INSTITUTE OF INFORMATION TECHNOLOGY
JAHANGIRNAGAR UNIVERSITY
MSc. FINAL EXAMINATION-2016

COURSE CODE: IT-5106 COURSE TITLE: CLIENT SERVER AND CLOUD COMPUTING

TOTAL MARKS: 60 TIMES: 3 HOURS

ANSWER ANY FIVE (5) QUESTIONS

1. a) What is cloud? Discuss the core technology on which cloud computing is built up. 4
   b) Discuss the origin of the cloud concept. 4
   c) How the cloud based software development can differ from the traditional one? 4

2. a) Explain what is the use of "EUCALYPTUS" in cloud computing? 4
   b) At the phase of cloud planning, it is necessary to make a detailed investigation on customer position and to analyze the problems and risks in cloud application both at present and in future. Therefore we need to consider practicable planning phase to ensure that customer can use cloud computing successfully to reach their business goal. What are the practicable planning phases that we need to consider? 4
   c) i) In cloud, who actually has the access on the data or the hardware where the data is stored on? 4
   ii) Does the provider have a right or ability to access or use data?

3. a) Suppose you are an application developer who develops applications according to your clients' requirement. One day a client came with a request to develop an application where the interfaces of each service's in the application will run on client's machine but the original services will reside on server machine. When the client clicks on any of the services' interface, the body of the service (actual program) will be called from the server and then run on the client's machine. Explain how you can build such application? 6
   b) What are the main characteristics of platform-as-a-Service solution? How can it differ with IaaS solution? 6

4. a) Explain Virtualization technology. 3
   b) What are the features of managed executions? 3
   c) Discuss different types of hardwire virtualizations techniques. 6

5. a) What are the benefits of virtualizations 3
   b) Discuss the logical components of Hypervisors. 3
   c) Write short note on : VMware and Xen 6

6. a) Draw the cloud computing architecture and discuss different services. 9
   b) Explain the Scheduler interaction with the other components. 3

7. a) What is energy efficiency in cloud? 3
   b) Explain cloud Federation. 3
   c) What is CSA? 2
   d) Mention the key elements of cloud security management. 1

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1st Semester of M.Sc. Final Examination-2015

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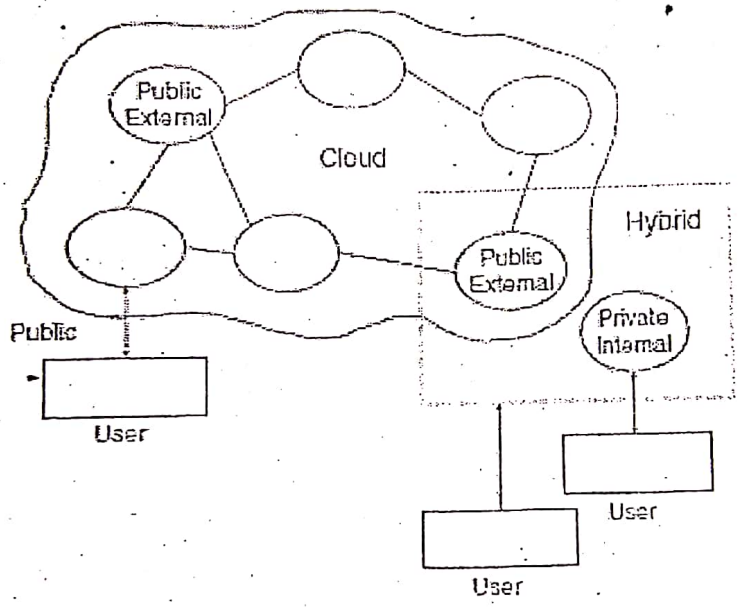
a) According to the figure given below, describe the types of cloud computing. [5]



b) Show the differences and major attributes of cloud computing versus cloud services in tabular form. [5]

c) Write down the challenges that cloud computing faces. [2]

a) i) List three main software components that may be fail when a client process invokes a method in a server object, giving an example of failure in each case. [6]

ii) Suggest how the components can be made to tolerate one another's failure?

b) Suppose you are an application developer who develops applications according to your clients' requirement. One day, a client came with a request to develop an application where the interfaces of each service's in the application will run on client's machine but the original services will reside on server machine. When the client clicks on any of the services' interface, the body of the service (actual program) will be called from the server and then run on the client's machine. How you can build such application? [6]

3. In phase 1, many users shared powerful mainframes using dummy terminals. In phase 2, stand-alone PCs became powerful enough to meet the majority of users' needs. In phase 3, PCs, laptops, and servers were connected together through local networks to share resources and increase performance. In phase 4, local networks were connected to other local networks forming a global network such as the Internet to utilize remote applications and resources. In phase 5, grid computing provided shared computing power and storage through a distributed computing system. In phase 6, cloud computing further provides shared resources on the Internet in a scalable and simple way.

Answer the following questions:

a) Adapted from Voas and Zhang, shows six phases of computing paradigms. [6]

b) Describe cloud computing attributes. [6]

4. In 2005, the total energy consumption for servers and their cooling units was projected at 1.2% the total U.S. energy consumption and doubling every 5 years. The majority of the energy used in today's society is generated from fossil fuels which produce harmful CO_2 emissions. Therefore, it is imperative to enhance the efficiency and potential sustainability of large data centers. One of the fundamental aspects of virtualization technologies employed in Cloud environments is resource consolidation and management. In this regards answer the following questions.

a) What are the benefits of virtualization techniques in cloud computing? [2]

b) Explain the uses of Dynamic Voltage and Frequency Scaling (DVFS). Compare DVFS with Green Cloud Framework (GCF). [5]

c) While Supercomputer and Cluster scheduling algorithms are designed to schedule individual jobs and not virtual machines, some of the concepts can be translated to the Cloud. In many service oriented scientific Cloud architectures, new VMs are created to perform some work. The idea is similar to sand boxing work within a specialized environment. Write a power based scheduling algorithm of VMs for strong establishment of GCF. [5]

5. a) Who will be liable if the data missing or accessible to unauthorized people? [4]

b) If the data is stored in U.S, how can I be sure that public authorities will not access my data? [4]

c) How long do you keep the data? If the agreement is terminated, do you delete all the data? [4]

Facebook has a list of friends (note that friends are a bi-directional thing on Facebook. If I'm your friend, you're mine). They also have lots of disk space and they serve hundreds of millions of requests every day. They've decided to pre-compute calculations when they can to reduce the processing time of requests. One common processing request is the "You and Joe have 230 friends in common" feature. When you visit someone's profile, you see a list of friends that you have in common. This list doesn't change frequently so it'd be wasteful to recalculate it every time you visited the profile (sure you could use a decent caching strategy, but then I wouldn't be able to continue writing about Map-reduce for this problem). We're going to use Map reduce so that we can calculate everyone's common friends once a day and store those results. Later on it's just a quick lookup. We've got lots of disk, it's cheap.

Assume the friends are stored as Person->[List of Friends], our friends list is then:

A -> B C D

B -> A C D E

C -> A B D E

D -> A B C E

E -> B C D

a) Find the map function using Google Map-reduce language. [6]

b) Find the common friends of B and D using reduce function [6]

a) 2005 study of users in 15 countries found longer battery life to be more important than all other features, including cameras or storage. In IEEE Xplore, searching "low" and "power" in the document title produces more than 5,000 results. So, What are the four basic approaches to saving energy and extending battery lifetime in mobile devices? [4]

b) How offloading computation can be used to save energy for a mobile device? Explain with an example and calculate the amount of power that has to be saved. [4]

c) For security and privacy in mobile cloud computing, Performing encryption or steganographic techniques before sending data to the cloud requires some additional processing. How much additional energy consumes by the device? Calculate and explain. [4]