###

 Date: 06/01/2020 

Name and Surname : ………………………………………

Student Number : ………………………………………

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| **Q1(30p)** | **Q2(40p)** | **Q3(30p)** | **Bonus(15p)** | **Total** |
|  |  |  |  |  |

**Q1)** **(30p)**

1. What is MIMD ? Example a real-world application for MIMD architecture
2. What is SIMD ? Example a real-world application for SIMD architecture
3. What are distributed memory and shared memory architectures?
	1. Example a project scenario which is suited for distributed memory (if your number is odd)
	2. Example a project scenario which is suited for shared memory (if your number is even)

**Q2)** **(40p)**

|  |  |
| --- | --- |
|  | The left figure illustrates a direct network topology for a 9-computer architecture. Using message-driven structure for given architecturea. Develop a barrier algorithm (if your number is unique)b. Show that the barrier algorithm you have developed works in the same topology as 4x4 (if your number is unique)c. Develop an All-reduce algorithm (if your number is even)d. Show that the all-reduce algorithm you have developed works in the same topology as 4x4 (if your number is even) |

**Q4)** **(30p)**

1. Describe Foster’s methodology steps which are given below:
2. Partitioning.
3. Communication.
4. Agglomeration or aggregation.
5. Mapping.
6. Apply this methodology for a matrix multiplication algorithm,

i . For shared memory (if your number is even)

ii . For distributed memory (if your number is odd)

**Bonus)** **(15p)**

**Imagine** giving you $ 100,000 if you pass this lesson (it really won't happen :))

1. How would you develop a project with this money? What layers would your project consist of?

2. What kind of benefits did you learn in this lesson bring to your project design?