UCL Department of Computer Science
CS M038/GZ06: Mobile and Cloud Computing
2011–2012, Term 2
Kyle Jamieson and Brad Karp

One-pager: Dynamo (DeCandia et al., 2007)   **Due: Start of lecture, 26th January 2012**

Instructions: **in your own words,** *answer the following question as* **succinctly** *as possible (in 200–500 words, but shorter answers within this range are encouraged). Quoting figures or text from the assigned reading or from any other source is specifically prohibited.*

In Section 4.2, the authors discuss the use of "virtual nodes" in Dynamo. The authors claim that one advantage of using virtual nodes is that, "If a node becomes unavailable ..., the load handled by this node is evenly dispersed across the remaining available nodes." Consider the Chord DHT (as presented in the previous assigned reading) *without* virtual nodes and Dynamo *with* virtual nodes, where Dynamo uses "Strategy 1" to partition key space and place keys, as defined in Section 6.2 of the Dynamo paper.

Draw an example of a Chord ring with several nodes. When one node fails, explain which remaining nodes become responsible for the keys the failed node was previously responsible for. Now draw an example of a Dynamo ring with virtual nodes (using Strategy 1), and explain why when a node on the ring fails, the use of virtual nodes disperses the load formerly served by a failed node evenly across the remaining available nodes.