INSTITUTE OF TECHNOLOGY TRALEE

AUTUMN EXAMINATIONS AY 2014-2015

Advanced Database Programming

DBMS 81001
CRN 48065

External Examiner: Mr. Sean McHugh

Internal Examiner: Mr Peter Given

Duration: 2 Hours

Instructions to Candidates:

i) Answer any **three** questions.

ii) All questions carry equal marks. Submit all your rough-work, marks may be lost otherwise.

Question 1:

i) Explain how CouchDB achieves "eventual" consistency and discuss, using an example, why CouchDB keeps old values around. **(16 marks)**

ii) Describe how CouchDB uses HTTP/REST and JSON and explain the benefits of using these technologies. **(9 marks)**

iii) Discuss the strengths and weaknesses of CouchDB **(8 marks)**

Question 2:

i) Discuss the CAP theorem, show how it might be proved, and using an architecture diagram, discuss where MongoDB sits in relation to consistency. **(16 marks)**

ii) Discuss MongoDB's indexing mechanism, and discuss the performance gains in using a B-tree index (**9 marks)**

iii) Discuss the use of sharding in MongoDB **(8 marks)**

Question 3:

i) Appendix 1 shows a graph database. Explain how the following Gremlin queries arrive at a solution. **(13 marks)** `

a. `g.V.filter{it.name=='Vogue'}.outE.inV.name`

b. `jane.bothE('friends').bothV.name` (note ***jane*** points to the Vertex with name "Jane")

c. `jane.bothE('friends').bothV.except([jane]).loop(3){it.loops <= 2}.name` (Note ***jane*** points to the Vertex with name "Jane")

d.
```
bags_count = [:]
g.V.outE('likes').outV.name.groupCount( bags_count)
bags_count
```

ii) Using a diagram, discuss Neo4J High Availability. How does it manage consistency? **(12 marks)**

iii) Discuss the strengths and weaknesses of Neo4J **(8 marks)**

Question 4

i) Discuss, using examples, the different data structures used in Redis. **(16 marks)**

ii) "Redis is *eventually durable* by default". Discuss this and the other durability options in Redis. (9 marks)

iii) Discuss the strengths and weaknesses of Redis. (8 marks)