UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

BIT

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2012/2013 –3rd Year Examination – Semester 5

IT5104 - Professional Issues in IT
Structured Question Paper

16th March, 2013
(TWO HOURS)

Important Instructions:

- The duration of the paper is **2 (two) hours**.
- The medium of instruction and questions is English.
- This paper has **4 questions** and **11 pages**.
- **Answer all questions.**
- All Questions carry equal marks.
- **Write your answers** in English using the space provided **in this question paper**.
- Do not tear off any part of this answer book.
- Under no circumstances may this book, used or unused, be removed from the Examination Hall by a candidate.
- Note that questions appear on both sides of the paper.
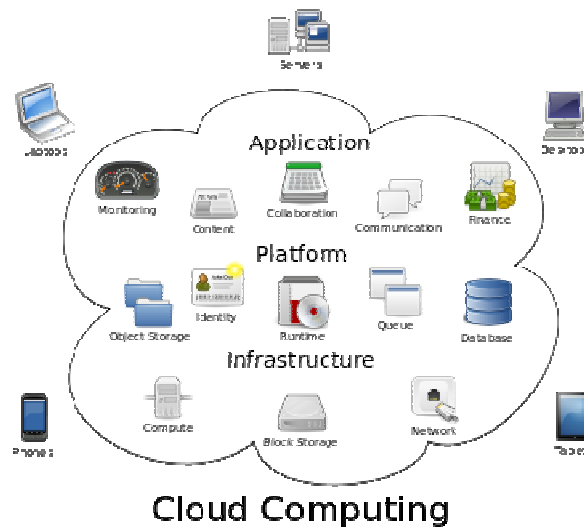 If a page is not printed, please inform the supervisor immediately.

Questions Answered
Indicate by a cross (✗), (e.g. ✗) the numbers of the questions answered.

To be completed by the candidate by marking a cross (✗).	Question numbers				
	1	2	3	4	
To be completed by the examiners:					

CASE STUDY

Cloud computing is the use of computing resources (hardware and software) that are delivered as a service over a network (typically the Internet). The name comes from the use of a cloud-shaped symbol in system diagrams as shown below as an abstraction for the complex infrastructure it contains. Cloud computing entrusts remote services with a user's data, software and computation.

Cloud Computing

There are three basic types of cloud computing:

1. Software as a Service (SaaS) is the most common and widely known type of cloud computing. SaaS applications provide the function of software that would normally have been installed and run on the user's desktop. With SaaS, however, the application is stored on the cloud computing service provider's servers and run through the user's web browser over the Internet. Examples of SaaS include: Gmail, Google Apps, and Salesforce.

2. Platform as a Service (PaaS) cloud computing provides a place for developers to develop and publish new web applications stored on the servers of the PaaS provider. Customers use the Internet to access the platform and create applications using the PaaS provider's API, web portal or gateway software. Examples of PaaS include: Saleforce's Force.com, Google App Engine, Mozilla Bespin, Zoho Creator.

3. Infrastructure as a Service (IaaS) seeks to obviate the need for customers to have their own data centres. IaaS providers sell customers access to web storage space, servers and Internet connections. The IaaS provider owns and maintains the hardware and customers rent space according to their current needs. An example of IaaS is Amazon Web Services. IaaS is also known as utility computing.

Cloud collaboration is a newly emerging way of sharing and co-authoring computer files through the use of cloud computing, whereby documents are uploaded to a central "cloud" for storage, where they can then be authorized for access by others. New cloud collaboration technologies have allowed users to upload, comment and collaborate on documents and even amend the document itself, evolving the document within the cloud. Businesses in the last few years have increasingly been switching to use of cloud collaboration. An issue with this kind of collaboration is the vulnerability of data against viral attacks, unauthorized access when hackers use passwords obtained from outside sites to access these accounts. Thus high availability of data in the cloud and disaster recovery capabilities is vital. It is important to know how often a cloud service provider (CSP) does verification testing of its disaster recovery capabilities and in what form it reports on such testing.

1) Cloud computing is the use of computing resources (hardware and software) that are delivered as a service typically over the Internet. The roles and responsibilities of Internet Service Providers (ISPs) and how far an ISP can be held responsible for material generated by customers are central issues.

(a) What are the laws/directives that govern the issues pertaining to ISPs in Europe and UK respectively called?

(04 marks)

<u>**ANSWER IN THIS BOX**</u>

Europe – European Electronic Commerce Directive 2000/31/EC

UK – This directive is implemented through the Electronic Commerce (EC Directive)

Regulation 2002

[Pages 194 of Ref 1]

(b) Name three roles that an Internet Service Provider (ISP) may play in delivering Cloud Computing services over the Internet.

(03 marks)

<u>**ANSWER IN THIS BOX**</u>

Mere conduit

Caching

Hosting

[Pages 194 of Ref 1]

(c) Explain briefly what each one of the above roles is and the conditions under which each ISP role may not be liable for damages or for any criminal sanctions as a result of transmission.

(18 marks)

<u>**ANSWER IN THIS BOX**</u>

<u>**Mere conduit role:**</u> **ISP does no more than transmit data. [1 mark]**

An ISP acting in the Mere conduit role is not liable for damages or for any criminal

sanctions as a result of a transmission provided that it:

- **did not initiate the transmission;**

- **did not select the receiver of the transmission;**

Continued...

- **did not select or modify the information contained in the transmission**

- **stored the information temporarily, provided this is only done as part of the transmission process. [5 marks]**

The Caching role arises when the information is the subject of automatic, intermediate and temporary storage where that storage is for the sole purpose of making more efficient onward transmission of the information to other recipients of the service upon their request. **[1 mark]**

An ISP acting in the Caching role is not liable for damages or for any criminal sanctions as a result of a transmission provided that it:

- **does not modify the information;**

- **complies with conditions on access to the information;**

- **complies with any rules regarding the updating of the information, specified in a manner widely recognised and used by industry;**

- **does not interfere with the lawful use of technology, widely recognised and used by industry, to obtain data on the use of the information;**

- **acts expeditiously to remove or to disable access to the information that has been stored upon obtaining actual knowledge of the fact that the information at the initial source of the transmission has been removed from the network, or access to it has been disabled, or that a court or an administrative authority has ordered such removal or disablement.**

  [5 marks]

Hosting role - Where an ISP stores information provided by its customers. [1 mark]

An ISP acting in the Hosting role is not liable for damages or for any criminal

sanctions as a result of a transmission provided that it:

- **did not know anything unlawful was going on;**

- **where a claim for damages is made, it did not know anything that**

    should have led it to think that something unlawful might be going on;

- **when it found out that something unlawful was going on, it acted**

    expeditiously to remove the information or to prevent access to it;

- **the customer was not acting under the authority or the control of the**

    service provider. [5 marks]

[Page 194, 195 of Ref 1]

2) To obtain Infrastructure as a Service (IaaS) type of service, a client will have to come to an agreement or sign a contract with a Cloud Service Provider (CSP).

(a) In England and Wales a contract need not be written down, yet there are some factors essential to a contract so that it can be enforced in a court of Law. What are these essentials?

(06 marks)

ANSWER IN THIS BOX

All the parties must intend to make a contract.

All the parties must be competent to make a contract, that is, they must be old

enough and of sufficiently sound mind to understand what they are doing.

There must be a 'consideration', that is, each party must be receiving something

and providing something.

[Page 145 of Ref 1]

(b) What are the different types of contracts for providing software and services?

(05 marks)

> **ANSWER IN THIS BOX**
>
> **Fixed price contracts for bespoke systems;**
>
> **Consultancy and contract hire;**
>
> **Time and Materials;**
>
> **Outsourcing;**
>
> **Licence agreements.**
>
> *[Pages 146 - of Ref 1]*

(c) What is the most suitable type of contract that you would recommend for the above mentioned IaaS type of cloud service?

(02 marks)

> **ANSWER IN THIS BOX**
>
> **Outsourcing**

(d) Justify your choice of contract chosen with at least 3 reasons for justification.

(12 marks)

> **ANSWER IN THIS BOX**
>
> **Any three of the following justifications:**
>
> (i) **A company that specializes in a particular area is likely to be able to do a better job of running such services than an organization whose main area of expertise is elsewhere.**
>
> (ii) **The organization making use of the outsourcing company can concentrate on their core business, which is the main source of their revenue.**
>
> (iii) **IaaS providers sell customers access to web storage space, servers, and**
>
> *Continued...*

> **Internet connections. Therefore customer does not have to purchase or**
>
> **maintain such facilities. This prevents him from been distracted from his main**
>
> **business.**
>
> **(iv) The IaaS provider owns and maintains the hardware and customers rent**
>
> **space according to their current needs, so the customer pays for only what he**
>
> **utilizes.**
>
> *[Pages 155 - of Ref 1]*

3) Communicating data over the public internet, as opposed to keeping it entirely within a private corporate network, may increase data vulnerability. In addition, the business models of CSPs involve sharing infrastructure among many clients and managing IT workloads among many different physical machines or even geographically dispersed data centres.

(a) Describe three data protection principles of the 1998 UK Data Protection Act which may <u>not</u> be complied with in respect of all the personal data stored and communicated via a CSP as indicated above.

(09 marks)

> **ANSWER IN THIS BOX**
>
> **(i) Fourth data protection principle:**
>
> **Personal data shall be accurate and, where necessary, kept up to date.**
>
> **(ii) Fifth data protection principle:**
>
> **Personal data processes for any purpose or purposes shall not be kept for**
>
> **longer than is necessary for that purpose or those purposes.**
>
> **(iii) Seventh data protection principle:**
>
> **Appropriate technical and organizational measures shall be taken against**
>
> *Continued...*

unauthorized or unlawful processing of personal data and against accidental

loss or destruction of or damage to personal data.

Any other answers are acceptable provided that it is accompanied by reasonable explanations.

[Pages 185 - 186 of Ref 1]

(b) Explain briefly how such non-compliance can occur for each of the three described in (a).

(09 marks)

ANSWER IN THIS BOX

   (i) **Deleting data from a client's site may not actually remove the stored data from**

       the CSP's servers. This may lead to data that may not be up to date which

       may be still accessible to interested parties from the cloud where it is stored.

   (ii) **Deleting data from a client's site may not actually remove the stored data from**

       the CSP's servers, thereby making such data available for further access.

       Procedures to ensure that all the data is erased at the appropriate time are

       needed, and this must include erasure from backup copies as well.

   (iii) **Access control (through passwords or other means) alone may not be**

       adequate. Vetting of personnel who have access to data, integrity checks on

       the data, backup procedures and so on are important.

[Pages 185 - 186 of Ref 1]

(c) Define what a data subject is according to the 1998 Data Protection Act of UK.

(02 marks)

> ## ANSWER IN THIS BOX
>
> **Data subject means the individual who is the subject of personal data.**
>
> *[Page 183 - of Ref 1]*

(d) What are the rights of access given to data subjects in the 1998 Data Protection Act of UK apart from those that were given in the 1984 Act?

(05 marks)

> ## ANSWER IN THIS BOX
>
> **Data subject has the right to receive the following:**
>
> **(i) A description of the personal data being held;**
>
> **(ii) An explanation of the purpose for which it is being held and processed;**
>
> **(iii) A description of the people or organizations to which it may be disclosed;**
>
> **(iv) An intelligible statement of the specific data held about them;**
>
> **(v) A description of the source of the data.**
>
> *[Page 186 of Ref 1]*

4) (a) Why is Cloud computing considered to be more environmentally friendly than traditional computing?

(06 marks)

> ## ANSWER IN THIS BOX
>
> **Cloud computing does not require most users to have high-powered PCs or laptops.**
>
> **Low power computers based on processers like Intel's Atom are perfectly sufficient to run cloud applications.**
>
> **This potentially reduces the carbon footprint.**

(b) What is Green computing?

(07 marks)

> **ANSWER IN THIS BOX**
>
> **Green computing refers to environmentally sustainable computing or IT.**
>
> **In the article Harnessing Green IT: Principles and Practices, San Murugesan defines**
>
> **the field of green computing as**
>
> **"the study and practice of designing, manufacturing, using, and**
>
> **disposing of computers, servers, and associated subsystems**
>
> **such as monitors, printers, storage devices and networking and communications**
>
> **systems efficiently and effectively with minimal or no impact on the environment."**

(c) How does the packaging of a computer affect the environment and health adversely?

(05 marks)

> **ANSWER IN THIS BOX**
>
> **Plastics are used to package the computer, largely from casings but also internally to**
>
> **hold components together.**
>
> **Polyvinyl chloride (PVC) that is a specific form of plastic, is used in cabling and**
>
> **housings.**
>
> **These are difficult to recycle and production and burning of PVC generates dioxins**
>
> **and furans to the environment which can be harmful to human beings.**

(d) What is meant by e-waste?

(02 marks)

> **ANSWER IN THIS BOX**
>
> **Unwanted of computer components constitute about 5% of the total waste of the**
>
> **planet. This waste is called as e-waste.**

(e) Describe briefly how e-waste affects the environment adversely.

(05 marks)

> **ANSWER IN THIS BOX**
>
> **When e-waste is sent to landfills, toxic substances can leach into the environment.**
>
> **These substances can seep into ground water, contaminate the soil and enter the**
>
> **food chain.**
>
> *[LMS teachers notes]*

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