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| Programme: | F03332B Diploma in IT | | |
| Unit (No. and Name): | Unit 28 Website Production | | |
| Assignment Title: | Assignment 1 Workbook | | |
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**GRADING CRITERIA**

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| **Unit:** | | |
| **Criteria** | **Task** |  |
| P1 | 1 | outline the web architecture and components which enable internet and web functionality |
| P2 | 1 | explain the user side and server side factors that influence the performance of a website |
| P3 | 1 | explain the security risks and protection mechanisms involved in website performance |
| M1 | 1 | explain the role of web architecture in website communications |
| D1 | 2 | explain the role of the TCP/IP protocol and how it links to application layer protocols |

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Work handed in against this brief must be the learner’s own work. Any content not generated by the learner must be appropriately referenced, otherwise it will be taken to be that of the learner submitting it. Any infringement of the College’s Plagiarism guidelines will result in the Assignment not being marked and Disciplinary proceedings initiated.

# Note

Unless there are instructions otherwise, the space given for writing an answer indicates the amount of writing you are expected to do

## P1 – Outline the web architecture and components which enable Internet and Web functionality

Insert the correct phrase, from (a) Internet and (b) World Wide Web

The internet is larger than the World Wide Web.

What role / purpose do the following organisations have in the running of the Internet

1. Internet Service Providers (ISP):

An internet service provider provides people with internet connection so that they can browse and use the internet, they are also responsible for maintaining internet connectivity.

1. web hosting services:

A web hosting service is used to allow people who own websites to host them and give the website an internet connection so it can be accessed by the public who use the web. These people are responsible for hosting and maintain the internet connection of dozens of websites.

1. Name one ISP:

British Telecoms or BT

1. Name one Web Host:

godaddy

This is the URL of the BBC's Click programme Web page

http://www.bbc.co.uk/programmes/b006m9ry

1. What is its protocol?:

http

1. What is its host?:

bbc

1. What is its domain name?:

.co

1. What is its top level domain?:

.uk

What is the purpose of the following devices on the Internet?

1. Web Server:

A web server’s purpose is to process incoming and outgoing request from the website.

1. Gateway:

A gateway acts as a point of acess between a network and the internet.

1. Proxy Server:

A proxy server acts as a third party between clients and it accepts requests from the clients and then fulfils these requests.

1. Router:

A routers purpose is to connect networks together and forward packets of data.

**Internet Addressing**

1. What is a domain name?:

A domain name is used to remember a website IP address.

1. What is an IP address?

An internet protocol address is a number which is assigned to your device to help identify it.

1. What is the role / purpose of a Domain Name Registrar

A domain name registers role is to check the domain that you are trying to register is available and that it is a suitable domain to be used on the internet.

1. Explain how a domain name is converted into an IP address using the hierarchical domain name system:

A domain name is an alias that is given to an IP address because it’s more memorable and easier to remember, to convert the domain name into an IP address the browser sends a request to the name server to convert the url into a IP address.

1. What do the initials IANA stand for?

Internet assigned numbers authority

1. What does Nominet do?

Nominet is a domain registry service for the .uk domains.

**Internet Protocols**

1. Name three protocols used specifically for email:

IMAP

POP3

SMTP

1. Describe how a mail server uses the "store and forward" technique

The store and forward technique refers to how email is managed, it’s sent from the person who sent the email to a server which holds or “stores the email until it can be forwarded to the recipients.

1. Explain the difference between accessing email through a Web client and accessing email through a desktop client

Emailing through the web client means that it changes from SMTP to HTTP so it’s compatible on the web, this makes it compatible and allows you to use it on the web.

## P2 – Explain the user side and server side factors that influence the performance of a Website

Explain the impact that the following client side system features have on the speed at which a Web page is rendered in a browser

1. Connection speed to the ISP:

If the connection speed to the ISP is poor than the amount of data that can be sent is reduced so it will take longer to load the website.

1. system hardware

The system hardware on the client side when poor will reduce how many processes it can handle and how fast it can carry out request so it will take longer to load the website.

1. Browser cache

Browser cache on the client side will reduce how much temporary data they can hold for their visitors so they will have to get the data again and again instead of holding it for a later use.

1. Add blocking software

Add blocking software will take longer to render the page because it first has to filter out all the ads and then it loads the website.

1. Browser Software

Browser software will take more hardware to be used and processed which will slow down the responsiveness of the website, it will also take more bandwidth to be downloaded and loaded because of this software.

Explain the impact that the following server side system features have on the speed at which a Web page is served from a Web site

1. Number of simultaneous requests

A large amount of simultaneous requests to a website will really slow down the rate at which the request are handled because of the sheer volume of requests, it could also crash the server if there are too many requests.

1. system hardware

The system hardware is responsible for processing and handling request and instructions given to the server and if these are slow then it will reduce how fast the server can process these requests.

1. Dynamic and Static content

Dynamic content will be a lot more demanding on the server because the content will change depending on the user, static content however will be much less demanding because it will be the same content being loaded with each user.

1. Streamed media

Streamed media demands a lot of bandwidth to process and it will slow down the rate at which other requests are handled because of the lower bandwidth.

1. Database queries

Database queries will increase the amount of time it will take for the web page to be served because it will take time to extract data from a database.

1. Embedded media content (jpg, gif, wav, mp3, avi, swf)

Embedded media content is will be much more demanding than plain text so it will take a long time to load the web page.

### P3 – Explain the security risks and protection mechanisms involved in Website performance

* + 1. Describe the following threats to Internet security

1. Physical access

Physical acess to someone device will grant them an easy way to acess almost anything on your computer such as saved passwords on website, any files and they could also physically attach things onto your computer which could track things you do.

1. Network Hacking (cracking)

Hacking a network is a threat to internet security because if they are inside the network they will be able to acess confidential files and leak them.

1. DDOS

A ddos attack is a threat to your internet security because an attack like this will make certain services unavailable.

1. Phishing

Phising is a threat to your internet security because it will try to trick you into giving personal and sensitive information over by pretending to be something that it isn’t, this could be in the form of an email pretending to be your bank and they will request information from you.

1. Social Engineering

Social engineering is a threat to your internet security because it involves someone getting to know you personally so that they can have a better chance of being able to guess your emails and password based of their current knowledge of you.

1. Identity theft

If someone steals your identity they can acess your things and use your personal information for whatever they want, this can be a threat to your internet security because they can get passwords, recover emails and use things like your amazon and buy things with your account.

* + 1. **Password Security**

1. State three attributes that make a password secure

The first attribute is length which will make is harder to guess than a simple small worded one.

Another attribute is the use of capitals because this makes your password much more unique because of the capital letter and it will be much harder to guess the password if there are random capital letters within it.

The use of symbols makes your password much more complex and less vulnerable to certain types of attacks such as a dictionary attack.

1. Describe how a dictionary attack tries to break password security

A dictionary attack involves someone using every word in the dictionary in an attempt to try and guess your password, this type of attack is very good at guessing password if they do not have things like capitals and symbols in their password.

1. Describe how a brute force attack tries to break password security

A brute force attack is a trial and error attack which will enter countless different combinations of words and numbers in an attempt to try and guess your password.

1. Why does encrypting passwords on a server provide only modest protection?

The encryption will provide security for the passwords but the server itself may be vulnerable and if hacked they could get acess to the encryption key and de-encrypt the passwords.

1. Describe how hash and salt are used to provide secure login to a server account?

Hash and salt is used on a server account because it means that the login details will be “hashed” into random combinations of numbers, letters and symbols. This provides a secure login because it means that anyone who gets this login information cannot do anything with it and also can’t find out the login details from the hash.

Describe how the following software vectors deliver malware

1. Virus

A virus self-replicates and attaches itself to files, it will also attack any code that is executable.

1. Worm

A worm copies itself to other computers and it exploits vulnerable types of communication in apps. A common example of this would be an email service and it would attach itself to emails between people.

1. Trojan

A Trojan virus will be inside a “free” piece of software or game which does actually have the software although when it’s installed and is running so is the Trojan. The “free” software is used as a vector by the Trojan and is also once again used to run the Trojan on the computer without the person knowing.

Describe the how the following payloads cause grief to the system and operators

1. Spyware

A spyware will try to monitor things like your key logs in an attempt to acquire your password.

1. Botnet

Botnet uses computers to do malicious activity, this could be anything from DDOS to spamming. Botnet is a number of computers which are being controlled by someone else, the computer owners also don’t know that their device is infected.

1. Ransomware

Ransomware restricts access to a computer unless you pay for a key to unlock it, this completely blocks the use of the computer.

1. Rootkit

Rootkit is a collection of software that works to hide on the computer and attempts to cloak and enable other malware such as viruses or spyware.

**Encryption**

1. Describe how single key encryption can protect communications

A single key encryption system would protect communications because it would encrypt the message and it would only be decrypted when the precipitant receives the message. This would protect t because if the message was intercepted by someone they would need they decrypt ion key to understand the message.

1. What is the fundamental weakness of single key encryption?

The algorithm for the encryption is always the same to if they can crack it they will have acess to everything encrypted by that algorithm.

1. Describe how public/private key encryption overcomes the weakness of single key encryption

It overcomes the problems with single key encryption because it only means that the person with both keys can decrypt the cypher so it is much more secure.

**Security Devices**

1. Describe how a firewall operates to increase system security

A firewall controls incoming and outgoing packets from the device it’s installed on, this can be used to block and completely reject packet requests from unknown of untrusted services.

1. Describe how Anti-virus software operates to increase system security

Anti-virus software works by scanning the computer in an attempt to identify and eliminate any malicious software. This works to increase the systems security because it will identify things like malware and viruses and remove them from the system.

1. Describe how a using a proxy server can increase system security

A proxy server can because it can use network address translation which means that any requests from machines connected the server will be remapped by the network to hide and keep the machines anonymous to anything outside of the proxy serve.

**Laws**

1. State what is meant by "personal data" in the Data Protection Act (DPA)

Personal data is any data that can be used to identify someone.

1. State three rights that the DPA allows data subjects

A data subject can request to view any information that is held about them.

They can make a request to the information commissioner to review what their data is being used for.

A data subject can request to stop their data being used as a marketing attempt towards them.

1. State three things that a retail Internet sales organisation must do under the DPA

They must attempt to protect the personal data as long as it’s reasonable.

1. Give one example of an activity that is illegal under the Computer Misuse Act

Unauthorised acess to computer material.

1. Describe how the EU directive on Privacy in Electronic Communications protects privacy

An opt-out opportunity must be given for each electronic communication sent.

Third party cookies can be disabled if the user pleases.

### M1. Explain the role of Web architecture in Website communications

Commercial Cloud Services

1. Describe the role / purpose of the hypervisor in providing system virtualisation

The hypervisor shares resources and the computer hardware between multiple virtual machines, this enables the computer to be efficiently used by multiple devices and also allows users to only pay for how much they are using.

Describe each of the following Commercial Cloud service categories

1. IaaS

1 this is the basic infrastructure of a computer, for example the amount of RAM.

1. PaaS

1 platform as a service is paying for the platform on which the computer runs on (hardware and the OS)

1. SaaS

Software as a service means that the user pays for certain software on the computer, this could be anything from games to Photoshop.

1. State three advantages of virtualisation to the cloud service user

The user only pays for what they use and no more.

It doesn’t require any physical space.

It can be set up in only a few seconds and then is ready to be used by the user.

**Individual Cloud Services**

Describe one service provided to regular individual users for the following

1. Data Storage

Dropbox is a personal cloud service and offers file synchronisation across multiple devices. You also get 2GB of free storage when you create an account so you can give it a trial run before you purchase extra storage.

1. Applications

Microsoft provide applications such as office 365 which for a price can be accessed and used on every device you have.

1. Communications

Google provides gmail for free which is an email service which can be used on most devices and you can use their cloud storage to store your emails.

**Web 1.0 vs Web 2.0**

Give three examples of how a web 1.0 application has been transformed by Web 2.0

|  |  |
| --- | --- |
| Web 1.0 Application | Web 2.0 Application |
| Encyclopaedia Britannica written by specialists | Wikipedia written by public volunteer contributors |
| Akamai was a business that delivers software | Bittorrent allows files to be distributed from peer to peer |
| Ofoto was a business that automated scanning in physical images | Flickyr is an image and video hosting service that is free |
|  |  |

Describe the concept of the "wisdom of crowds" and give one example

Wisdom of the crowds is collective opinion of a group and not an individual, an example of this would be the transformation of Encyclopaedia Britannica which was created and published by an individual or a few specialist that would give information or knowledge from these experts. With the transformation of web 2.0 online Wikipedia’s are relying on community’s which can all edit and create their own wiki pages of information.

### D1 – Explain the role of the TCP/IP protocol and how it links to application layer protocols

Write an extended piece (300-500 words) to explain how information is prepared in the application layer and is carried through the transport and network layers and onto the network. You should include reference to the four layer network model; protocols HTTP, TCP and IP; flow control and error checking; encryption SSL and HTTPS.

Circuit switched – like telephones

Packet switched – like royal mail

END.