tasks at once, which improves computational dependability and speed [6].   1. Multicomputers   Multicomputers are systems made up of several separate computers that interact with one another and share information via a network [7]. In a multicomputer system, every computer functions as an independent node inside the broader network and has its own memory [8].   1. Distributed system   A distributed system is a group of separate computers connected by a network that cooperates to accomplish a shared objective and presents itself to the user as a single, cohesive system [9]. These systems increase efficiency, fault tolerance, and scalability by dividing up processing duties among several processors [10].   1. Time Complexity   A computing term known as time complexity quantifies how long an algorithm takes to execute based on the length of the input [11]. It aids in assessing the effectiveness of various algorithms by offering a theoretical estimation of the running time [12].   1. Data parallelism   When an action is carried out concurrently on several data components, usually utilizing several processors, it is referred to as data parallelism [13]. By splitting up big datasets into smaller pieces that are handled in parallel, this approach helps to speed up data processing operations [14].   1. Hybrid algorithm model   In order to capitalize on the advantages of each algorithmic technique and improve performance or accuracy, a hybrid algorithm model mixes them all [15]. This paradigm is frequently applied in situations involving intricate problem-solving when a single algorithm might not be adequate [16].   1. Point-to-Point Communication   The direct data transmission between two different sites, or nodes, in a network is referred to as point-to-point communication [17]. Precise and effective data transfer is ensured by this kind of communication, which is crucial for a variety of networking and parallel processing activities [18].   1. Hypercube Network   A multi-dimensional cube structure connected by several processors is known as a hypercube network [19]. A hypercube network's processors are connected to one another in a way that promotes fault tolerance and effective data routing [20].  **References:**  [1] *Parallel Algorithm - Introduction*. (n.d.). https://www.tutorialspoint.com/parallel\_algorithm/parallel\_algorithm\_introduction.htm  [2] GeeksforGeeks. (2023, July 31). *Parallel Algorithm Models in Parallel Computing*. GeeksforGeeks. https://www.geeksforgeeks.org/parallel-algorithm-models-in-parallel-computing/  [3] GeeksforGeeks. 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Pure Storage. https://www.purestorage.com/knowledge/what-is-data-parallelism.html  [14] *Data parallelism vs Task parallelism*. (n.d.). https://www.tutorialspoint.com/data-parallelism-vs-task-parallelism  [15] *Hybrid optimization algorithm for the definition of MLP neural network architectures and weights*. (n.d.). IEEE Conference Publication | IEEE Xplore. https://ieeexplore.ieee.org/document/1587741  [16] *What is Hybrid Algorithm | IGI Global*. (n.d.). https://www.igi-global.com/dictionary/particle-swarm-optimization-algorithm-its/13449#google\_vignette  [17] Serpanos, D., & Wolf, T. (2011). Interconnects and switching fabrics. In *Elsevier eBooks* (pp. 35–61). https://doi.org/10.1016/b978-0-12-374494-4.00004-9  [18] *Point to Point Communication Explained - melita.io*. (2023, June 13). melita.io. https://www.melita.io/help/general-information/iot-wiki/point-to-point-communication-explained/  [19] GeeksforGeeks. (2024c, May 21). *Hypercube Interconnection*. GeeksforGeeks. https://www.geeksforgeeks.org/hypercube-interconnection/  [20] *What is Hypercube Interconnection?* (n.d.). https://www.tutorialspoint.com/what-is-hypercube-interconnection  **Honor Pledge**  *“I affirm that I have not given or received any unauthorized help on this assignment and that all*  *work shall be my own.”*  <Bryan Dominick A. Tiamzon> | |