King Saud University

College of Computer and Information Sciences
Information Systems Department

Course Code/Title: IS466 (Decision Support System)
TOTAL MARKS: 20
Exam: **Midterm I** **Semester / Year**: Fall 2016-17
Exam date: October 27, 2016
Time Allowed: 1.0 Hours

Student ID: _____ Name: _____

EXAM POLICY&ETHICS:

- Read the paper carefully, should have any query be asked within first 15 minutes.
- Closed-book exam, no course-related papers are allowed.
- During examination, any form of communications with peer students is strictly forbidden.
- Students will not be allowed to attend the exam if arrived 20 minutes after the exam starts.
- Mobile phones should strictly be off.

QUESTIONS/ Questions TOTAL STUDENT OUTCOMES: This exam covers the following student outcomes (SOs):

Outcomes Covered	Questions	TOTAL
	Question 1 Part A	**__ x0.5= /6**
	Question 2 Part A	**__ x0.5= /5**
	Question 1	**/3**
	Question 2	**/3**
	Question 3	**/3**
	Total	**/20**

FEEDBACK SUMMARY:

…….....
……
…….....

Part A: (11 marks) consist of two questions.

Question No. 1 (6 marks): Select the appropriate answer from multiple choice questions.

1. Which of the following activities permeates nearly all managerial activity?
   (i) planning
   (ii) **decision-making**
   (iii) directing
   (iv) controlling

2. The deployment of large data warehouses with terabytes of data been crucial to the growth of decision support. All the following explain why EXCEPT
   (i) data warehouses have enabled the affordable collection of data for analytics.
   (ii) data warehouses have assisted the collection of data for data mining.
   (iii) **data warehouses have enabled the collection of decision makers in one place.**
   (iv) data warehouses have assisted the collection of data from multiple sources.

3. All of the following may be viewed as decision support systems EXCEPT
   (i) an expert system to diagnose a medical condition.
   (ii) a system that helps to manage the organization's supply chain management.
   (iii) a knowledge management system to guide decision makers.
   (iv) **a retail sales system that processes customer sales transactions**.

4. Operational or transaction databases are product oriented, handling transactions that update the database. In contrast, data warehouses are:
   (i) **subject-oriented and nonvolatile.**
   (ii) subject-oriented and volatile.
   (iii) product-oriented and nonvolatile.
   (iv) product-oriented and volatile.

5. In which stage of extraction, transformation, and load (ETL) into a data warehouse are irregularities detected and corrected?
   (i) load
   (ii) transformation
   (iii) **cleaning**
   (iv) extraction

6. When representing data in a data warehouse, using several dimension tables that are each connected only to a fact table means you are using which warehouse structure?
   (i) relational schema
   (ii) dimensional schema
   (iii) **star schema**
   (iv) snowflake schema

7. A DSS application can employ a data management subsystem, a model management subsystem, a user interface subsystem, and a(n) _____.
   (i) Internet, intranet, extranet
   (ii) **knowledge-based subsystem**
   (iii) Other computer based systems
   (iv) None of above

8. When querying a dimensional database, a user went from summarized data to its underlying details. The function that served this purpose is
   (i) slice
   (ii) roll-up
   (iii) **drill down**
   (iv) dice

9. The decider communicates with and commands the DSS through the _____ subsystem.
   (i) **user interface**
   (ii) OLAP/OLAM
   (iii) MDDM
   (iv) none of above

10. Which of the following online analytical processing (OLAP) technologies does NOT require the precomputation and storage of information?
   (i) MOLAP
   (ii) SQL
   (iii) HOLAP
   (iv) **ROLAP**

11. A search for alternatives occurs in which phase of the decision making/action model?
    (i) the intelligence phase
    (ii) the implementation phase
    (iii)the choice phase
    (iv)**the design phase**

12. The knowledge-based management subsystem can be interconnected with the organization's knowledge repository, which is sometimes called the _____.
    (i) **organizational knowledge base**
    (ii) data management
    (iii)knowledge-based subsystem
    (iv)all of above

Question No. 2 (5 marks): Select the correct answer as True/False.

1. ❑ In a four-step process for decision making, managers construct a model of the problem before they evaluate potential solutions. True
2. ❑ Data warehouses are subsets of data marts. False
3. ❑ Visualization differs from traditional charts and graphs in complexity of data sets and use of multiple dimensions and measures. True
4. ❑ One way an operational data store differs from a data warehouse is the summarize of their data. True
5. ❑ A well-designed data warehouse means that user requirements do not have to change as business needs change. False
6. ❑ **Metadata** describe the structure and meaning of the data, contributing to their effective use. True
7. ❑ **Dimensional** modeling is a retrieval-based system that supports high-volume query access. True
8. ❑ Knowledge-based management subsystems does not provide intelligence to augment the decision maker's own intelligence. False
9. ❑ Group communication and **collaboration** involves decision makers who are likely to be in different locations. TRUE
10. ❑ Fact constellation data modelling involves dimensional hierarchy in which each level represent one table. False

Part B: (9 marks) consist of three questions, each of 3 marks.

1. Describe three characteristics of data warehousing.

   Subject oriented. Data are organized by detailed subject, such as sales, products, or customers, containing only information relevant for decision support.

   • **Integrated.** Integration is closely related to subject orientation. Data warehouses must place data from different sources into a consistent format. To do so, they must deal with naming conflicts and discrepancies among units of measure. A data warehouse is presumed to be totally integrated.

   • **Time variant** (time series). A warehouse maintains historical data. The data do not necessarily provide current status (except in real-time systems). They detect trends, deviations, and long-term relationships for forecasting and comparisons, leading to decision making. Every data warehouse has a temporal quality. Time is the one important dimension that all data warehouses must support. Data for analysis from multiple sources contains multiple time points (e.g., daily, weekly, monthly views).

   • **Nonvolatile.** After data are entered into a data warehouse, users cannot change or update the data. Obsolete data are discarded, and changes are recorded as new data.

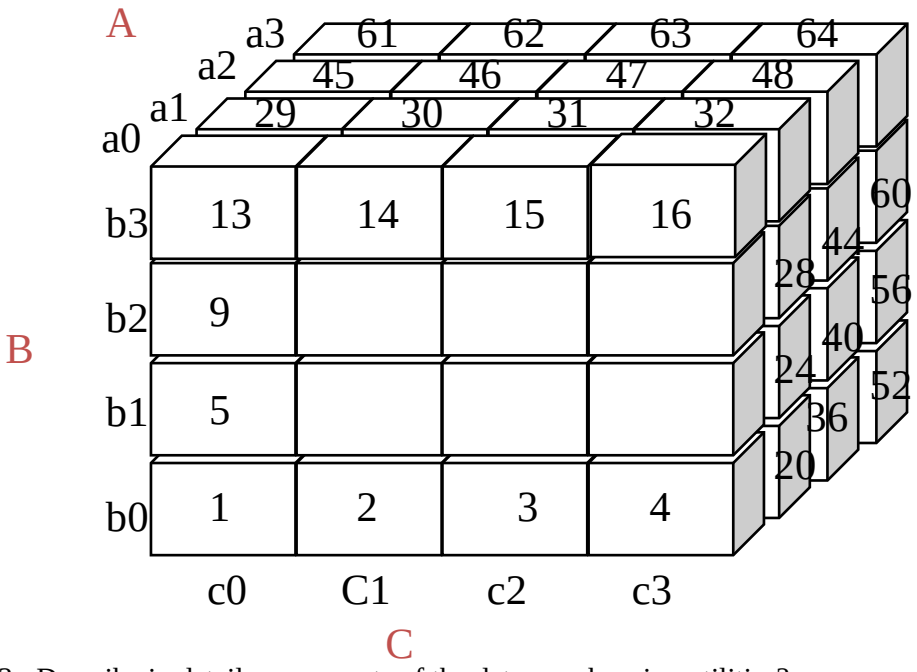
2. a. (1pts) What is multi-way array aggregation for cube computation?

Compute aggregates in "multiway" by visiting cube cells in the order (1) which minimizes the # of times to visit each cell, and (2) reduces memory access and storage cost.

b. (2pts) Let us consider the following data cube where size(A) = 4000, size(B) = 400 and size(C) = 40. The size of each chunk of A, B and C are respectively 1000, 100 and 10. What is the <u>best order</u> among 1,4,2,3,5,8,6,7,… and 1,17,33,49,5,21,37,35 to scan chunks in cuboids computation?

In order to avoid bringing 3-D chunk into memory more than once the minimum memory requirement for holding 2-D plans according to chunk ordering of 1 to 64 is
40*400 (for BC)

+ 40*1000 (for one row of AC)
+ 100 * 1000 (for one chunk of AB) = 156 000
If the chunk ordering is 1,17,33,49,5,21,37,53,…the memory requirement is
400*4000 (for AB)
+ 10*4000 (for one row of AC)
+ 10*100 (for one chunk of BC) = 1 641 000
The best traversing is from 1 to 64



3. Describe in detail components of the data warehousing utilities?

Data extraction: get data from sources

Data cleaning: detect errors in the data and rectify them when possible

Data transformation: convert data from host format to warehouse format

Load: sort, summarize, consolidate, compute views, check integrity, and build indices and partitions

Refresh: propagate the updates from the data sources to the warehouse