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**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER II  
SESSION 2012/2013**

**COURSE NAME : MULTIMEDIA DATABASE**  
**COURSE CODE : BIT 3193 / BIT 31903**  
**PROGRAMME : 3 BIT**  
**EXAMINATION DATE : JUNE 2013**  
**DURATION : 2 HOURS AND 30 MINUTES**  
**INSTRUCTION : ANSWER ALL QUESTIONS**

**THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES**

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**Q1** Given the following scenario:

A client registers at [www.songondemand.com](http://www.songondemand.com) to enable songs streaming. A registered client browses the list of songs from the song catalog. A song may be available according to the advertised fixed schedule or available at any time, subject to a small delay. The client can select the song based on textual or pictorial information of the singer, its category (e.g., pop, jazz, classic) and the title of the song. Clients can play the selected list of songs continuously or randomly. The song can be paused and resumed play as requested.

- (a) Identify **THREE (3)** types of multimedia data used for developing the required database. For each type, provide **ONE (1)** possible file extension format. (6 marks)
- (b) Determine **THREE (3)** requirements of the song on demand application. (6 marks)
- (c) Design the database schema for the application. (8 marks)
- (d) Describe **ONE (1)** table based on your answer in **Q1(c)**. (5 marks)

**Q2** Disk stripping is a process to store multimedia objects in multiple disks. It has become popular due to the availability of RAID architecture.

- (a) What does RAID stands for? (2 marks)
- (b) Justify **ONE (1)** reason why disk stripping is important due to the availability in storing multimedia objects. (3 marks)
- (c) Explain the simple data stripping technique for stripping multiple objects on multiple discs using an appropriate figure. (5 marks)

- (d) Provide **ONE (1)** advantage and **ONE (1)** disadvantage of the simple data stripping technique. (4 marks)
- (e) Assume the  $b_{\text{disk}}$  represents the maximum disk bandwidth and  $b_{\text{object}}$  is the maximum bandwidth required for an object. Calculate the maximum number of objects that can be retrieved concurrently from the disk if  $b_{\text{disk}} = 500$  and  $b_{\text{object}} = 5$ . (3 marks)
- (f) Assume that there are five concurrent retrievals of 5 objects that are similar in nature (the size and consumption rates are the same). Consider the memory requirement of each object at a time instant  $T_1$ : sub-object  $O_1$  requires  $B/6$ ,  $O_2$  requires  $B/3$  memory,  $O_3$  requires  $2B/3$  memory,  $O_4$  requires  $B$  memory and  $O_5$  requires  $3B$  memory. Calculate total memory requirement for concurrent retrieval of these objects. (4 marks)
- (g) A multimedia database server with a main memory of  $M$  needs to support  $N$  concurrent object retrievals. Assume  $N = 500$ , calculate the minimum number of  $M$  in bytes ( $B$ ) to support the concurrent object retrievals. (4 marks)

**Q3** (a) Given the following scenario:

You own a freelance multimedia and graphic production company. You are required to develop one new logo for your customer. For the copyright purpose, you need to determine whether a new logo you've commissioned might conflict with other logos that have already been copyrighted. For that purpose you need to use Registered\_Logos database which contains all copyrighted logos.

Write SQL/MM statements correspond to the given scenario using texture descriptions of the logo.

(3 marks)

- (b) Explain **TWO (2)** object types that comply with the first edition of the ISO/IEC 13249-5:2001 SQL MM Part5: StillImage standard.

(6 marks)

- (c) Given the following table definition:

```
CREATE TABLE PM.SI_MEDIA (
  PRODUCT_ID          NUMBER(6),
  PRODUCT_PHOTO      SI_StillImage,
  AVERAGE_COLOR     SI_AverageColor,
  CONSTRAINT id_pk   PRIMARY KEY (PRODUCT_ID));
```

- (i) Insert into PM.SI\_MEDIA table an object with PRODUCT\_ID = 5 and have average color of RED = 10, GREEN = 20 and BLUE = 100.  
(5 marks)

- (ii) Derive SI\_AverageColor object for image with PRODUCT\_ID = 3 using the SI\_FindAvgClr() function.  
(5 marks)

- (d) Explain **THREE (3)** methods for content based image retrieval.  
(6 marks)

- Q4** (a) Given the following query:

Give me all audios and videos of the football match between Manchester United versus Aston Villa sometime between the first 45 minutes where Van Persie scored a goal assisted by Wayne Rooney.

- (i) Give the type of the temporal specification and justify your answer.  
(4 marks)

- (ii) Draw an appropriate figure to show the spatial model for the output, assuming that the query will display the output which consists of two windows for videos and one window for text. Both videos should be positioned at the top of the screen, side by side with the same length and height, while the text will be positioned exactly below both videos.  
(6 marks)

- (b) Given the following scenario:

A multimedia product consists of 9 objects. Object w is a text with the duration of t1 to t7. Objects x1, x2, x3 and x4 are images where x1 meets x2, and x3 meets x4. x1 starts at t1 while x3 starts at t4. x1 and x2 have the same duration of 1, while x3 and x4 have the same duration of 1.5. Objects y1 and y2 are video where y1 is before y2. y1 duration is t3-t1 while y2 duration is t7-t4. Objects z1 and z2 are video where z2 is after z1. z1 duration is t3-t1 while z2 duration is t7-t4.

Develop the timeline model group by multimedia elements.

(10 marks)

- (c) List **FIVE (5)** sub-components in a multimedia database (MMDBMS) server.

(5 marks)

**-END OF QUESTION-**