

Workshop 21-22
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Exam via Canvas Quiz

- This examination is worth 50% of your final mark
- Answer 5 out of any 7 questions.
 - Please note that only the first 5 questions will be marked.
- Each question carries 10 marks.
- The number in square brackets after each sub-question represents the marks allocated to it.
 - Be mindful of this!!!
- You are free to use the course materials and your laptop/PC in this exam but note that there is a 2-hour time window for the exam hence you should be mindful of the time spent using such materials.
- Bulleted answers are acceptable.
- The Quiz clock indicates the time left for the exam. This clock will continue to count down even if technical issues arise, e.g., you lose Internet connectivity.
- You may revisit/edit your exam answers throughout.

Exam via Canvas Quiz...ctd

- 17th June 3pm
- 18th June 7am (Alternative Exam Arrangements)
- Exam auto-saves the answers
- Will stop you editing once timer gets to 0:00
- Exam will not require equations or images to be uploaded
- Text based answers only

Example Questions

Question 1:

- A) Discuss the major trends in research and research computing over the last 20 years that have led to the emergence of Cloud computing. [6]
- B) How has the evolution of service-oriented architectures supported Cloud computing? [2]
- C) A HTTP method can be *idempotent*.
 - What is meant by this italicized term? [1]
 - Give an example of an idempotent ReST method. [1]

A) *There have been many trends over the last 20 years - ...*

B) ...

C)...

Example Questions

Question 2:

- A) Define Amdahl's law and discuss the challenges of its practical implementation. [2]
- B) The actual performance as experienced by users of shared-access HPC facilities such as the Edward cluster at the University of Melbourne can vary – where here performance can be considered as the throughput of jobs, i.e. from the time of first job submission to the time of last job completion.
 - Explain why this can happen. [2]
 - Explain how the Edward cluster has been set up to minimize this. [2]
 - Explain what users can do to optimize their throughput (use) of the Edward cluster. [2]
 - Describe some of the challenges with application benchmarking on HPC facilities. [2]

A) ...

B) ...

Example Questions

Question 3:

- A) Explain the consequences of Brewer's CAP theorem on distributed databases. [4]
- B) Describe which aspects of the CAP theorem are supported by the following database technologies:
 - non-SQL (unstructured) databases such as CouchDB. [2]
 - relational databases such as PostgreSQL. [2]
- C) Describe the advantages of MapReduce compared to other more traditional data processing approaches. [2]

A) ...

B) ...

C)...

Example Questions

Question 4:

- A) Compare and contrast Representational State Transfer (ReST) based web services and Simple Object Access Protocol (SOAP)-based web services for implementing service-oriented architectures. [8]
- B) Explain the differences between ReST-based PUT and POST methods and explain when one should be used over another. [2]

A) ...

B) ...

Example Questions

Question 5:

A) Explain what is meant by the following terms:

- Virtual Machine Monitor/Hypervisor [1]
- Full virtualization [1]
- Para-virtualization [1]
- Shadow page tables [1]
- Explain how hardware virtualization and software virtualization can differ in their treatment of shadow page tables. [2]
- Explain the advantages and disadvantages of virtual machines. [2]
- Describe the typical steps that are required to support live migration of virtual machine instances using a Cloud facility such as the NeCTAR Research Cloud. [2]

A) ...

Example Questions

Question 6:

- A) There are many open challenges in delivering secure Clouds. Describe some of the technical and non-technical issues that currently exist for development and delivery of security-oriented Clouds. [4]
- B) The Internet2 Shibboleth technology as currently supported by the Australia Access Federation provides *federated authentication*.
 - a. Explain what is meant by this italicized term and discuss the advantages and disadvantages of the Shibboleth approach for security. [3]
 - b. Why isn't Shibboleth used to access Cloud-based systems more generally? [3]

A) ...

B) ...

Example Questions

Question 7:

- A) Many research domains are facing “big data” challenges. Big data is not just related to the size of the data sets. Explain. [5]
 - B) What capabilities are currently offered or will be required for Cloud Computing infrastructures such as the NeCTAR Research Cloud to tackle these “big data” challenges. [5]
- You may refer to specific research disciplines, e.g. life sciences, astrophysics, urban research (or others!) in your answer to part A) and B) of this question.

A) ...

B) ...

Feedback

- Too much tech?
- Not enough tech?
- More HPC?
- More hands-on Cloud?
- Assignments and team sizes?
- Software dev vs sys-admin skills?