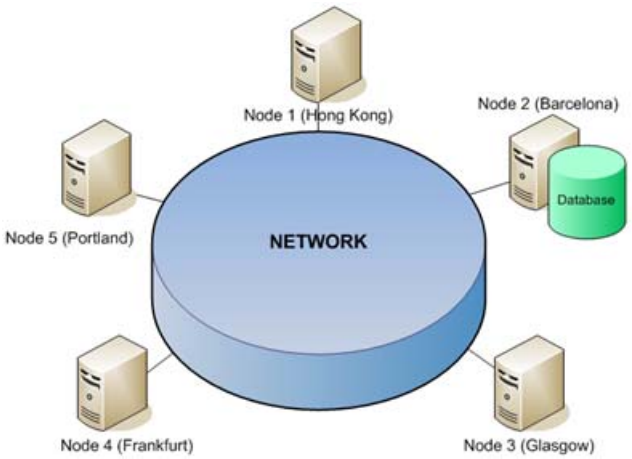
Family name:…… Given name:……

1) (20%) Which kind of database is this according to the distribution of data?



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2) (40%) Let's suppose that we have a cluster of 100 machines and a *MapReduce* job with 1.000.000 key-value pairs in the input that generate 100.000 pairs in the output. Assume that both *map* and *reduce* functions generate one pair in the output per pair in the input. Assuming the *reduce* function is transitive, is it worth to use the *combine* function? Briefly justify your answer.

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3) (40%) Let's suppose that our service receives 10 calls per hour, and it takes us 3 minutes to serve each of them. Assuming that we only have one server and using the model of queues M/M/1, find the expected number of jobs in the system (i.e., either in the queue, or being processed) at any time. Provide the details to obtain the number.

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