INSTITUTE OF TECHNOLOGY TRALEE

WINTER EXAMINATIONS AY 2015-2016

Advanced Database Programming

Module Code DMDS 81001

CRN 48064

External Examiner: Mr Sean McHugh

Internal Examiner: Mr. P 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) CouchDB does not support ad-hoc queries. Explain how queries are developed in CouchDB, giving an example to support your answer. **(13 marks)**

ii) You have to choose a database for a project. What advantages do you think CouchDB has when compared to Relational Databases? **(10 marks)**

iii) Write a note on the use of REST and JSON in couch. **(10 marks)**

Question 2:

i) Describe an installation architecture in MongoDB which includes both replication and sharding and discuss the benefits of replication and sharding . **(13 marks)**

ii) Compared to Relational Databases, MongoDB has a flexible data model. Discuss giving examples where appropriate. **(10 marks)**

iii) Compare and contrast CouchDB's and MongoDB's differing approaches to the CAP theorem. **(10 marks)**

Question 3:

i) Discuss, using examples, the Redis Sorted Set data structure and explain, using an example, how a union of sorted sets can be weighted in favour of one of the keys. What performance disadvantage do sorted sets have? **(10 marks)**

ii) Describe, using an example, how the Redis Publish Subscribe model works **(11 marks)**

iii) Describe how the Redis durability model works and list the advantages and disadvantages of this model. **(12 marks)**

Question 4:

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

a. g.V.filter{it.name=='Ardagh Castle Cheese'}.outE.inV.name

b. ***alice***.bothE('friends').bothV.name (Note ***alice*** is a reference to the Vertex named "Alice")

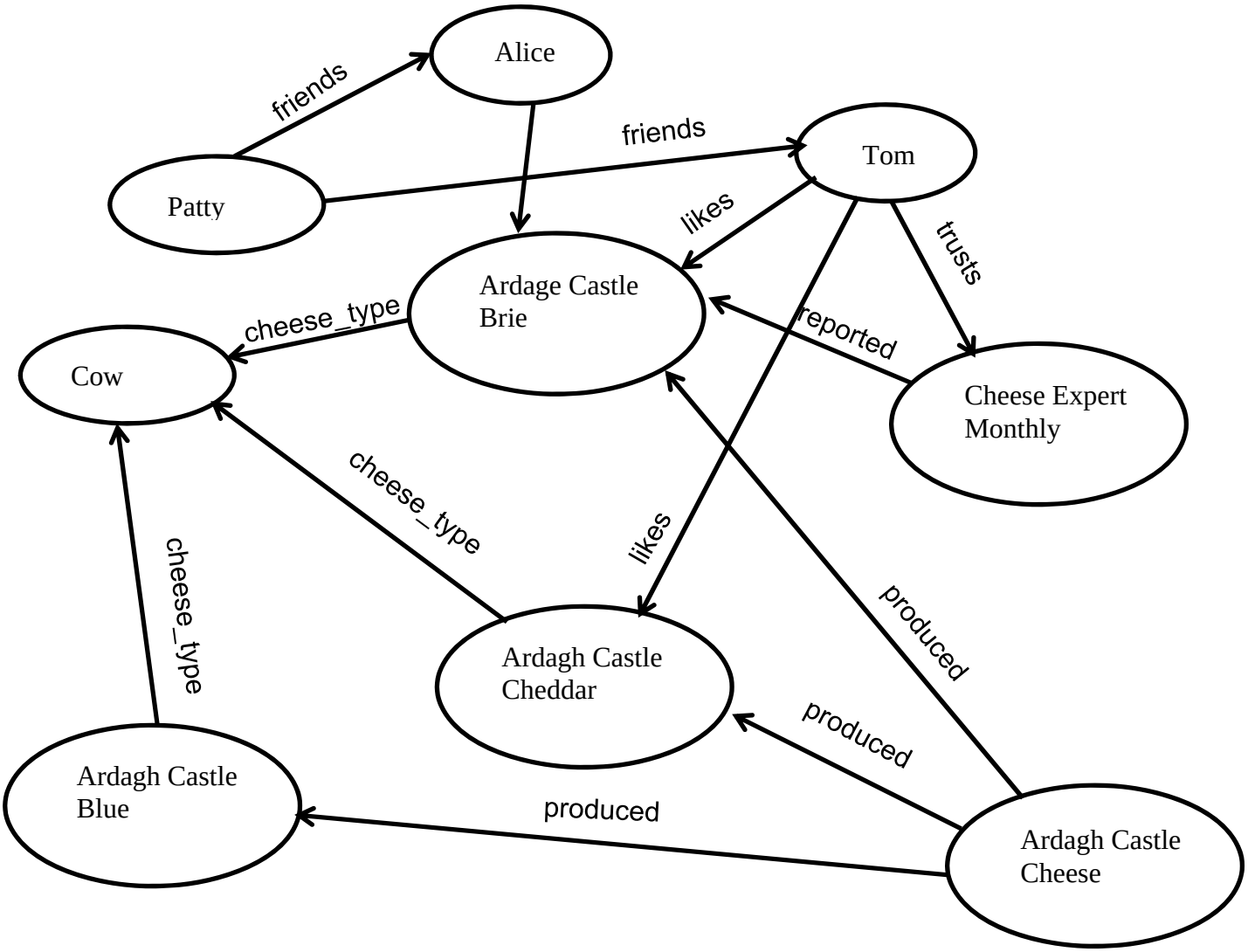
c. ***alice***.bothE('friends').bothV.except([alice]).loop(3){it.loops <= 2}.name (Note ***alice*** is a reference to the Vertex named "Alice")

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

ii) Discuss the architecture of the Riak ring and discuss the advantage this ring gives to Riak**.** **(12 marks)**

iii) Riak allows us to control reads and writes into the cluster by altering three values: N, W, and R. Describe these three parameters and discuss a scenario where the W parameter can be used. **(8 marks)**

Appendix 1:


Alice
friends
friends
Tom
Patty
likes
trusts
Ardage Castle
Brie
cheese_type
reported
Cow
Cheese Expert
Monthly
cheese_type
likes
cheese_type
produced
Ardagh Castle
Cheddar
produced
Ardagh Castle
Blue
produced
Ardagh Castle
Cheese