Year 9 IST
Away work

Student Name:_____

Teacher:_____

IN ACTION

Who invented the GUI?

The emergence of the GUI (graphical user interface) on personal computers in the 1980s was a significant turning point in software development. No longer was the computer the closed domain of the technical experts. Many other people were able to use the computer and soon began to develop software applications for it.

Since then, the computer's power in applications and technical specifications has expanded, pushed by ever-increasing market forces. More sophisticated programs demanded more powerful central processing units (CPUs) and monitors, greater storage space and, ultimately, the need to communicate over the Internet to transfer multimedia.

However, for years there was fierce debate and litigation to decide who originally invented the GUI. Consider this article from the website inventors.about.com.

⊘ **Figure 3.1** The Macintosh computer was introduced in January 1984 and was the first to use a WIMP (windows, icons, menus and pointer) GUI.

Take a look at your computer screen. The GUI provides you with windows, pull-down menus, clickable buttons, scroll bars, icons, images and the mouse or pointer.

The first user interfaces for computers were not graphical or visual; they used only text and keyboard commands and are known as command line interfaces [see figure 3.16]. MS-DOS is an example of a text and keyboard method of computer control that you can still find on many PCs today.

The very first graphical user interface was developed by the Xerox Corporation at their Palo Alto Research Center (PARC) in the 1970s, but it was not until the 1980s that GUIs became widespread and popular. By that time the CPU power and monitors necessary for an effective GUI became cheap enough to use in home computers.

Steve Jobs, co-founder of Apple Computers, visited PARC in 1979 (after buying Xerox stock) and was impressed by the 'Alto', the first computer ever with a graphical user interface. Several PARC engineers were later hired by Apple and worked on the Apple Lisa and Macintosh. The Apple research team contributed much in the way of originality in their first GUI computers, and work had already begun on the Lisa before Jobs visited PARC. Jobs was definitely inspired and influenced from the technology he saw at PARC, however, enough for Bill Gates to later defend Microsoft against an Apple lawsuit over Windows 1.0 having too much of the 'look and feel' of an Apple Macintosh – Gates' claim being, 'hey, we both got it from Xerox'. The lawsuit ended when Gates finally agreed that Microsoft would not use Macintosh technology in Windows 1.0, but the use of that technology in future versions of Windows was left open. With that agreement, Apple lost its exclusive rights to certain key design elements.

Source: inventors.about.com

⊘ **Figure 3.2** The Xerox Alto was the first computer to use the desktop metaphor and the mouse-driven GUI. The separate hard drive seen below the computer could hold 2.5 megabytes (MB) of data.

QUESTIONS

1 Who first invented the GUI?

2 How did people interact with computers before the GUI was invented?

3 How is the GUI on today's personal computers different from earlier ones?

IN ACTION

Roll up! Roll up! Get your super-flexible screens here!

Mobile devices such as phones, computers and media players have been shrinking in size since they first appeared on the market. Reducing the size of these devices increases their portability, but there is a point where the screen becomes too small for effective image display. Technology companies are producing flexible screens that can be rolled up like a window blind. These screens are made up of a thin film of pixels that can be rolled tightly around a cylinder as small as a pencil yet are still able to display moving images. The screens are lighter and generally tougher than conventional glass-based displays, so this idea can be developed further into areas of wearable items such as wristbands, or displays on the outside of moving vehicles or even on the steering wheel.

One type of display is made up of an array of organic light-emitting diodes (OLEDs). These OLEDs are molecules that can produce light when a voltage is applied to them, and can retain the image for several months without electricity.

A rollable display might measure a few centimetres wide and about 80 micrometres thick, which is thinner than a human hair. It can produce 16 million colours, which means full-colour quality. These panels are able to produce moving images while being repeatedly rolled up and unrolled. Even after 1000 cycles of rolling and stretching, the video image does not appear to be adversely affected.

Ordinary light-emitting diodes (LEDs) have been used in electronic circuits for many years; for example, as a monitor on-off indicator light. With circuitry now being developed at a molecular level using organic materials, the technology is now referred to as 'organic'. The display devices can be created from liquids in a similar way to artists creating screen-prints. This type of production requires fewer steps and uses materials more efficiently than previous display production, with less impact on the environment.

High-resolution television screens present another important application that benefits from flexible, lightweight, low-energy-consumption screens. As screens get larger and image quality is enhanced, the demand for smarter technology increases.

QUESTIONS

1 In what ways are flexible screens more useful than rigid ones?

2 How thin is the screen? How tightly can it be rolled?

3 What does OLED mean?

4 Explain how these screens are more environmentally friendly than conventional screens.

5 What other devices could use the flexible screen idea?

↷ **Figure 2.1** A smartphone on a wristband

↷ **Figure 2.2** Exercising with wearable smart devices is no longer a futuristic idea.
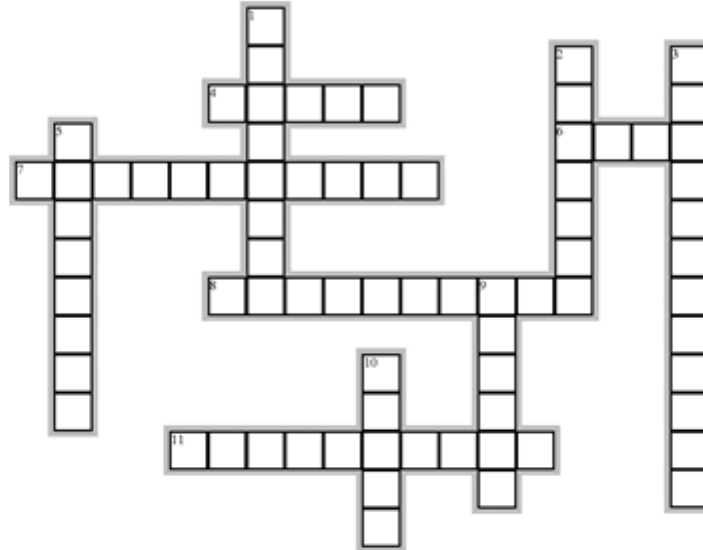
Chapter 11 Worksheets

11.1 The purpose of digital media

Use the word list and the clues to solve the crossword.

MEDICINE   INTERACTIVE   MPEG   GAMES   DIGITAL MEDIA   E-MUSIC

CD-ROM   MULTIMEDIA   NEWSPAPERS   DOMAINS   ANALOGUE

Across

4   Currently the dominant form of recording and distributing music digitally

6   _____ layer 3 (MP3) audio format allows digital data to be stored with minimal loss of audio quality and with small file sizes

7   ITV: _____ TV allows viewers to select such aspects as the camera angle at they wish to view a game of football or an alternative outcome to a favourite TV soap

8   The biggest advantage of digital _____ is perhaps the ease of searching past stories

11   The combination of three or more digital media

Down

1   There are many examples of digital media products in the field of _____

2   MUDs: multi-user _____ allow games players to make decisions which affect other players

3   The various forms in which digital data can exist, such as text, audio, graphics, animation and video (two words)

5   Data whose signal size can vary continuously, like a waveform

9   Music that can be downloaded from the Internet

10   Many of the advances made in digital media have been driven by the _____ industry

11.4 Data types of digital media products

Place the correct text and video file format next to the corresponding definition.

TIFF	GIF	ASCII (TXT)	DOC	JPEG	PDF
HTML	RTF	EPSF or EPS	PICT	BMP	

Definition	File Format
A format defined by Microsoft and used in its word processing software, Microsoft® Word.	
Rich text format. A format based on ASCII which retains basic formatting, such as bold and italics.	
Encapsulated PostScript® format. This is a vector graphic format. The PostScript® language was created for high-resolution-quality printed output, and not for viewing on screens.	
American Standard Code for Information Interchange, also known as text (TXT). The standard universal format for exchange of text and numerical data only. One byte stores one character.	
Portable document format. A format owned by Adobe Systems which preserves the appearance of text and graphics across platforms and systems, and facilitates the transfer of documents using the Internet.	
Tagged image file format. A popular choice for printed publications and desktop publications. Some versions of this format allow compression.	
Graphic interchange format. Popular lossless (no loss of data) compression suitable for bitmapped images of line art, and images with blocks of colour. Compression can be up to 2:1.	
Joint Photographic Experts Group A popular graphics format which uses lossy (some loss of data) compressions of up to 100:1. Best for bitmapped photographs and images with continuous tones. It is commonly used on the web and in digital cameras.	
Bitmap. This is the default bitmapped graphic format for Microsoft® Windows® computers, but can also be used on Macintosh®. They result in large files with no compression.	
Picture. This is the default graphics format on Macintosh® computers, but can also be used in Windows®. These are either bitmapped or vector images.	
Hypertext markup language. A text-based language with embedded tags which indicate the locations of images, audio, video and other files.	

11.6 Digital manipulation techniques

1 **Find the following words in the word maze. After you have located the words, fill in the gaps in the paragraph below.**

VIDEO MANIPULATE

SHADOW MOVIE

SOUND DISTORTING

SPECIAL PANORAMAS

REALITY JOURNEYS

MUSEUMS ANOTHER

DEGREES TIMES

SOFTWARE FOUR

DIGITAL ONE

HEADSETS MANIPULATION

USER

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V L V M W R F Q D B W D O N B H R T K U
S Z V M D O Z O O K T P O K G U F I D N
S I N C D D T X U L D I V K Z S W A D B
B Y L B Y R V H G R T D E G R E E S W K
D L E J C F U K W A K I C H H R C I Z H
F I Z N D R U J L X U G I G A H N U D A
H Q S J R L X U H D C I L W I F M V K Z
C I H T S U P B H Y G T G K N W L U T H
D E L V O I O V J K A A N S I J H H S K
I J R Q N R N J G S V L L F U P S O A A
C T S A V L T W O D A H S U T P F K U U
T P M Y M J Z I J O H Y J G E T R T I P
E M L C S K F R N M U G H C W R P N T A
O Z U J A G M V Y G R Y I A Y E Y P Y N
T E Q S T E S D A E H A R T S H Q D A O
A R D G E U J B A U L E I E R T M N A R
M A N I P U L A T E O L M L A O U U I A
A W S P V E M Q X N A I V O U N D O I M
M O V I E R T S E E T C Z L N A Z S W A
F D U Y T O N Z R D Z T B X B O U O Q S
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Once text, audio, graphics, animation and _____ data are in _____ form, there are many exciting techniques available to _____ them, often with surprising effects. Special software can take text and reshape and _____ it to create _____ text effects. Digitised _____ editing software allows endless possibilities for _____ of real-world audio. Warping is the manipulation of an image by _____ or transforming it. Morphing is the transformation of _____ image into _____. Virtual _____ (VR) effects are achieved using _____. _____ allow us to explore up to 360 _____ of a scene with interactivity. This technology is suited to virtual reality _____ through _____, where travel occurs between rooms or floors. Amazing effects are now available to filmmakers that would have been beyond belief in earlier _____. It has now become easy for the home computer _____ to create their own movies using editing _____ available for desktop computers. There are _____ basic steps to editing a home _____: collecting and ordering the clips, adding transitions, adding effects (such as sepia tones), adding sound and adding titles.

nelsonnet

WORKSHEET

Option test

Chapter 11: Digital media

Section 1: Multiple choice (10 marks)

Circle the letter that represents the best answer.

1   Video can be converted into digitised MPEG files using:
    A video cameras.
    B CODECs.
    C digitising.
    D modulation/demodulation.

2   Digital techniques always use:
    A zeros and ones to represent data.
    B discrete quantities rather than continuous variables.
    C digitising.
    D bytes.

3   The purpose of digitisation is to:
    A record data accurately.
    B enable the use of digital movie cameras.
    C capture real-world data for computers in a computer-friendly form.
    D make more information available more rapidly to users.

4   An important ethical issue associated with e-music is:
    A the cost of MP3 players.
    B the unwillingness of the music industry to use e-music.
    C the ability of MP3 music to be downloaded over the Internet.
    D illegal copying of music over the Internet.

5   Widespread use of interactive TV has been limited by:
    A online alternatives.
    B the cost.
    C unwillingness of TV stations to adopt the technology.
    D a lack of interest by consumers.

6 Paint and draw graphics are also known as:

    A bitmapped and vector respectively.

    B vector and bitmapped respectively.

    C bitmapped and raster respectively.

    D object and vector respectively.

7 A major advantage of draw graphics over bitmapped graphics is:

    A precision.

    B more software is available.

    C more tools are available.

    D smaller file size.

8 A major advantage of MIDI sound format over digitised waveform is:

    A accuracy of reproduction.

    B more software is available.

    C ease of editing.

    D smaller file size.

9 The tool typically used in a paint application to copy any part of an image to a new location in the same image is the:

    A masking tool.

    B eyedropper tool.

    C clone tool.

    D magic wand tool.

10 Warping and morphing are forms of:

    A animation.

    B computer generated images (CGI).

    C virtual reality (VR).

    D digitisation.

Section 2: Match the terms (10 marks)

Match the meaning to the term in the following table by writing the appropriate number in the final column.

	MEANING
1	Distortion of an image
2	Changing one image into another
3	Converting analog data into digital data
4	'Slices' of sound
5	Compression and decompression technique
6	Simulation software and hardware
7	Using a coloured backdrop for film compositing
8	Generated frames between key frames of an animation
9	3D images generated by computer
10	Surface generation for 3D images

TERM	ANSWER
CGI	
Chromakeying	
CODEC	
Digitising	
Morphing	
Rendering	
Sampling	
Tweening	
Virtual reality	
Warping	

Section 3: Fill in the blanks (10 marks)

Use the words from the following list to complete the sentences below. Words may be used once, more than once or not at all.

Word list:

discrete	analogue	rendered	cels	video
eraser	vectors	pixels	speech	instruments
digitising	scanner			

1 Binary data is a form of digital data measured in _____ quantities, whereas _____ data is measured in continuous quantities.

2 To create a realistic 3D shape, a wireframe is first _____ and then textures are added to create the surfaces.

3 Traditional animation uses _____ that are individually hand painted, whereas computer animation often uses CGI techniques.

4 Of all digital media types, _____ can make the biggest demands on a CPU. Regular video requires 25 frames per second as the rate of display.

5 Two tools missing in a typical draw application but present in a typical paint application are the _____ and the brush.

6 A draw application uses _____ in the form of primitives describing a basic shape, colour, thickness of line and type of fill for an object. A paint application instead uses individual _____ to create an image.

7 MIDI format does not allow for the recording of _____.

8 The process of changing an analog signal into a digital one is known as _____.

9 The typical hardware used for changing a magazine photograph into a digital image is a _____.

10 A MIDI file contains descriptions of particular musical _____ along with their durations, pitches and timing.

Section 4: Short answer (10 marks)

You will need separate writing paper for this section.

1 Give two examples each of analog and digital data.
2 Complete the table below by noting similarities and differences between the two graphic data types.

Characteristic	Bitmapped graphics	Vector-based graphics
File size: larger, smaller?		
Suitability for line art?		
Suitability for photographs?		
Suitability for 3D images?		
Method of recording binary data		
Name a suitable software application		
Use of eraser in tool palette or application?		

3 Two methods of creating 3D solids are extrusion and lathing. Describe these two techniques and draw an example of a typical 3D wireframe for each.
4 Describe the two processes of warping and morphing.
5 Explain the difference between lossy and lossless compression and give a typical example of each type.

Section 5: Extended answer (25 marks)

You will need separate writing paper for this section.

You are a member of a team that has been asked to produce a three-minute film to showcase the major resource and service areas of your school (library, canteen, hall, computer rooms, sports areas, etc.) to prospective new students. Outline the pre-production steps involved.

Solutions will be unique to each chosen scenario but will involve each of the following.

• Script
• Team
• Actors
• Storyboarding
• Locations
• Scheduling
• Budget