

GOLDSMITHS UNIVERSITY OF LONDON

Department of Computing

B. Sc. Examination 2014

IS52027A

Databases, Networks and the Web

Duration: 3 hours

Date and time:

This paper is in two parts, Part A and Part B. There are a total of three questions in each part. You should answer TWO questions from Part A and TWO questions from Part B. Your answers to Part A and Part B should be written in separate answer books.

Full marks will be awarded for complete answers to a total of four questions, two from Part A and two from Part B. Each question carries 25 marks. The marks for each part of a question are indicated at the end of the part in [.] brackets.

There are 100 marks available on this paper.

No calculators should be used.

THIS PAPER MUST NOT BE REMOVED FROM THE EXAMINATION ROOM

PART A

Question 1

The following database is composed of the tables Films, Actors and Cast which store information about films, actors, and which actors acting in which films, respectively. The attributes in each table are self explanatory. In particular a film can have one or more genres (see attribute Genres) which are included in a string of characters (as for instance 'musical comedy'). The attributes forming primary keys are underlined.

Films (FilmId, FilmTitle, Year, Language, Director, Budget, BoxOffice, UserRating, Genres)

Actors (ActorId, Name, DateOfBirth)

Cast (FilmId, ActorId)

You are required to write the following retrieval queries in SQL:

- a) What is the average budget of the films directed by Steven Spielberg? [2]
- b) What genres has the film entitled Argo? [2]
- c) How many actors acted in the film entitled Gravity? [3]
- d) What are the name and the year of production of the films with the largest budget overall? [3]
- e) List the details of the comedy films. [3]
- f) List the title of the films in the period 2000-2013 and the number of actors that acted in each film. [3]
- g) Which directors directed only films whose user rating is above the average user rating? [4]
- h) List the names of the films in which both Angelina Jolie and Brad Pitt acted. [5]

Question 2

Consider the database whose schema is provided below. This database is to store information about courses in which students register, and that are taught by tutors. In particular students have personal tutors which are among the tutors that perform teaching activity. Primary keys are underlined.

Students(StudentId, StudentName, Programme, Level, PersonalTutorName)

Registration(StudentId, CourseCode)

Courses(CourseCode, Title, Credits, TutorName)

Tutors(TutorName, Office, Phone, SurgeryHours)

You are required to:

- a) Create the four tables above in SQL by including all the primary keys, and all the necessary foreign keys. You should create the tables in the appropriate order such that the Database Management System does not issue any error. [15]

b) Add a constraint to the database that imposes a restriction for tutors not to teach more than 3 courses. **[4]**

c) Create a view that provides the tutor names and the titles of the courses they teach, and the number of students in each of these courses. Is this view updatable? **[6]**

Question 3

a) You are required to draw an ER diagram for the following specification. In particular, in the ER diagram, you should represent the entity types, the relationship types and the relevant constraints.

A company that specialises in IT training has 30 instructors and can handle up to 100 trainees per training session. The Company offers five advanced technology courses, each of which is taught by a teaching team of two or more instructors. Each instructor is assigned to a maximum of two teaching teams or may be assigned to do research. Each trainee undertakes one advanced technology course per training session. **[16]**

b) How many database tables result from converting to relational an ER diagram formed of two entity types linked through a many-to-many relationship type? Name the concept, in the relational model, that is used to express the relationship types from the ER model? **[3]**

c) Define what recursive, ternary and quaternary relationship types in the ER model are, and provide an example of each. The examples should be expressed in plain English, and the word(s) expressing the relationship should be underlined. Do not use more than two sentences for the definition and example, in each case. **[6]**