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UNIVERSITI SAINS MALAYSIA

Second Semester Examination  
*[Peperiksaan Semester Kedua]*

Academic Session 2007/2008  
*[Sidang Akademik 2007/2008]*

April 2008

**CMT316 – Hypermedia & Multimedia Information Systems**  
***[Hypermedia & Sistem Maklumat Multimedia]***

Duration : 2 hours  
*[Masa : 2 jam]*

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**INSTRUCTIONS TO CANDIDATE:**  
***[ARAHAN KEPADA CALON:]***

- Please ensure that this examination paper contains **TWO** questions in **ELEVEN** printed pages before you begin the examination.

*[Sila pastikan bahawa kertas peperiksaan ini mengandungi **DUA** soalan di dalam **SEBELAS** muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]*

- Answer **ALL** questions.

*[Jawab **SEMUA** soalan.]*

- You may answer the questions either in English or in Bahasa Malaysia.

*[Anda dibenarkan menjawab soalan sama ada dalam Bahasa Inggeris atau Bahasa Malaysia.]*

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1. (a) Explain in detail the statement below.
  - (i) Associate link and spaghetti syndrome.
  - (ii) Two product models for hypermedia application and their respective examples.
  - (iii) Content of hypermedia project plan.
  - (iv) The development process for hypermedia web base application.

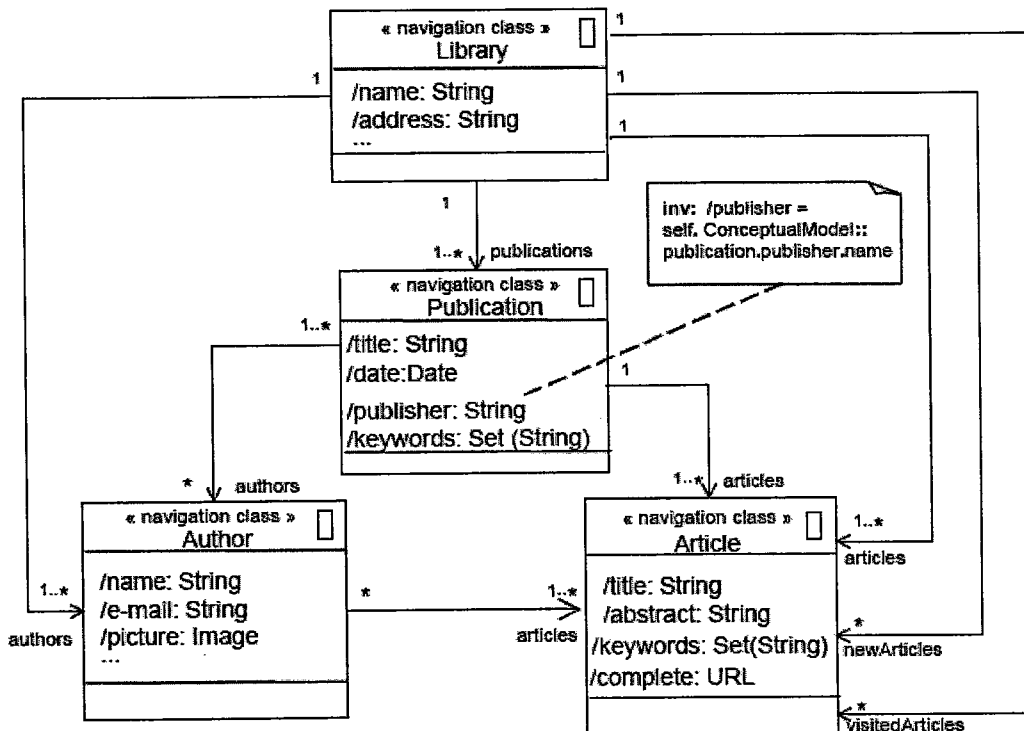
(20/100)

- (b) Draw a navigation structure model (first level) of the following problems.

- (i) A system to manage hotel bookings.
- (ii) A mail order clothes system.
- (iii) An airline booking system.

(30/100)

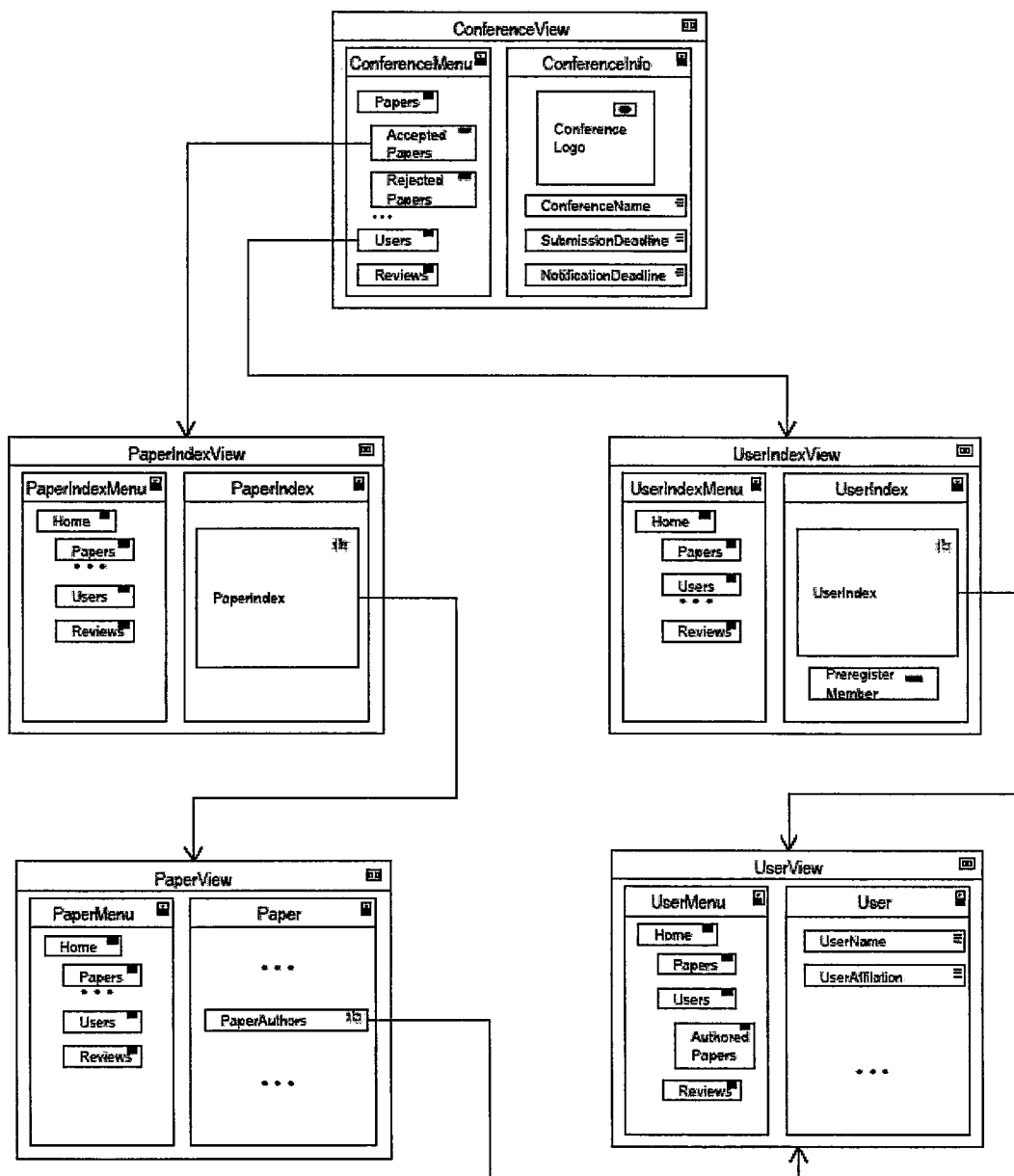
- (c) Given a diagram below of an online library system.



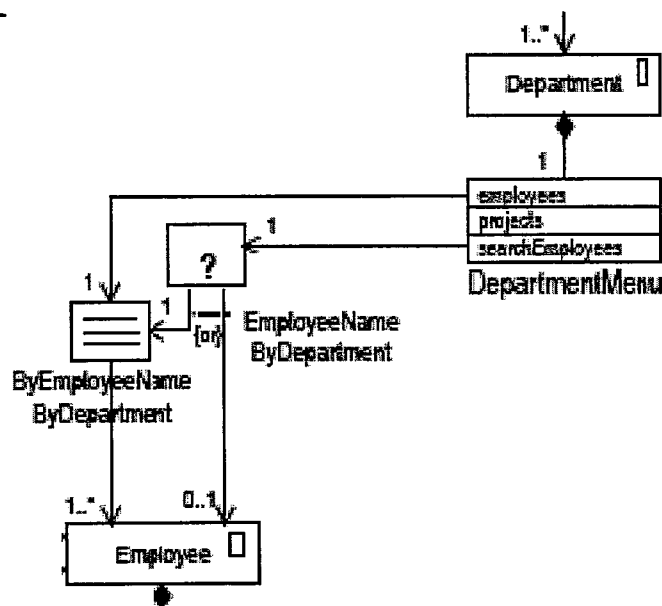
- (i) Transform the diagram above to navigation structure model by adding menu (second level).
- (ii) Based on the answer of Question 1(c)(i) above, sketches the storyboard scenario.

(20/100)

- (d) (i) Based on a diagram below, draw a presentation flow model.



(ii) Explain in detail the diagram below.



(30/100)

2. (a) Give a brief description of the following keywords.

- (i) Multimedia Information Retrieval (MIR) System.
- (ii) Keyword indexing vs. Content based indexing.
- (iii) Color lookup table.
- (iv) Test reference collection.

(20/100)

(b) A Multimedia Research Group at School of Computer Science has designed a new content-based algorithm for multimedia information retrieval. The algorithm retrieves all images in the database that similar to the image given by a user's query.

Given  $T_i = \{Image1, Image2, Image3, Image4, Image5, Image6, Image7\}$  is a relevant images to query  $I$ . Suppose that the new algorithm received query  $I$  and returns the following answer set  $A$ :

$$A = \left\{ \begin{array}{lll} 1. Image2 & 4. Image8 & 7. Image12 \\ 2. Image7 & 5. Image3 & 8. Image16 \\ 3. Image9 & 6. Image10 & 9. Image11 \end{array} \right\}$$

Answer the following question:

- (i) Calculate the precision and recall of answer set A.
- (ii) Calculate the average Precision at seen Relevant Documents of answer set A.
- (iii) Calculate the R-Precision, where  $R$  is at *Image3*.

(30/100)

- (c) (i) Based on the gray image A below with color depth of 2 bits. Plot a color histogram of the image.

11	00	01	10
10	11	00	10
11	11	01	11
01	10	10	11

Image A

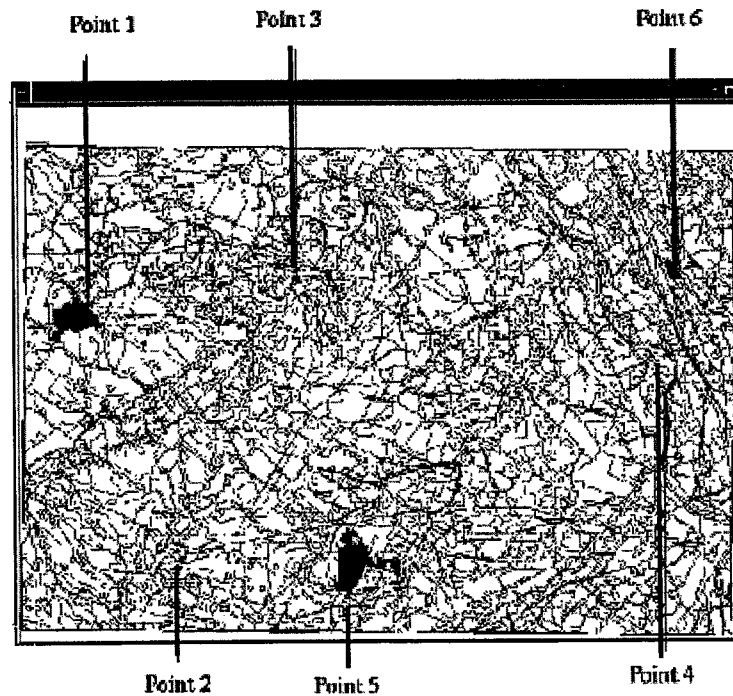
- (ii) Explain in detail how the similarity comparison is made between image A and image B (assume image B is a grey scale image with color depth of 2 bits).



Image B

(20/100)

- (d) (i) Spatial access methods (SAMs) can help us to cluster the object and find them in the image. Based on the map image below with six point (point 1, point 2, .. , point 6), group the objects in spatial data into the hierarchy of their location using R-tree indexed structure.



- (ii) Query interface is an important component for users to input query into the system to be processed. Sketch an example of query interface using the proximity and filtering approach.

(30/100)

1. (a) Definisikan dengan terperinci pernyataan di bawah.

- (i) Konsep 'associate' dan sindrom spageti.
- (ii) Dua model produk hipermedia berserta contoh aplikasinya.
- (iii) Kandungan perancangan projek hipermedia.
- (iv) Proses pembangunan aplikasi jaringan hipermedia.

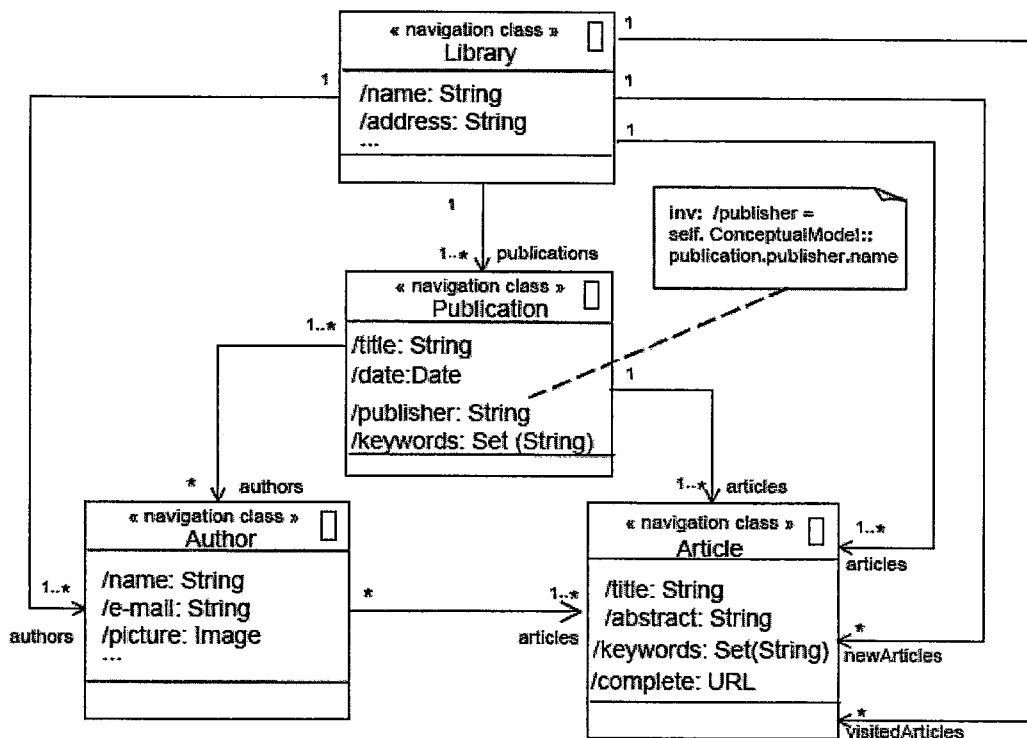
(20/100)

(b) Lukiskan model struktur navigasi (paras pertama) bagi masalah di bawah:

- (i) Sistem pengurusan penempahan hotel.
- (ii) Sistem tempahan pakaian secara pos.
- (iii) Sistem tempahan penerbangan.

(30/100)

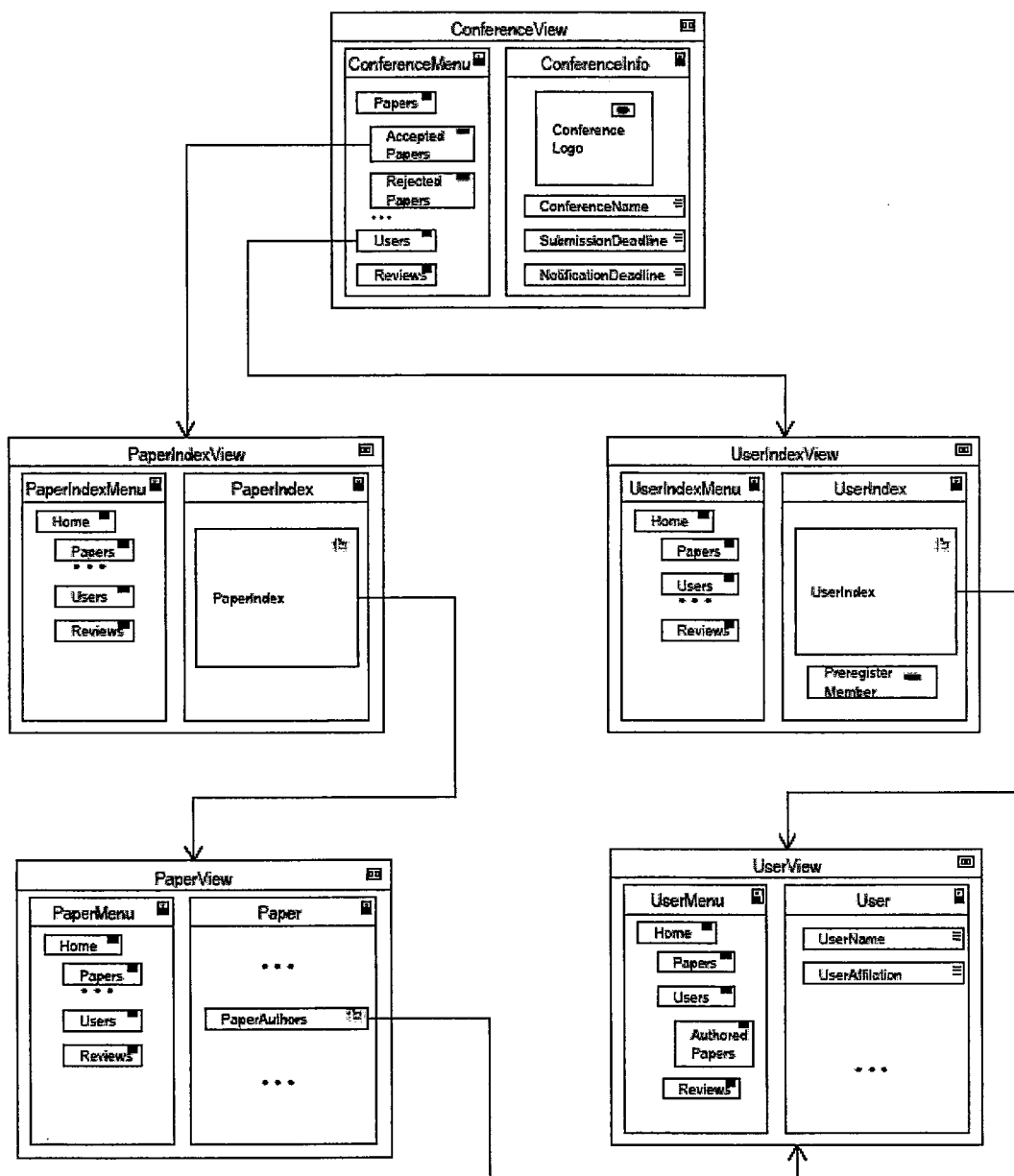
(c) Diberi gambar rajah di bawah untuk sistem perpustakaan secara talian.



- (i) Ubah suai gambar rajah di atas kepada model struktur navigasi dengan tambahan menu (paras kedua).
- (ii) Berdasarkan jawapan di Soalan 1(c)(i) di atas, lakarkan scenario papan cerita.

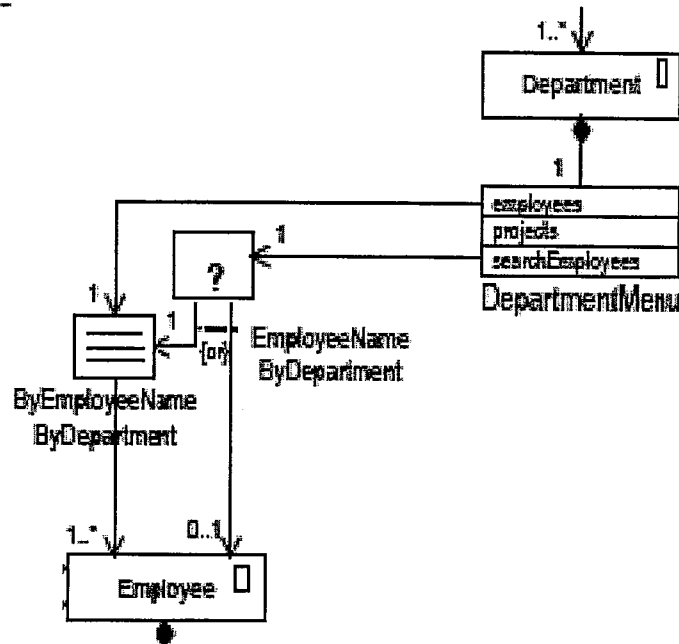
(20/100)

- (d) (i) Berdasarkan gambar rajah di bawah, lukiskan model aliran persembahan.





(ii) Terang dengan ringkas gambar rajah di bawah.



(30/100)

2. (a) Beri penjelasan ringkas untuk kata kunci-kata kunci berikut.

- (i) Sistem capaian maklumat multimedia.
- (ii) Pengindeksian kata kunci vs. pengindeksian berdasarkan isi.
- (iii) Jadual rujukan warna.
- (iv) Koleksi rujukan ujian.

(20/100)

(b) Kumpulan Penyelidikan Multimedia di Pusat Pengajian Sains Komputer telah mereka bentuk satu algoritma berdasarkan isian untuk capaian maklumat multimedia. Algoritma tersebut mencapai semua imej-imej di dalam pangkalan data yang serupa dengan imej yang diberi oleh pengguna.

Diberi  $T_i = \{Image1, Image2, Image3, Image4, Image5, Image6, Image7\}$  adalah imej-imej yang relevan terhadap pertanyaan  $I$ . Anggapkan algoritma baru menerima pertanyaan  $I$  dan memulangkan set jawapan  $A$  seperti berikut:

$$A = \left\{ \begin{array}{lll} 1. Image2 & 4. Image8 & 7. Image12 \\ 2. Image7 & 5. Image3 & 8. Image16 \\ 3. Image9 & 6. Image10 & 9. Image11 \end{array} \right\}$$

Sila jawab soalan di bawah:

- (i) Kirakan Ketepatan dan Panggilan Semula untuk set jawapan A.
- (ii) Kirakan Purata Ketepatan pada Dokumen Relevan untuk set jawapan A.
- (iii) Kirakan nilai Ketepatan-R di mana  $R$  pada  $d15$ .

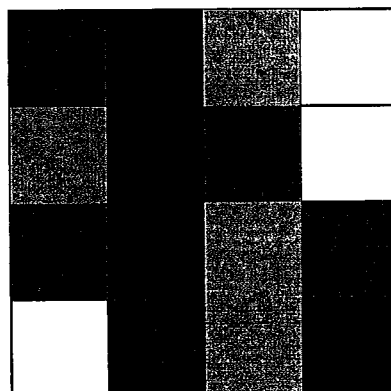
(30/200)

- (c) (i) Diberikan imej berserta histogram warna seperti gambar rajah di bawah. Terangkan secara terperinci bagaimana histogram warna dihasilkan.

11	00	01	10
10	11	00	10
11	11	01	11
01	10	10	11

Imej A

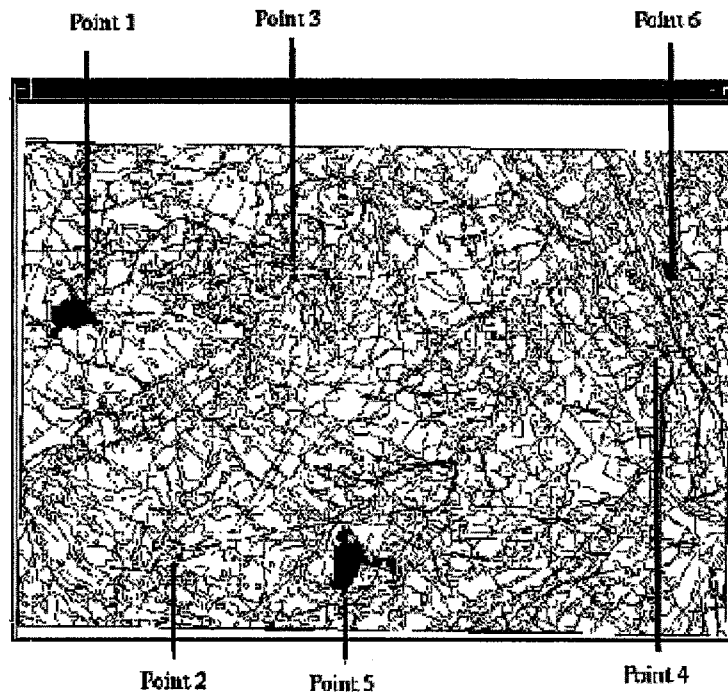
- (ii) Terangkan dengan terperinci bagaimana proses perbandingan kesamaan dibuat di antara imej A di atas dan imej B di bawah (anggap imej B adalah imej skala kelabu dengan 2 bit kedalaman warna).



Imej B

(20/100)

- (d) (i) Cara capaian “spatial” boleh membantu kita untuk mengklusterkan objek dan mencari objek-objek tersebut. Berdasarkan imej di bawah dengan enam titik (titik 1, titik 2, .. , titik 6), kumpulkan objek-objek tersebut di dalam hirarki data spatial terhadap lokasi-lokasi objek tersebut menggunakan pokok-R indek struktur.



- (ii) Antara muka adalah komponen terpenting untuk pengguna memasukkan input ke dalam sistem untuk diproses. Lakarkan contoh antara muka dengan menggunakan kaedah “proximity” dan “filtering”.

(30/100)