THE UNIVERSITY OF WESTERN AUSTRALIA

SEEK WISDOM

SEMESTER 2, 2018 EXAMINATIONS

Physics, Mathematics & Computing
EMS

CITS5503

Cloud Computing

.

This paper contains: 4 Pages **(including title page)**

Time Allowed: **2:00** hours

INSTRUCTIONS:

There are a total of 7 questions in this exam paper, worth a total of 100 marks.

Students are expected to answer all questions.

All answers should be answered in the **answer booklet**.

Answers written on this **exam booklet** will be ignored.

THIS IS A CLOSED BOOK EXAMINATION

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Question 1. Cloud Computing (20 points)

a. [20 points] A company is trying to decide if it should use Cloud Computing for all of its computing service needs rather than using its own machines in a data centre. As background, this company runs its own web applications, databases and carries out data analysis, machine learning and other ad hoc computing functions.

You have been asked to provide a brief summary of the advantages and disadvantages of using Cloud Computing versus owning and running its own infrastructure and services. These should be stated from a technical, economic, security and efficiency perspectives.

Question 2. Virtual Machines and Containers (20 points)

a. [10 points] Describe what virtualisation is and describe the characteristic attributes of the different types of virtualisation (Language, Operating System and Hardware).

b. [10 points] Describe what containers are with reference to Docker and discuss their similarities and differences from operating system virtualisation perspective as provided by VirtualBox.

Question 3. Storage (10 points)

a. [5 points] Describe what S3 is and discuss its similarities and differences with the data store DynamoDB.

b. [5 points] You are asked to store data about music albums in a DynamoDB table. For each album, you need to record the title of the album and the artist name. Describe the commands you would use to create a table to store such information and write an entry to that table in DynamoDB.

Question 4. Identity and Access Management (20 points)

a. [20 points] An organisation has 5 departments and has separated out each of the IAM users into separate groups using paths following the pattern companybucket/department1/*, companybucket /department2/*, companybucket /department3/* etc.

Their IAM account names follow the pattern user@department1.company.com, user@department2.company.com etc.

You are tasked with securing a bucket that contains a folder for each of 5 departments in an organisation. Only people within a department can write to their own folder. Everyone can read from all folders.

Discuss the principles that you would use to create a policy that would achieve this objective.

Write the policy as a JSON file that you would use.

Note: you can have individual statements for each department.

Question 5. Networking, Network Address Translation (10 points)

a. [10 points] Discuss the reasons why you would use Application Load Balancing and how this would be set up to load balance a Python Django application. Specifically, describe the configuration of the Listener and Target Group running the Python Django application.

Question 6. DevOps (10 points)

a. [10 points] You have been asked to set up the ability to automatically build and test code updated in a repository. Discuss which AWS service you would use to do this, and the steps involved in getting it to work. What information would be needed in the configuration file for this service?

Question 7. Machine Learning (10 points)

a. [7 points] Describe the 3 different types of Machine Learning Models that AWS Machine Learning allows you to use and describe examples of the types of questions you could answer with each one.

b. [3 points] A dog recognition program recognises 10 dogs in a picture of 14 dogs and some cats. Of the 10 dogs, 7 are true positives and 3 are false positives.

    i.   How many actual dogs did the recognition program recognise?

    ii.   What is the precision of the program?

    iii.   What is the recall of the program?