UiT
THE ARCTIC
UNIVERSITY
OF NORWAY

EXAMINATION QUESTION PAPER

Exam in:	Inf-3701
Date:	Thursday 16th of May 2019
Time:	09:00 – 13:00
Place:	Adm.bygget, Aud.max
Approved aids:	None
Type of sheets (sqares/lines):	
Number of pages incl. cover page:	**2**
Contact person during the exam:	**Randi Karlsen**
Phone:	**99297389**

NB! It is not allowed to submit rough paper along with the answer sheets. If you do submit rough paper it will not be evaluated.

Task 1: (35%)

a) Describe the difference between *top-down* and *bottom-up* design of distributed databases, and how the characteristics of *distribution*, *heterogeneity* and *autonomy* apply to each of these two types of databases.

b) Assume a homogeneous distributed database.
Describe *how* and *why fragmentation* is performed. Describe both *horizontal* and *vertical* fragmentation.

c) Describe the concepts *interoperability* and *semantic interoperability,* and some of the *challenges* related to semantic interoperability
Explain what an *ontology* is and how it can *support* semantic interoperability.

Task 2: (35%)

a) Describe *what* Online Analytical Processing (OLAP) is and *why* it is needed. *Compare* characteristics of OLAP and OLTP (Online Transaction Processing).

b) Describe what a *data warehouse* is.
Describe *architecture* and *data model* of a warehouse. Also explain how the warehouse is *populated* with data.

c) Describe the *retrieval process* in an information retrieval system.
Explain what an *inverted index* is and what it is used for.

Task 3: (30%)

a) Describe a *column-based* data model and a use-case where *column database* can be useful.

b) Describe the transactional *ACID properties* and the *BASE properties*. Compare the two sets of properties and explain why BASE properties are used in some systems.

c) Describe the in-memory database and how they are different from traditional RDBMS. Describe the in-memory SAP HANA architecture.