Higher
Computing Science

Web Design and Development

Pupil Notes

Name:_____

Contents

Analysis

End User and Functional Requirements

During the analysis stage of database development, the following requirements should be identified:

1 End-user requirements:

- The end users are the people who are going to be using the website.
- Their requirements are the tasks they expect to be able to do using the website.

2 Functional requirements:

- Processes and activities that the system has to perform.
- Information that the system has to contain to be able to carry out its functions.

These requirements will help:

- clarify the design of each webpage
- identify the features to be implemented on the website
- evaluate whether the system is fit for purpose after development is complete

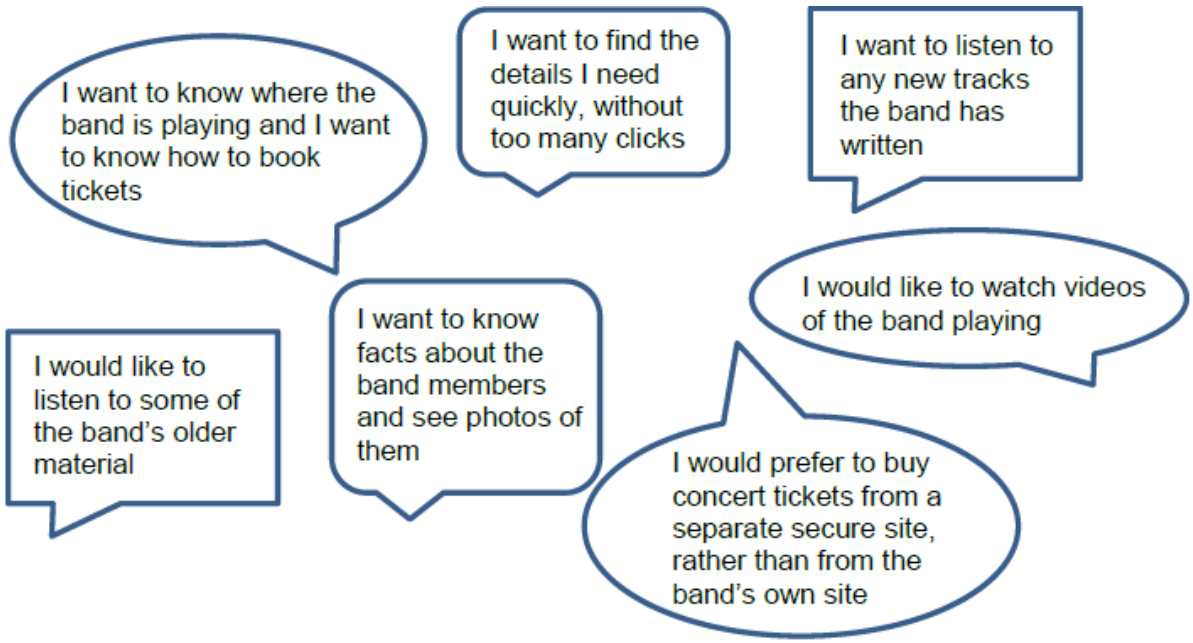
Example

A rock band has three members. The band wants to develop a website for its fans.

The site will provide details about the band, including biographies, music tracks, video clips and concert details.

The band asked some of its fans what they would like to see on the new website.

Here are a few of the comments they made.



End-user requirements

- ✓ Users should be able to:
    - navigate the site easily
    - view biographies and photos of band members
    - view all upcoming concerts and link to an external booking site
    - view video clips of the band
    - listen to the band's audio tracks

Functional requirements

- ✓ The Home page should provide internal links to the four topic pages (biographies, music, videos and concerts).

- ✓ Individual profile pages should include biography information, with photos of the band member and should have a link back to the Biographies page.

- ✓ The Music page should list the band's albums and allow individual audio tracks to be played.

- ✓ The Videos page should list video clips and allow these to be played.

- ✓ The Concerts page should list all the upcoming concerts, with links to the external booking site.

  All pages (except the Home page) should link back to the Home page.

Reading Review 1
Having read pages 4-6, answer the questions below.

1. Who is the end-user of a website?

   _____
   _____

2. What are end-user requirements?

   _____
   _____
   _____

3. What are functional requirements?

   _____
   _____
   _____
   _____

Design

Website Structure

The design of the structure of a website is vital to ensure that users can easily find information on what could be thousands of individual pages. When creating a website, the developers must first decide on the overall navigational structure of the site.

Most commonly, websites are examples of **hierarchical** structures with large complex website have many levels or tiers within the structure.

Hierarchical Structure

A hierarchical website is one whose contents begin with the most important information and trickles down to the specific and optional subjects.

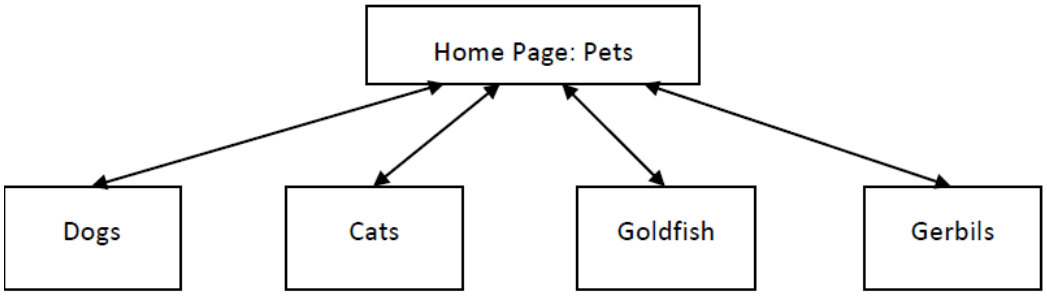
The hierarchical website structure is the most common navigation structure on the internet.

Most organisational websites such as those for schools and companies have this kind of websites; this is because a layered or tiered structure is almost always the most effective and efficient way to arrange the pages of your website, and for the end user to navigate.

The home page (the first page a user typically encounters when visiting a website) is typically at the top of the hierarchy.

The second level of the hierarchy usually consists of topic pages.

Using navigation bars in hierarchical structures makes navigation through multi-level websites logical and straight forward.

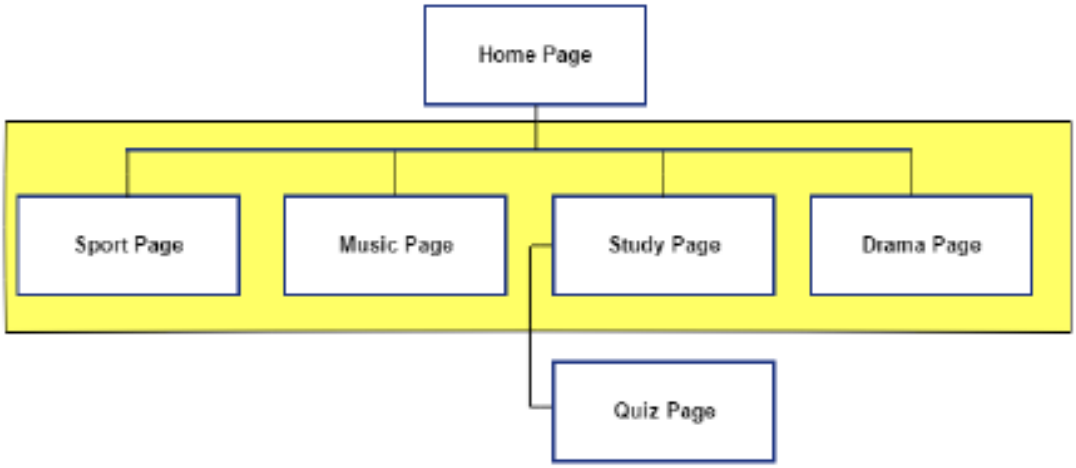


Multi-Level Structure

In **multi-level** structures, the third level of the website hierarchy would be sub-topics that stem off of the main topics.

Complex websites may well have several layers of sub-topics. Examples of multi-level structures are shown below.

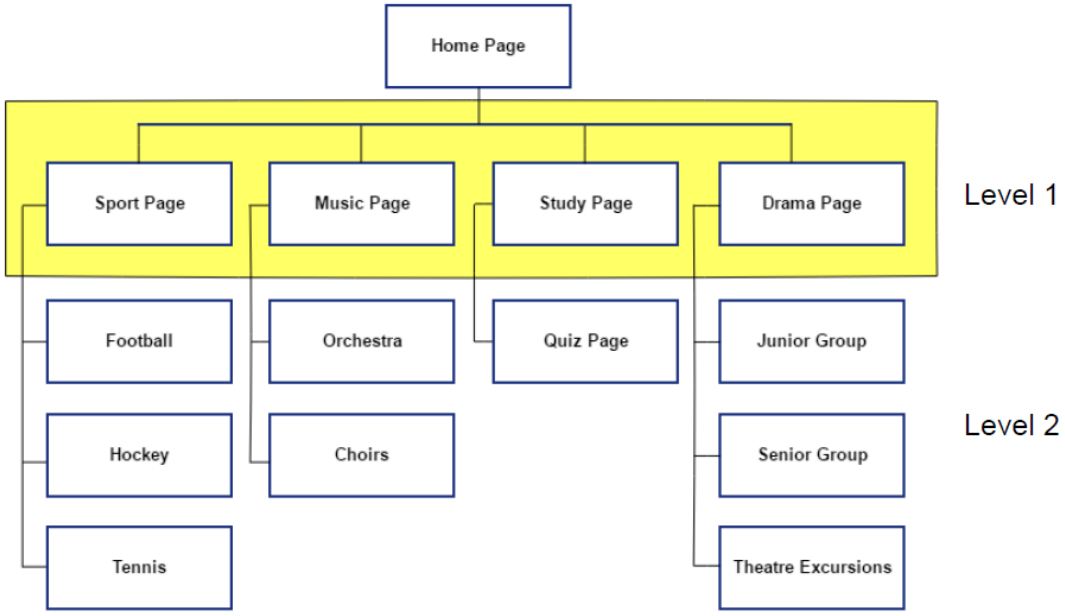
The pages which will be part of the navigational bar (at the top of each page in the website) are shaded in the diagram below. The home page will also be included in the navigational bar.



Example

Penny High School is developing a new website. The website will have a multi-level structure, consisting of a home page with a horizontal navigation bar that gives clear links to four main areas (pages).

Each of the four main pages will have links to relevant sub-pages.
The following diagram shows the navigational structure of the Penny High School website:

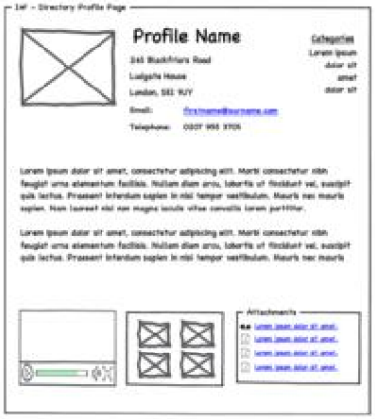


Wireframe

The user-interface planning should be illustrated using **wireframes**. A separate wireframe is needed for each page on a website. Each wireframe indicates the intended layout of the page and shows the horizontal and vertical position of:

- navigational bars
- all text elements on the page
- any media elements (images, audio clips and video clips)
- elements that allow the user to interact with the page
- any form inputs
- intended position and type of hyperlinks (internal or external)

A wireframe represents the **skeletal framework** of a website.



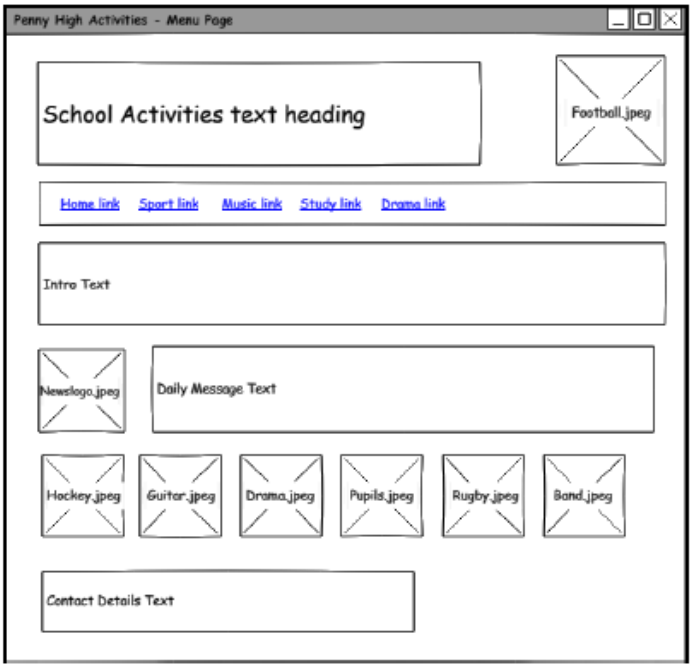
It shows the website's layout and arrangement of the website's content, including interface elements and navigational systems.

Wireframes can be pencil drawings or sketches, or they can be produced using a range of software tools such as Pencil by Evolus.

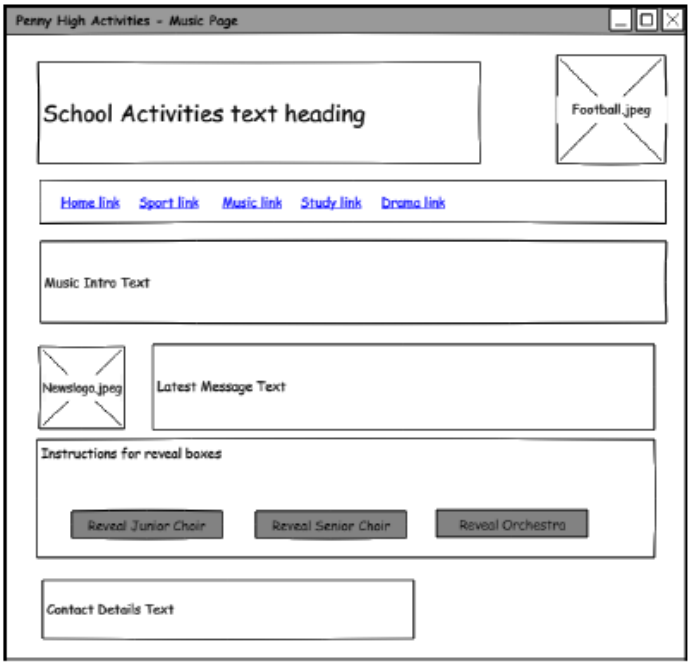
Wireframes are used to produce **low fidelity prototypes** of a website. These prototypes can be shown to the client at the design stage of the development to give an early indication of how the final website will look and how users will interact with it.

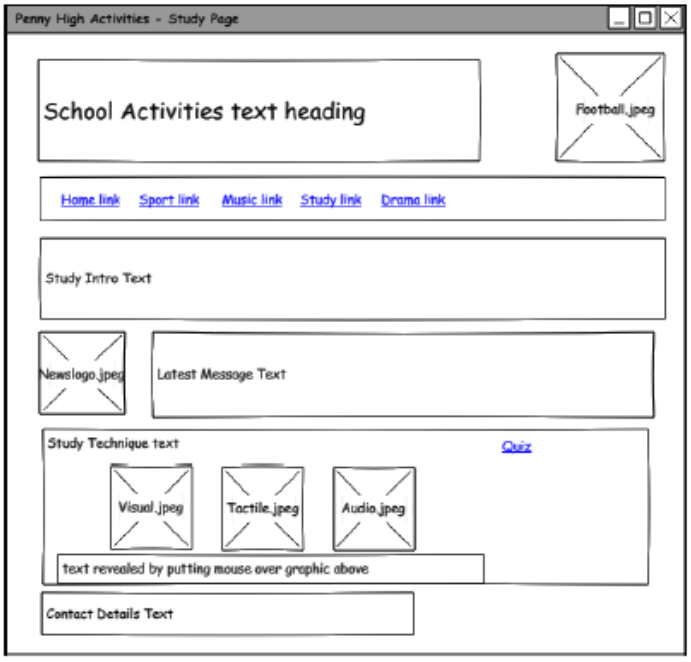
During the implementation stage of any website development, the wireframes are used to guide the developers by indicating the layout, styling to be applied to the page content, the navigational features of each page and the media clips required on each page.

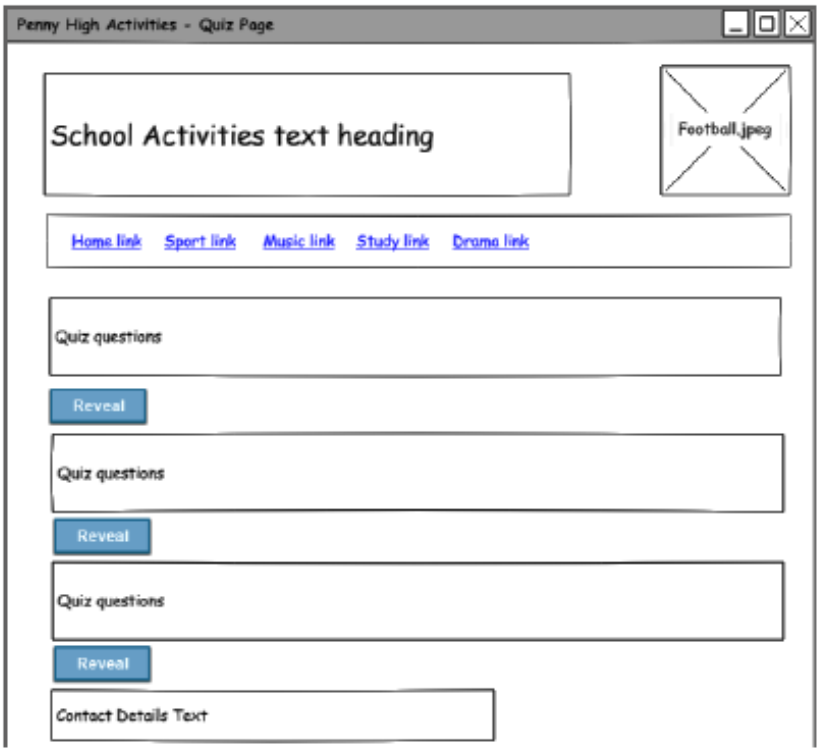
Example:

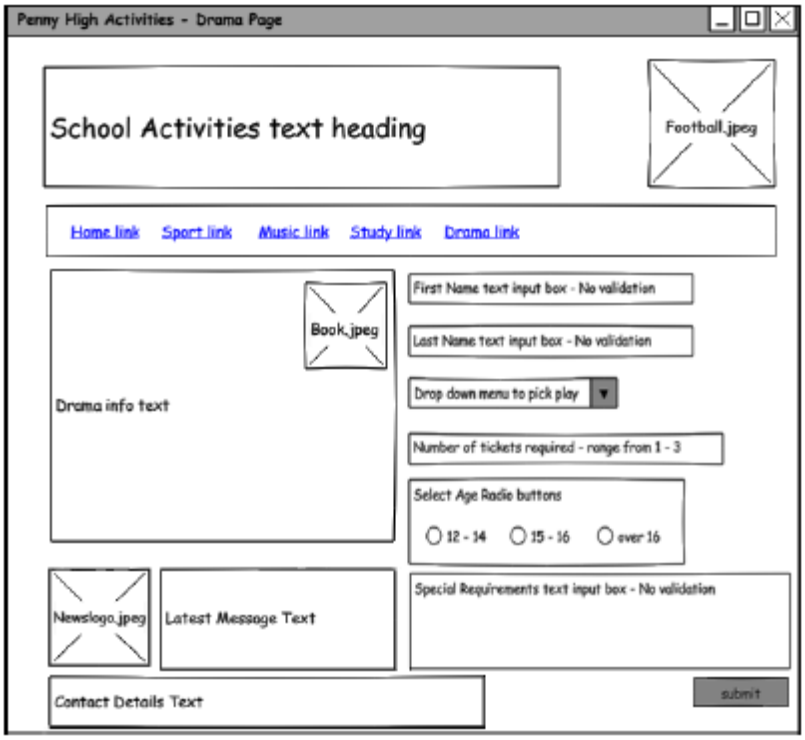

Penny High Activities - Menu Page
School Activities text heading
Football.jpeg
Home link
Sport link
Music link
Study link
Drama link
Intro Text
Newslogo.jpeg
Daily Message Text
Hockey.jpeg
Guitar.jpeg
Drama.jpeg
Pupils.jpeg
Rugby.jpeg
Band.jpeg
Contact Details Text


Penny High Activities - Sport Page
School Activities text heading
Football.jpeg
Home link
Sport link
Music link
Study link
Drama link
Sport Intro Text
Newslogo.jpeg
Daily Message Text
Footteam.jpeg
TableTennis.jpeg
Judo.jpeg
Contact Details Text


Penny High Activities - Music Page
School Activities text heading
Football.jpeg
Home link
Sport link
Music link
Study link
Drama link
Music Intro Text
Newslogo.jpeg
Latest Message Text
Instructions for reveal boxes
Reveal Junior Choir
Reveal Senior Choir
Reveal Orchestra
Contact Details Text


Penny High Activities - Study Page
School Activities text heading
Football.jpeg
Home link
Sport link
Music link
Study link
Drama link
Study Intro Text
Newslogo.jpeg
Latest Message Text
Study Technique text
Quiz
Visual.jpeg
Tactile.jpeg
Audio.jpeg
text revealed by putting mouse over graphic above
Contact Details Text


Penny High Activities - Quiz Page
School Activities text heading
Football.jpeg
Home link
Sport link
Music link
Study link
Drama link
Quiz questions
Reveal
Quiz questions
Reveal
Quiz questions
Reveal
Contact Details Text


Penny High Activities - Drama Page
School Activities text heading
Football.jpeg
Home link
Sport link
Music link
Study link
Drama link
Book.jpeg
Drama info text
First Name text input box - No validation
Last Name text input box - No validation
Drop down menu to pick play
Number of tickets required - range from 1 - 3
Select Age Radio buttons
12 - 14
15 - 16
over 16
Newslogo.jpeg
Latest Message Text
Special Requirements text input box - No validation
Contact Details Text
submit

Reading Review 2

Having read pages 9-14, answer the questions below.

1. Website structure can be designed in different ways.

a) Describe the navigational structure of a multi-level website.

_____

_____

_____

_____

b) Draw a diagram of a multi-level website

2. Wireframes are also used in web design.

a) What is a wireframe?

_____

_____

_____

_____

b) What is the purpose of a wireframe?

_____

_____

_____

_____

3. Draw a wireframe diagram for the home page of a software development company website. The navigational bar should include links to the about us, what we do, job roles and future of technology pages. The page should include introduction text with an image of the company logo. There should also be form on the home page to allow users to send general enquiries to the company.

Implementation

Implementing Websites

The implementation of a website is carried out using three main languages:

- HTML
- CSS
- Javascript

You will find detailed information on how to implement each of these in your **Web Design and Development Practical Notes.**

You must be able to describe, identify and use the following:

HTML	CSS	Javascript

• Nav
• Header
• Footer
• Section
• Form
• Id attribute
 	
• Form element: input
  ○ Text
  ○ Number
  ○ Textarea
  ○ Radio
  ○ Submit
• Form element: select
• Data validation
  ○ Length
  ○ Presence
  ○ Range
	• control appearance/positioning
	  ○ display
	  ▪ block
	  ▪ inline
	  ▪ none
	  ○ float
	  ▪ left
	  ▪ right
	  ○ clear
	  ○ margins
	  ○ padding
	  ○ sizes
	  ▪ width
	  ▪ height
	• create horizontal navigation bars
	  ○ list-style-type: none
	  ○ hover
		• onmouseover
		• onmouseout
		• onclick

Practical Notes pages	**Practical Notes pages**	**Practical Notes pages**

Testing & Evaluation

Usability testing

Usability testing involves systematic observation to determine how well people can use a product. In this case, the product will be the low-fidelity prototypes of a website.

The goal with usability testing is to recreate real-world scenarios where the tester will actually be able to use your product. Then, by observing their behaviour, you will be able to understand what could be done better. In this case, the product will be the low-fidelity prototypes of a website.

This helps to eliminate design problems at an early stage, before money has been spent implementing the design.

The testers may be given:

- a persona — this may relate to the age or experience that the tester should exhibit
- test cases — a set of actions executed to verify a particular feature or function of the website
- scenarios — they may be asked to use the website to place an order or book flights

They use the low-fidelity prototypes under a variety of conditions, while they are observed. The observers make notes about any difficulties that the testers experienced and what alterations are required to the website design to make it easier to use the website.

Testing websites

There are a number of tests you should carry out on your website to ensure that it meets the functional requirements.

- Input validation:

  — Check that every field in a form has the correct validation by trying to get every field on the form to accept incorrect data.

- Links and navigation:

  — Test the navigational bar links take you to the correct pages

  — Test all external links work correctly

  — Test that all pages can get back to the home page

  — Test all internal links work correctly

  — Test to check if there are any orphan pages (pages that are not linked to any others)

- Media content:

  — Ensure that the text, graphics and video display correctly and in the position in which it was designed to appear.

Compatibility testing

This is when you test your website to ensure that it works in the same way across a range of platforms.

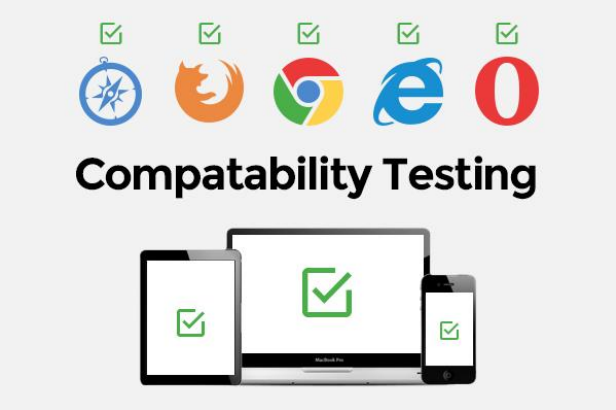
Types of compatibility testing include:

Browser testing It is important that your website will work on all the main browsers, for example Chrome, Firefox, Internet Explorer, Safari, and Opera. Your customers will not use your website if it does not function properly on their chosen browser.

Device type You should check that your website is accessible on tablets, smartphones and desktop computers, as there are so many different types of hardware with different size screens available.

Common compatibility testing exposes the following types of problem:

- changes in font size
- changes in the user interface
- alignment issues
- changes in CSS style and colour
- scroll bar related issues
- content or label overlapping
- broken tables or frames



Evaluation

To evaluate a website, consideration should be given to its fitness for purpose.

A website is fit for purpose if:

- All testing criteria are passed successfully (see previous page).
- All user and functional requirements are met (see page 5)

If the website does not display content correctly or it does not fulfil its designed purpose, then it cannot be considered to be fit for purpose.

Reading Review 3
Having read pages 20-23, answer the questions below.

1. Describe usability testing.

2. Describe compatibility testing.

3. Describe three ways in which a website should be tested.

4. Describe how a website should be evaluated.