Research in Groups

IS5102 – Database Management Systems

Due date: Tuesday 24th November (week 11), 21:00
34.0% of continuous assessment for the module
(MMS is the definitive source for deadline and credit details)

Summary

This is a **group assignment**.

You will be assigned to groups and your group will be assigned a topic. Your task is to research the topic as a group, and present your findings in a report.

You are expected to have read and understood all the information in this specification at least ten days before the deadline. You must contact the lecturer regarding any queries well in advance of the deadline.

Arrange to meet with your group members early and often. A key part of working in information systems is to harmonise different perspectives by team work, and this practical will help build your skills in this area.

Purpose

The aims of this practical are to get experience in:

- database related issues, related to the module but perhaps not covered extensively in lectures;

- researching a topic to some detail;

- working as a small group;

- delivering a presentation of research findings at appropriate levels of detail.

Group membership

This assignment is to be done in groups. If you have any serious reasons as to why you should NOT be in the same group as someone else please contact the Student Welfare Officers by email at `student-welfare-cs@st-andrews.ac.uk` as soon as possible, and in any event before Friday 13 November, by which time the groups are expected to start working together. If you are unable or unwilling to raise a concern before that date, you can still contact the Student Welfare Officer(s) within one week of the groups having been announced. Note that in this case it may be much harder to make group changes.

Project allocation

Topic 1 - Groups A, K :

The cloud has brought new opportunities but also new challenges to database system design. What new opportunities arise in this context? What are the issues faced by an organisation trying to move databases to the cloud, and how can they be overcome?

Topic 2 - Groups B, J, M :

Databases accumulate valuable information, which can be retrieved and processed by various tools for different aspects of data analytics: data mining, visualisation, reproducibility, high-throughput computing, etc. Identify and compare some popular and useful tools and systems for key aspects of data analytics, including their strengths and benefits.

Topic 3 - Groups C, I, L :

Groups C : Compare SQLite with several other common SQL implementations. Provide a brief comparison of their functionality, and summarise your findings in a list of factors to consider when choosing a particular SQL implementation for a project.

Topic 4 - Groups D, F, H :

Compare several document-oriented NoSQL databases, e.g. MongoDB, ArangoDB, CouchDB, etc. Provide a brief comparison of their functionality. Discuss situations when such database may be preferable over a relational one, and summarise your findings in a list of factors to consider when choosing a particular document-oriented NoSQL database.

Topic 5 - Groups E, G :

The advent of Big Data lead to many new terms starting with "Data" and describing dealing with information at various stages; to name just a few, there are "data cleansing", "data fusion", "data governance", "data mining", "data modelling", "data scraping", "data wrangling", etc. What do these processes involve, which tools exist to support them, and how can they be effectively used by organisations large and small?

Submission

Submit a report (described more below), which should be in PDF format. The report should have two sections, one being the group research section which will be common for all members of a particular group, and one being the individual report, which would be individual, (that is, different for every group member). Each of the sections may include further subsections, as appropriate.

Group Report

Please present the findings of your group research as a research report. This should go into deeper details on the material you discovered, with the context, background and findings. As a general guide, you may want to consider using a structure addressing the following points:

- Context; the problem being solved

- Background on alternative approaches

- Current open questions; or key issues to consider

- Recommendations and/or conclusions

Feel free to illustrate your arguments with examples, tables, diagrams, or plots. You should assume that the report is intended for the audience consisting of all students currently taking IS5102 module.

Again, you are expected to work on this task as a group, and all members of the group should submit the same material for this section in their report. It is expected that each member of the group stands behind the report, and is capable of answering high or medium level questions on any part of the report. There is no word limit imposed for the report. As an advisory guide only, it is suggested to aim for around 6000 words for this section.

Individual Report

Each student must also submit an individual report describing the (sub-)topic they researched; how they went about carrying out this research; the resources that were used and a reflective summary of the experience of working in their group. This part is to be worked on individually, reflecting your own personal experiences during this assignment.

Again, there is no word limit imposed. As an advisory guide only, it is suggested to aim for around 1500 words for this section.

Marking

The marking of this assignment will be based on the quality of research done; on the quality of presenting your research in the report; and on its suitability for the intended audience, assumed to comprise of students taking IS5102 module.

It is expected that all students in the same group will receive the same grade for their presentation. Individual grades will be determined based on the individual report. If there are unresolved problems with teamwork within a group, these should be identified in the individual reports. After careful consideration, individual grades may be further amended to take the problems into account. Of course, it is in everybody's interests to flag up issues or problems early with the lecturer.

The marks for this assignment are divided as follows:

- 75% for the group report;

- 25% for the individual report.

Policies and Guidelines

Marking

See also the standard mark descriptors in the School Student Handbook, which apply as usual:
`https://info.cs.st-andrews.ac.uk/student-handbook/learning-teaching/feedback.html#Mark_Descriptors`

Lateness

The standard penalty for late submission applies (Scheme B: 1 mark per 8 hour period, or part thereof):
`https://info.cs.st-andrews.ac.uk/student-handbook/learning-teaching/assessment.html#Lateness_Penalties`

Good Academic Practice

The University policy on Good Academic Practice applies:
`https://www.st-andrews.ac.uk/students/rules/academicpractice/`