INFS4205/7205 – Spatial and Multimedia Database
Semester 1, 2012

Assignment 2 [*Total: 25 marks*]

Due dates: see below

While many commercial DBMSs such as Oracle have been extended to support spatial/multimedia data management and query processing, spatial and multimedia databases are still an active research topic. To meet the diverse requirements, this assignment consists of two components. One is research-oriented and the other is practice-oriented. You are asked to choose **one** component to work on in this assignment. This is a group assignment of up to 5 people with your classmates. Report the grouping and the component to work by 5pm 1 May (Tuesday) to the Lecturer (dengke@itee.uq.edu.au). **Each group is welcome to discuss with the lecturer when doing this assignment.**

Assessment: One score will be given to each group (all members of the same group will receive the same marks). The distribution of total 25 marks is indicated in the assignment description.

• **Research-oriented Component**

Several key issues to support efficient and effective spatial/multimedia data management and query processing remain to be open research challenges, and there are new applications emerging continuously. Some examples include (1) high dimensional indexing; (2) kNN and skyline query processing in road networks; (3) new skyline query processing strategies dealing with data uncertainty or the applications with too many skyline points; (4) feedback–based image retrieval; (5) integration of multimedia retrieval and web search; and (6) detection of near-duplicate image and video copies. Research results on these topics can be found from many recent papers published in leading conferences, such as SIGMOD, VLDB, ICDE, ACM Multimedia and WWW conferences.
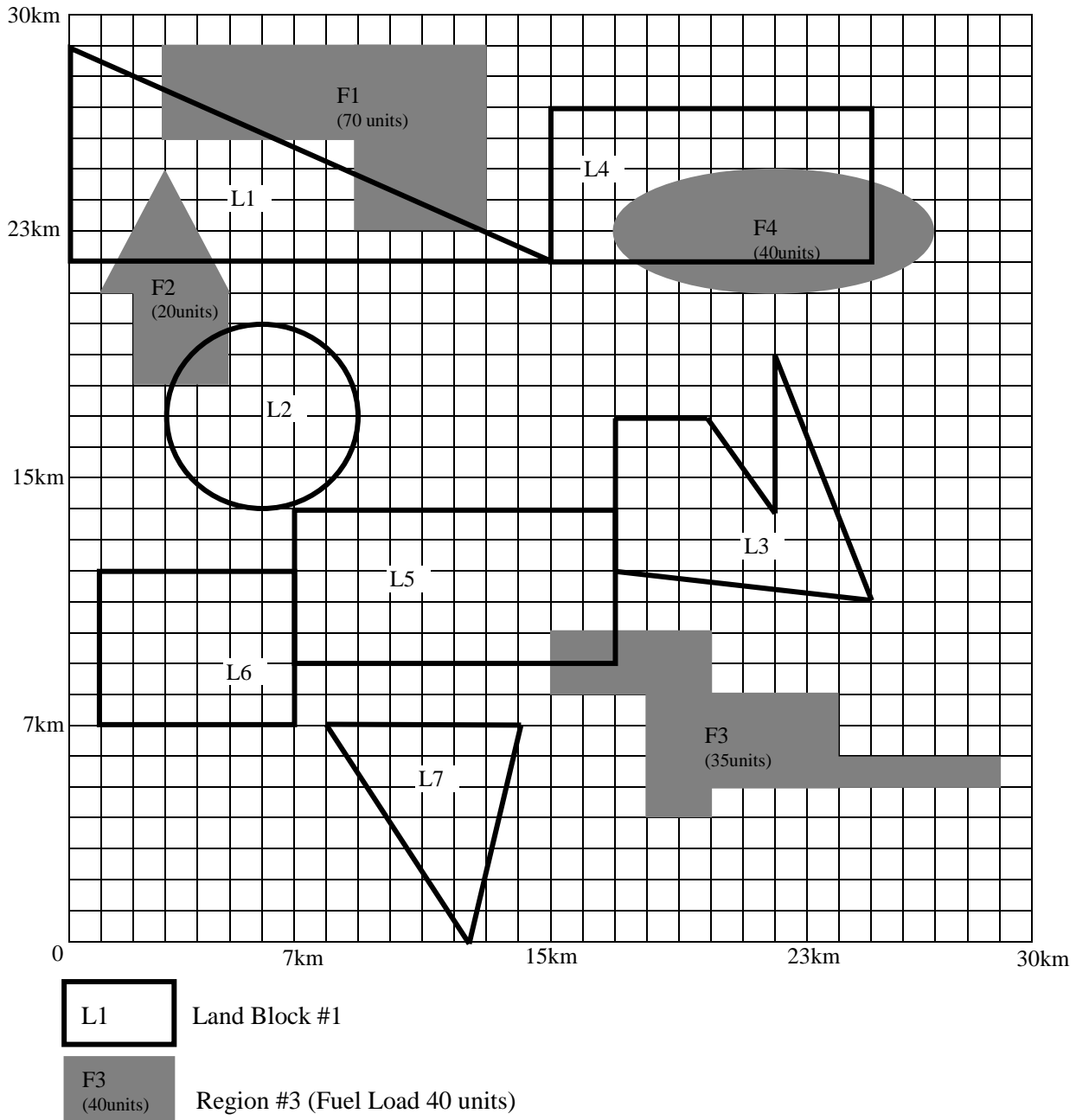
Choose one or a few research papers published in the last five years (i.e., year 2007 and after) on a topic related to spatial or multimedia databases in one of the leading conferences mentioned above. The tasks you need to perform in this assignment include the followings.

Tasks:
(1) Select a topic and at least one research **paper** and report your selection and a brief justification of your selection to the Lecturer no later than 5pm 8 May (Friday). [*Proceedings of these conferences can be found online (using Google), and full text of the papers can often be downloaded freely. Should a password is needed, you can (1) find an alternatively source which does not require password; (2) access from UQ Library through UQ's site licence; and (3) talk to your Lecturer immediately after failing other options*.]
(2) Prepare a **report** of up to 4 pages, to explain the problem, application scenarios for the problem, related work prior to the paper, the new solutions proposed in the paper(s), evaluation of the proposed solutions and essential references, to be submitted to the Lecturer by 5pm 23 May (Wednesday). (10 marks)
(3) Prepare a set of PowerPoint **slides** of no more than 20 slides, and email your slides to the Lecturer by 5pm 24 May (Thursday). (5 marks)

- **Practice-oriented Component**

30km

F1
(70 units)

L4

L1

F4
(40units)

23km

F2
(20units)

L2

L3

15km

L5

L6

7km

F3
(35units)

L7

0   7km   15km   23km   30km

L1 ─ Land Block #1

F3
(40units) ─ Region #3 (Fuel Load 40 units)

The above diagram shows the land blocks and the regions of fuel load introduced in assignment one. The tasks are:
1) You are required to create two tables using ORACLE SPATIAL. One table is called LandBlock to store land blocks and the other table is called FuelLoadRegion to store fuel

load regions. In these tables, one attribute must be SDO_GEOMETRY data type to describe the spatial objects. (8marks)

2) Create spatial index on attribute SDO_GEOMETRY in each table using ORACLE SPATIAL (2 marks)

3) Answer the following requests using ORACLE SPATIAL queries (5marks)
   a. Retrieve all regions in LandBlock and FuelLoadRegion
   b. Find the area size for each region in LandBlock and FuelLoadRegion
   c. Find all regions of fuel load higher than 30 units.
   d. Find all land blocks which have some region containing fuel load of 30 units or higher.
   e. Find all land blocks within 11km of the area containing fuel load over 70 units.

4) Prepare a document to introduce the attributes of the tables, and the SQL scripts used for creating tables, inserting, indexing and querying (for answering above requests) 5pm 23 May (Wednesday). (5 marks).

5) Make a demonstration to visualize the query results (i.e. query a,c,d,e in task 3) using ORACLE MapViewer (3-6pm 25 May Friday), each presentation will be 10 minutes maximum plus 3 minutes for Q&A. (5 marks).

To be successful in this component,

1. Download and install Oracle 10g/11g Express Edition on your laptop
   http://www.oracle.com/technetwork/database/expressedition/downloads/102xewinsoft090667.html

2. Install Sqlplus on your laptop, and understand how to use Sqlplus to access Oracle.
(I found a video in Youtube "Oracle DBA Justin - How to execute SQL and Sqlplus commands from an external script" is a good resource to learn the basic Sqlplus. Also there are many Sqlplus tutorials available online)

3. Read "Oracle Spatial User's Guide and Reference" to learn how to use ORACLE SPATIAL
   http://docs.oracle.com/cd/B19306_01/appdev.102/b14255.pdf

4. Download and run ORACLE MapViewer QuickStart Kit
   http://www.oracle.com/technetwork/middleware/mapviewer/downloads/index-100641.html
   Create data source (i.e connecting to database in Oracle) and issue queries in **DEMO – JView** to visualize the spatial query results.