

#### **9.4.4 Option 4: Multimedia Systems**

Multimedia systems are information systems that combine the different types of media. Professional multimedia systems, especially when being created, involve many participants with a wide breadth of experience. Multimedia systems encompass the entire information process. This topic emphasises the information process of displaying.

##### **Outcomes**

A student:

- H1.1 applies and explains an understanding of the nature and function of information technologies to a specific practical situation
- H1.2 explains and justifies the way in which information systems relate to information processes in a specific context
- H2.1 analyses and describes a system in terms of the information processes involved
- H2.2 develops and explains solutions for an identified need which address all of the information processes
- H3.1 evaluates and discusses the effect of information systems on the individual, society and the environment
- H3.2 demonstrates and explains ethical practice in the use of information systems, technologies and processes
- H4.1 proposes and justifies ways in which information systems will meet emerging needs
- H5.1 justifies the selection and use of appropriate resources and tools to effectively develop and manage projects
- H5.2 assesses the ethical implications of selecting and using specific resources and tools, recommends and justifies the choices
- H6.1 analyses situations, identifies needs, proposes and then develops solutions
- H6.2 selects, justifies and applies methodical approaches to planning, designing or implementing solutions
- H7.1 implements and explains effective management techniques
- H7.2 uses methods to thoroughly document the development of individual and team projects.

## 1. Characteristics of multimedia systems

*Students learn about:*

*Notes:*

- multimedia systems – information systems that include combinations of the following media, including:
  - text and numbers
  - audio
  - images and/or animations
  - video
  - hyperlinks

distortion and warping  
tweening and morphing

- **Multi – Many**
- **Media – Medium → the in-between of telecommunication or any communication system.**
  - **Text and Numbers:**
    - **Alphabetical data**, containing a **meaningful string**.
    - Usually made of **7 bits** from the **ASCII. A=65**
    - **Numbers** uses **binary** and are represented as **integers. [Whole numbers]**
    - Numbers can also represent **currency, Boolean, real numbers**.
    - Texts and Numbers are displayed as images using **fonts**. Maintaining consist formatting, such as font, size, colour is important in maintain a nice multimedia.
      - **Serif** fonts have curls [Time New Roman]
      - **San-serif** are plain straight line fonts [Arial]
  - **Audio:**
    - Audio is **sound** that has been **digitised**.
    - They are **represented as waveforms**, determined by its **wavelength** and **amplitude**.
    - Usually stored as **MP3, WAV**. Uses software like **MIDI**.
    - They can be **music, speech, sound effects and beep**.
      - **Sample Audio:**
        - Analogy sounds that is converted in digital signals.
      - **Individual Notes:**
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  - **Images and/or animation:**
    - Images are **visual data** for analysis and for **clearly understanding** than other media like text.
    - In forms of **picture, graphs, drawing, photographs**.
    - Can be displayed on a **monitor, screen** or a **printed** carbon copy.
    - Images are constructed by **pixels** that create a dimension known as the resolution.
    - Images can be stored as **PNG, JPEG, GIF, BMP**.
      - **Bitmap:**
        - Bitmap images are **represented by dots** known as **pixels**.
        - Within each pixel, are its colours with their **binary colour**.

	<ul style="list-style-type: none"> <li>▪ <b>Resolution is a major factor</b>, as an <b>enlargement of the image</b> also <b>enlarges the pixel</b> hence providing a <b>jagged effect</b> where the image is now <b>pixelated [Alias]</b>. There are software that can anti-alias.</li> <li>▪ To <b>calculate Bitmap storage size</b>: <ul style="list-style-type: none"> <li><math display="block">\text{Horizontal pixels} \times \text{Vertical pixels} \times \text{Bit depth} = \text{File size}</math></li> <li><math display="block">\text{Resolution} \times \text{Bit depth} = \text{File size}</math></li> </ul> </li> <li>– <b>Vector</b>: <ul style="list-style-type: none"> <li>▪ The image is <b>represented by shapes</b> rather than pixels.</li> <li>▪ <b>Enlargement of those images</b> will <b>remain</b> the same <b>without loss of quality</b> and <b>file size</b>.</li> <li>▪ Those vector images require <b>less storage</b>; it take <b>more processing power</b> then bitmap.</li> </ul> </li> <li>▪ Animation is done by <b>connecting sequences of images. [cells or frames]</b></li> <li>▪ Animation can be stored as <b>GIF</b> or <b>SWF [Flash]</b>.</li> <li>▪ This connecting of frame creates <b>continuous movements</b>. <ul style="list-style-type: none"> <li>– <b>Cell based: A sequence of cells [images] with small changes between each of them. When played the illusion of movement is created.</b></li> <li>– <b>Path based: The cell [image] follows a drawn path or line. When played, the image move along the line in front of the background. On the way, it can be transformed, twisted, flipped or even rotate.</b></li> </ul> </li> <li>– <b>Video</b> <ul style="list-style-type: none"> <li>▪ Video images [as well as image] are used to <b>appeal</b> and <b>interest</b> the system in a multimedia.</li> <li>▪ It is a combination of both <b>sound and images to form a film</b>.</li> <li>▪ <b>Buffering</b> is the cause or <b>delay</b> of a video.</li> <li>▪ Videos are mainly stored as <b>MP4, MOV, AVI</b>.</li> <li>▪ To <b>calculate storage size</b>: <ul style="list-style-type: none"> <li><math display="block">\text{Total Frame} = \text{Amount of frames/second} \times \text{Seconds}</math></li> <li><math display="block">\text{Size of frame} = \text{Resolution} \times \text{Bit depth}</math></li> <li><math display="block">\text{Total Frame} \times \text{Size of frame} = \text{Total storage}</math></li> </ul> </li> </ul> </li> <li>– <b>Hyperlinks</b> <ul style="list-style-type: none"> <li>▪ Hyperlinks are piece of text that allow individual to <b>connect to another page</b>.</li> <li>▪ Usually denote based of HTML tag: <code>&lt;a href=www.google.com.au&gt; Google Site &lt;/a&gt;</code></li> <li>▪ <b>Anchor: Links</b> the user to another <b>site within the webpage</b>.</li> <li>▪ <b>Link: Links</b> the user to a <b>new webpage</b>.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>▪ the differences between print and multimedia, including:</li> </ul>	<ul style="list-style-type: none"> <li>▪ Print [Static] usually is defined as a hard copy of the information, whereas multimedia [Dynamic] contains the same purpose but is more interactive and appealing to use.</li> </ul>

<ul style="list-style-type: none"> <li>- different modes of display</li> <li>- interactivity and involvement of participants in multimedia systems</li> <li>- ease of distribution</li> <li>- authority of document</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Different modes of display:</b> <ul style="list-style-type: none"> <li>▪ Print <ul style="list-style-type: none"> <li>- Uses paper base like <b>books, magazines, paper.</b></li> </ul> </li> <li>▪ Multimedia <ul style="list-style-type: none"> <li>- Uses a <b>screen, monitor or project</b> to display its data.</li> </ul> </li> </ul> </li> <li>- <b>Interactivity and involvement of participants in multimedia systems:</b> <ul style="list-style-type: none"> <li>▪ Print <ul style="list-style-type: none"> <li>- <b>Lacks interactivity</b> as the printed copy can only provide images and text for individuals to interact.</li> <li>- A <b>change</b> within a printed version require money to <b>replace</b> the whole thing.</li> </ul> </li> <li>▪ Multimedia <ul style="list-style-type: none"> <li>- <b>Very interactive</b>, as multimedia can be displayed on screens that have unlimited navigation of information.</li> <li>- Have the ability to <b>run videos</b> and <b>hyperlink pages</b> to further information.</li> <li>- <b>Touch screen</b> in multimedia allows user to physically interactive with system.</li> <li>- Also, the information <b>can be updated, changed with ease.</b></li> </ul> </li> </ul> </li> <li>- <b>Ease of distribution:</b> <ul style="list-style-type: none"> <li>▪ Print <ul style="list-style-type: none"> <li>- Require a <b>printer, lots of paper and ink.</b></li> <li>- <b>Harder to distribute</b> to large audience as it is <b>expensive.</b></li> </ul> </li> <li>▪ Multimedia <ul style="list-style-type: none"> <li>- Require a <b>device, hardware, software, internet and basic interaction skill.</b></li> <li>- <b>Easier to distribute</b> as sending things online to large audience is more <b>cheaper and faster.</b></li> </ul> </li> </ul> </li> <li>- <b>Authority of document:</b> <ul style="list-style-type: none"> <li>▪ Print <ul style="list-style-type: none"> <li>- <b>Professionally printed book</b> and <b>government print information</b> is more <b>trustworthy</b> and easier to store from other unauthorised access than multimedia.</li> </ul> </li> <li>▪ Multimedia <ul style="list-style-type: none"> <li>- Storing information on a multimedia, allows to data to be <b>hacked</b> or <b>stolen</b> by <b>hackers</b> and spammers. More <b>dangerous environment.</b></li> <li>- <b>Less privacy.</b></li> </ul> </li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>▪ the demands placed on hardware by multimedia systems, including:</li> </ul>	<ul style="list-style-type: none"> <li>▪ Since multimedia requires the use of videos and images, the <b>main hardware component is the CPU</b> to process those high-quality data types.</li> </ul>

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| <ul style="list-style-type: none"> <li>- primary and secondary storage requirements as a result of:             <ul style="list-style-type: none"> <li>- bit depth and the representation of colour data</li> <li>- sampling rates for audio data</li> </ul> </li> <li>- processing as a result of:             <ul style="list-style-type: none"> <li>- video data and frame rates</li> <li>- image processing, including morphing and distorting</li> <li>- animation processing, including tweening</li> </ul> </li> <li>- display devices as a result of:             <ul style="list-style-type: none"> <li>- pixels and resolution</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>- Primary and secondary storage requirements as a result of:             <ul style="list-style-type: none"> <li>- Bit depth and the representation of colour data</li> <li>- Sampling rates for audio data                 <ul style="list-style-type: none"> <li>- Primary Storage: Volatile, internal storage                     <ul style="list-style-type: none"> <li>▪ <b>RAM [Random Access Memory]</b> is used to as colours are represented on images as pixels.                             <ul style="list-style-type: none"> <li>- It allows for the image and memory of colours to be temporary stored and displayed.</li> <li>- It acts as a <b>frame buffer</b> to load images.</li> </ul> </li> <li>- Along with this requires a <b>hard disk</b> where the images and audio are stored.</li> </ul> </li> <li>▪ <b>ROM [Read Only Memory]</b> <ul style="list-style-type: none"> <li>- It allows for instruction and protocols to be <b>permanently stored</b>.</li> </ul> </li> <li>▪ <b>Cache Memory</b> <ul style="list-style-type: none"> <li>- <b>Caching speed up the process of data.</b></li> <li>- As <b>frequency</b> and <b>regular</b> use of the information is stored to speed up future access.</li> </ul> </li> </ul> </li> <li>- Secondary Storage: Non-volatile, external storage                     <ul style="list-style-type: none"> <li>▪ <b>Floppy Disk</b></li> <li>▪ <b>HDD [Hard Disk Drive]</b></li> <li>▪ <b>USB [Universal Serial Bus]</b></li> <li>▪ <b>CD [Compact Disc]</b></li> <li>▪ <b>SSD [Solid State Drive]</b></li> </ul> </li> </ul> </li> </ul> <li>- Processing as a result of:             <ul style="list-style-type: none"> <li>- Video data and frame rates                 <ul style="list-style-type: none"> <li>▪ <b>Video chip</b> or <b>processing cards</b> are used to lift the heavy process of the CPU, for a smoother viewing.</li> </ul> </li> <li>- Image processing, including morphing and distorting                 <ul style="list-style-type: none"> <li>▪ More on software having the ability to morph and distort multimedia data types.</li> <li>▪ <b>Morphing: The smooth and progressively change of one image to another. Transitioning the shape, size and colour.</b></li> <li>▪ <b>Distorting: The physical change in appearance of an image by bending, twisting, stretching, wrapping.</b></li> </ul> </li> <li>- Animation processing, including tweening                 <ul style="list-style-type: none"> <li>▪ <b>Tweening: The process of an object moving between key frames.</b></li> </ul> </li> </ul> </li> <li>- Display devices as a result of:             <ul style="list-style-type: none"> <li>- Pixels and resolution                 <ul style="list-style-type: none"> <li>▪ <b>Cathode ray tube screens</b> were an old fashion display device, which provided less pixel hence a <b>low-resolution</b> image.</li> <li>▪ <b>LCD, flat screen, 4K display</b> have the ability to capture images where even the human eye cannot comprehend the pixels.</li> </ul> </li> </ul> </li> |
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	<ul style="list-style-type: none"> <li>▪ <b>The more pixels == High Resolution == More expensive high resolution screen.</b></li> </ul>
<ul style="list-style-type: none"> <li>▪ the variety of fields of expertise required in the development of multimedia applications, including: <ul style="list-style-type: none"> <li>– content providers</li> <li>– system designers and project managers</li> <li>– those skilled in the collection and editing of each of the media types</li> <li>– those skilled in design and layout</li> <li>– those with technical skills to support the use of the information technology being used</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Jobs and applications that allow for a highly advance multimedia system.</b> <ul style="list-style-type: none"> <li>– <b>Content providers</b> <ul style="list-style-type: none"> <li>▪ Organisations that provide ready to use content for a fee (stock photographs, animations, video and text)</li> <li>▪ Individuals who can create original content to meet a specific need</li> </ul> </li> <li>– <b>System designers</b> <ul style="list-style-type: none"> <li>▪ Identify purpose of the system, decide feasibility, determine hardware and software and overall design</li> <li>▪ Leadership skills</li> </ul> </li> <li>– <b>Project mangers</b> <ul style="list-style-type: none"> <li>▪ Develop the project plan and ensure it is followed on time and on budget</li> <li>▪ Communication and negotiation skills needed</li> </ul> </li> <li>– <b>Those skilled in the collection and editing of:</b> <ul style="list-style-type: none"> <li>▪ <b>Text</b> – writers selected on ability and knowledge of subject matter</li> <li>▪ <b>Graphics</b> – illustrators and animators who use software to create figures</li> <li>▪ <b>Audio</b> – need technical skills to mix different digital audio clips and creativity to create sound effects</li> <li>▪ <b>Video</b> – camera operator, sound engineer, actors and director (who approves set design, costumes, camera angles, lighting, editing)</li> </ul> </li> </ul> </li> <li>▪ <b>Those skilled in design and layout</b> <ul style="list-style-type: none"> <li>▪ Graphic designers improve the readability of multimedia by organising layout of screen, adjusting colour and size.</li> </ul> </li> <li>▪ <b>Those with technical skills to support the use of information technology being used</b> <ul style="list-style-type: none"> <li>▪ Multimedia delivered over internet relies on internet speed. Different levels of compression, lower resolution and streaming can ensure presentation delivered quickly</li> <li>▪ Data distributed on CD-ROM is compressed. Must ensure required codec is present on user computers</li> <li>▪ For databases, need person skilled in creating schemas, writing queries, organising back-up and securing the database.</li> </ul> </li> </ul>

<i>Students learn to:</i>	<i>Notes:</i>
<ul style="list-style-type: none"> <li>▪ use multimedia systems in an interactive way and to identify how they control the presentation of information</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>

<ul style="list-style-type: none"> <li>▪ identify multimedia software appropriate to manipulating particular types of data</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>	
<ul style="list-style-type: none"> <li>▪ compare and contrast printed and multimedia versions with similar content</li> </ul>	<p><b>Printed</b></p> <ul style="list-style-type: none"> <li>▪ <b>Limited information</b> can be given</li> <li>▪ Requires a <b>printer</b></li> <li>▪ More privacy</li> <li>▪ <b>Lacks interactivity</b></li> </ul>	<p><b>Multimedia</b></p> <ul style="list-style-type: none"> <li>▪ <b>Unlimited amount</b> of information can be given</li> <li>▪ Requires a <b>screen and speakers</b> to function</li> <li>▪ Less secure and lacks privacy</li> <li>▪ <b>More interactivity</b>. Can be linked to more information, contain videos and audio.</li> </ul>

<p><b>2. examples of multimedia systems</b></p>	
<p><i>Students learn about:</i></p>	<p><i>Notes:</i></p>
<ul style="list-style-type: none"> <li>▪ the major areas of multimedia use, including: <ul style="list-style-type: none"> <li>– education and training</li> <li>– leisure and entertainment</li> <li>– information provision, such as information kiosk</li> <li>– virtual reality and simulations such as flight simulator</li> <li>– combined areas such as educational games</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Education and Training</b> / Combined areas such as <b>educational games</b></li> <li>▪ Multimedia systems can be used in <b>preschool and infant school</b>, as visually appealing and <b>interactive educational games can be introduced reading and writing</b>. Multimedia system, with <b>large buttons, bright colour and a touch screen and mouse input</b>, allow young individual to understand the function around them.</li> <li>▪ Online software or <b>Learning Management System</b> can allow any person <b>complete activity and learn new skills that can be harmful and dangerous in life</b>. Businesses can use multimedia system, to train staff about their economy, pilots can train trainees on flight simulators.</li> <li>▪ <b>Leisure and Entertainment</b> <ul style="list-style-type: none"> <li>– The <b>Worldwide Web</b> has allowed for online multimedia systems to assist in <b>long distance communication and provide games and virtual experience with thousands of other individuals</b>. MMO games and Skype has made people interact with human from around the world.</li> </ul> </li> <li>▪ <b>Virtual Reality and Simulations</b> such as flight simulator <ul style="list-style-type: none"> <li>– <b>Virtuality Reality (VR)</b> is an advanced trend in society, enabling a person to <b>interact with an artificial environment</b>. Hardware demands require, <b>VR goggles, Head up display, Motion sense equipment, Surround sound speakers, and Gloves</b>. They can provide <b>near real experience in games or can treat patient with extreme phobias</b>. <b>Flight Simulator can also be a VR application</b>.</li> <li>– Also, trending is <b>Argument Reality (AR)</b> where a <b>simulated environment acts co-existing with the real world</b>. These enable new advance interacting and <b>3D walkthroughs</b>, but are <b>high expensive and technical</b>.</li> </ul> </li> </ul>

<ul style="list-style-type: none"> <li>▪ advances in technology which are influencing multimedia development</li> </ul>	<ul style="list-style-type: none"> <li>▪ Worldwide Web <ul style="list-style-type: none"> <li>– The internet allows for a large amount of interactivity.</li> </ul> </li> <li>▪ High Resolution capture screen</li> <li>▪ Fast and more powerful CPU</li> </ul>
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<i>Students learn to:</i>	<i>Notes:</i>
<ul style="list-style-type: none"> <li>▪ identify participants, data/information and information technology for one example of a multimedia system from each of the major areas</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>
<ul style="list-style-type: none"> <li>▪ describe the relationships between participants, data/information and information technology for one example of a multimedia system from each of the major areas</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>
<ul style="list-style-type: none"> <li>▪ discuss environmental factors that will influence the design of a multimedia system for a given context, and recommend ways of addressing them</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>
<ul style="list-style-type: none"> <li>▪ critically evaluate the effectiveness of a multimedia package within the context for which it has been designed</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>



<ul style="list-style-type: none"> <li>interpret developments that have led to multimedia on the World Wide Web</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
<ul style="list-style-type: none"> <li>discuss multimedia systems that address new technological developments</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
<ul style="list-style-type: none"> <li>compare and contrast multimedia presentations</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>

<b>3. displaying in multimedia systems</b>	
<i>Students learn about:</i>	<i>Notes:</i>
<ul style="list-style-type: none"> <li>hardware for creating and displaying multimedia</li> </ul>	<ul style="list-style-type: none"> <li><b>Fast processor and large storage</b></li> <li><b>High Resolution Screen (CRT, Plasma, LCD, Touch Screen)</b></li> <li><b>Head-up displays</b></li> <li><b>Audio Display (Head Set, Speaker)</b></li> <li><b>Projection Device</b></li> </ul>
<ul style="list-style-type: none"> <li>software for creating and displaying multimedia</li> </ul>	<ul style="list-style-type: none"> <li><b>Presentation Software</b> <ul style="list-style-type: none"> <li>Used to create high quality presentation to display.</li> <li>Microsoft's PowerPoint, Apple's Keynote</li> </ul> </li> <li><b>Application for Video and Audio Processing</b> <ul style="list-style-type: none"> <li>Word Processing</li> </ul> </li> <li><b>Authoring Software</b> <ul style="list-style-type: none"> <li>Used to create the multimedia system.</li> <li>Quizmaker, Adobe Flash CS3</li> </ul> </li> <li><b>Animation Software</b> <ul style="list-style-type: none"> <li>Used to create cartoons and animation</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>- GIF Animator, Toon Boom Animation.</li> <li>▪ <b>Web Browser and HTML Editor</b> <ul style="list-style-type: none"> <li>- Allows the interaction and interface of the create multimedia system worldwide.</li> <li>- Google Chrome, Internet Explorer</li> </ul> </li> </ul>
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<i>Students learn to:</i>	<i>Notes:</i>
<ul style="list-style-type: none"> <li>▪ describe how relevant hardware devices display multimedia and use a variety of devices</li> </ul>	<ul style="list-style-type: none"> <li>▪ Embedding and Linking</li> </ul>
<ul style="list-style-type: none"> <li>▪ implement features in software that support the displaying of multimedia and explain their use</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>
<ul style="list-style-type: none"> <li>▪ use available hardware and software to display multimedia and interact with it</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>
<ul style="list-style-type: none"> <li>▪ summarise the techniques for collecting, storing and displaying different forms of media and implement these in practical work</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>
<ul style="list-style-type: none"> <li>▪ create samples of the different media types suitable for use in a multimedia display</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>

4. other information processes in multimedia systems	
<i>Students learn about:</i>	<i>Notes:</i>
<ul style="list-style-type: none"> <li>▪ processing: <ul style="list-style-type: none"> <li>– the integration of text and/or number, audio, image and/or video</li> <li>– compression and decompression of audio, video and images</li> <li>– hypermedia – the linking of different media to one another</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Processing</b> <ul style="list-style-type: none"> <li>– The process where data is <b>manipulated</b></li> </ul> </li> <li>▪ The integration of text and/or number, audio, image and/or video <ul style="list-style-type: none"> <li>– The starting point of multimedia system where content is <b>imported and embedded</b> on the created screens and pages. It is then displayed and distributed.</li> </ul> </li> <li>▪ Compression and decompression of audio, video and images <ul style="list-style-type: none"> <li>– <b>CODEC (Compression Decompression)</b> This is the methods used to compress data and revert into its original form.</li> <li>– End users can decompress the format of multimedia, by reducing the bits and hence reduced the file size.</li> </ul> </li> <li>▪ Hypermedia – the linking of different media to one another <ul style="list-style-type: none"> <li>– Involves the <b>linking of other different type of media</b> and relate the materials and source file. Usually done online or on the web.</li> <li>– Hypermedia is made <b>accessible</b> for everyone and linking together the information makes for <b>easier navigation</b>.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>▪ organising presentations using different storyboard layouts, including: <ul style="list-style-type: none"> <li>– linear</li> <li>– hierarchical</li> <li>– non-linear</li> <li>– a combination of these</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Storyboards</b> <ul style="list-style-type: none"> <li>– Storyboards are used mainly for designing user <b>interface software</b>. They are interactive and will bring upon another board upon interacting with the current board.</li> <li>– They are laid out with screens and connected to one another, using navigational links.</li> <li>– There are three types: <b>Linear, Hierarchical [common for webpages], Combination</b>.</li> <li>– User interface → When designing a user interface, it is important to know the statistic of users and their consistency of knowledge with the software, having recorded actions and reactions of what they are doing. The UI must show all possible function that are operational and an end/way out on potential threats.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>▪ storing and retrieving: <ul style="list-style-type: none"> <li>– the different file formats used to store different types of data</li> <li>– compression and decompression</li> </ul> </li> </ul>	<p><b>Storing and retrieving</b></p> <ul style="list-style-type: none"> <li>▪ <b>Images</b> <ul style="list-style-type: none"> <li>– JPEG: lossy compressed, for photographic images (large bit depth)</li> <li>– GIF: lossless compressed, for banners and logos (small bit depth)</li> <li>– PNG: lossless</li> <li>– BMP: lossless uncompressed</li> </ul> </li> <li>▪ <b>Audio</b></li> </ul>

	<ul style="list-style-type: none"> <li>– WAV: lossless uncompressed</li> <li>– MP3: lossy compressed</li> <li>– WMA: lossy compressed</li> <li>– MIDI: lossless uncompressed (for musical notes)</li> <li>▪ <b>Video and animations</b> <ul style="list-style-type: none"> <li>– MPG: lossy compressed</li> <li>– QuickTime: lossy</li> <li>– AVI: lossy</li> <li>– WMV: lossy</li> <li>– SWF: lossy (also stores vector images and animation with sound; need Flash Player)</li> </ul> </li> <li>▪ <b>Compression and decompression</b> – too much compression and the quality deteriorates, not enough and the file size is too large. <ul style="list-style-type: none"> <li>– Images <p>JPEG converts the 8 bit red, 8 bit blue and 8 bit green component to YCbCr (brightness, chrominance blue and chrominance red). The image is then altered so that Cb and Cr values are heavily compressed.</p> </li> <li>– Audio <p>The Digital Signal Processor on sound cards removes part of the sound that will not be noticed by most listeners (frequencies outside the human hearing range)</p> </li> <li>– Video <p>The frame is split into blocks and then compared to the past frame. If there is a close match then presumably no motion has taken place and the block only needs to be stored once. If <i>no</i> match is found, the block must be stored as a bitmap. Each frame is represented separately but requires that past frames be known before display. Therefore, there is no need to decompress the <i>entire</i> video before playback</p> </li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>▪ collecting: <ul style="list-style-type: none"> <li>– text and numbers in digital format</li> <li>– audio, video and images in analog format</li> <li>– methods for digitising analog data</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Collecting</b> <ul style="list-style-type: none"> <li>– The process data is <b>entered</b> into an information system.</li> </ul> </li> <li>▪ Text and numbers in digital format <ul style="list-style-type: none"> <li>– Can be input into a digit format, via <b>keyboard</b></li> <li>– Can be <b>handwritten</b> and used to convert into a digit format, via using an <b>OCR (Optical Character Recognition) software</b></li> </ul> </li> <li>▪ Audio, video and images in analogy format <ul style="list-style-type: none"> <li>– <b>Scanners</b> <p>Input device that electronically capture images and page base copies.</p> </li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>– <b>Video Camera (Digital Camera)</b> Use Len to focus on the images that is captured and stored as a digital form.</li> <li>– <b>Microphone</b> Collecting tool that captures sound waves and converts the audio into analogy digitised waves.</li> <li>– <b>VCR (Video cassettes player)</b> Capture Video on a videotape.</li> <li>▪ Methods for digitising analogy data <ul style="list-style-type: none"> <li>– <b>Sample Data</b> The method for converting analogy data through, <b>repeatedly sampling the magnitude of the incoming electrical current</b>. The samples are then <b>converted into binary</b>.</li> </ul> </li> </ul>
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<i>Students learn to:</i>	<i>Notes:</i>
<ul style="list-style-type: none"> <li>▪ describe the process of analog to digital conversion</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>
<ul style="list-style-type: none"> <li>▪ plan a multimedia presentation using a storyboard</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>
<ul style="list-style-type: none"> <li>▪ diagrammatically represent an existing multimedia presentation with a storyboard</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>
<ul style="list-style-type: none"> <li>▪ design and create a multimedia presentation</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>
<ul style="list-style-type: none"> <li>▪ combine different media types in authoring software</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Author Software</b> <ul style="list-style-type: none"> <li>– Used to <b>create</b> and <b>design</b> a multimedia system by <b>combining the input of videos, texts, numbers, audio</b> all in one multimedia system. They create <b>actions, relationships</b> and <b>increases interactivity</b>.</li> <li>– Examples:</li> </ul> </li> </ul>

	<p>E-book Interactive movies Quizzes</p>
<ul style="list-style-type: none"> <li>▪ design and create a multimedia World Wide Web site that includes text and numbers, hypertext, images, audio and video</li> </ul>	<ul style="list-style-type: none"> <li>▪ World Wide Web (www) <ul style="list-style-type: none"> <li>– Includes HTML</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>▪ identify standard file formats for various data types</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Bitmap Images: JPEG, GIF, PNG, TIF</b></li> <li>▪ <b>Vector Images: WMF, SWF, PDF</b></li> <li>▪ <b>Audio: WAV, MP3, MIDI</b></li> <li>▪ <b>Video and Animation: MPEG, MP4, AVI, WMV, FLV</b></li> </ul>
<ul style="list-style-type: none"> <li>▪ recommend an appropriate file type for a specific purpose</li> </ul>	<ul style="list-style-type: none"> <li>▪ MPG: lossy compressed</li> <li>▪ QuickTime: lossy</li> <li>▪ AVI: lossy</li> <li>▪ WMV: lossy</li> <li>▪ SWF: lossy (also stores vector images and animation with sound; need Flash Player)</li> </ul>
<ul style="list-style-type: none"> <li>▪ describe the compression of audio, image and video data and information</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Lossy Compression (Audio, Video and Images)</b> <ul style="list-style-type: none"> <li>– <b>Quality is reducing by removing several data byte from the file.</b> Lossy compression is done to audio and video, cause the feeling of compressed video is no different from the original file. Some images can be lossy, as a HD image isn't required, <b>JPEG</b>.</li> </ul> </li> <li>▪ <b>Lossless Compression (Text and Number)</b> <ul style="list-style-type: none"> <li>– The <b>file is kept in it full file size.</b> Data is no lost due to compression. Lossless in audio and video would be inappropriate as it takes a lot of space. However, text and images and numbers, are should be lossless as repeated words can be repeated with a value that take less room, <b>PNG</b>.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>▪ decide when data compression is required and choose an appropriate technique to compress data and later retrieve it</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Calculation</b> <ul style="list-style-type: none"> <li>– Usually a compression ratio is given. Example, 3:1 where 3 is the compressed / 1 is the compressed.</li> </ul> </li> <li>▪ For Video File Total Frame = Number of Frame per second (FPS) * length in seconds (sec)</li> </ul>

	<p>Data Per Frame = Resolution (pixel) * bit depth (byte)</p> <p>File Size = Total Frames * Data Per Frame</p> <p>With compression rate 25:1</p> <p>Total File Size = File size / 25</p>
<ul style="list-style-type: none"> <li>▪ capture and digitise analog data such as audio or video</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>

<b>5. issues related to multimedia systems</b>	
<i>Students learn about:</i>	<i>Notes:</i>

<ul style="list-style-type: none"> <li>▪ copyright: the acknowledgment of source data and the ease with which digital data can be modified</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Copyright Issue</b> <ul style="list-style-type: none"> <li>– According <b>Copyright Act</b>, it is a copyright infringement if, a original work is illegally distributed and used without the author’s consent. Duplication and reverse engineering of the software and cracked file can also be considered as copyright.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>▪ appropriate use of the Internet and the widespread application of new developments</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Internet</b> <ul style="list-style-type: none"> <li>– Lack of privacy as information and stolen detail are intercepted. Offensive language in forums and demotivate individuals. Skype with strangers and online communication with other can be at risk</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>▪ the merging of radio, television, communications and the Internet with the increase and improvements in digitisation</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>RSS Feeds</b> <ul style="list-style-type: none"> <li>– Content providers update new fees on regular basis on device with internet connection and interactivity.</li> </ul> </li> <li>▪ <b>Applications on Technology Stores</b> <ul style="list-style-type: none"> <li>– Apps can be purchased and used to increase the understanding and improvement of digitalisation, like eBooks, Flight Simulator Pocket Edition.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>▪ the integrity of the original source data in educational and other multimedia systems</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Data Integrity</b> <ul style="list-style-type: none"> <li>– Describes the <b>reliability of data, accuracy, and currency</b>. In educational content and helpful source, the multimedia information provided may be <b>cross reference</b> and can obtain false and misleading information, lowing it Data integrity.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>▪ current and emerging trends in multimedia systems</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Virtual Reality and Argument Reality</b> <ul style="list-style-type: none"> <li>– Users can enter new virtual experiences with <b>online simulated environment that has hands on interactivity</b>. This can be used for entertainment purpose or <b>important assist disability escape the real world</b>.</li> </ul> </li> </ul>

<i>Students learn to:</i>	<i>Notes:</i>
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<ul style="list-style-type: none"> <li>▪ evaluate and acknowledge all source material in practical work</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>
<ul style="list-style-type: none"> <li>▪ use Internet based multimedia presentations in a responsible way</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>
<ul style="list-style-type: none"> <li>▪ predict and debate new technological developments based on advancements in multimedia systems</li> </ul>	<ul style="list-style-type: none"> <li>▪ Virtual Reality <ul style="list-style-type: none"> <li>– VR, is expensive and very difficult to maintain, but it allows for advance realism in information system.</li> <li>– VR maximises its interactivity.</li> </ul> </li> <li>▪ Argument Reality <ul style="list-style-type: none"> <li>– AR, is another trend that creates real world scenario and co-exists with the simulated world.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>▪ cross-reference material supplied in multimedia presentations to support its integrity</li> </ul>	<ul style="list-style-type: none"> <li>▪</li> </ul>