TECHNICAL UNIVERSITY OF KENYA

FACULTY OF APPLIED SCIENCES AND TECHNOLOGY

SCHOOL OF COMPUTING AND INFORMATION TECHNOLOGY

END OF SEMESTER EXAMINATION SERIES

FIRST SEMESTER EXAMINATION SERIES 2018/2019

FOURTH YEAR EXAMINATIONS FOR THE DEGREE OF:
BACHELOR OF TECHNOLOGY INFORMATION TECHNOLOGY
BACHELOR OF TECHNOLOGY COMPUTER COMMUNICATION NETWORKS

ECII/ECSI 4102: MULTIMEDIA SYSTEMS/MULTIMEDIA APPLICATION SYSTEMS

Time: 2 Hours

Instructions to candidates:

This paper consists of FIVE Questions.

Answer Question ONE [30 Marks] and any other TWO Questions [20 Marks Each]

Mobile phones and any written materials are prohibited in the examination room

Programmable calculators are prohibited

Write your college number and questions attempted on the answer sheet.

This paper consists of 3 printed pages

Do not answer more than the number of questions instructed

Write clearly on the front of the answer script the questions you have attempted

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Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing

QUESTION ONE (30 MARKS) COMPULSORY

a) Define the term Multimedia [2 Marks]

Multimedia refers to the use of multiple forms of media, such as text, graphics, audio, video, and animations, in a single presentation or application

b) Ted Nelson invented the name "hypermedia" around 1965. Using two relevant examples discuss the connection between Multimedia and the root of the terminology "Hypermedia" in the context of their historical backgrounds [5 Marks]

*One example of hypermedia in the context of multimedia is the **World Wide Web**. The Web is a vast, interconnected network of multimedia documents, including text, images, audio, and video. Users can navigate between these documents by clicking on hyperlinks, which take them to related documents and information.*

*Another example of hypermedia is the concept of **interactive multimedia**, which emerged in the late 1980s and early 1990s. Interactive multimedia combines multiple forms of media, such as text, graphics, audio, and video, into a single presentation that allows users to interact with the content in a non-linear manner.*

c) You have been asked to transmit the smell of a rose flower over the internet. The aroma will be transmitted over the internet and reproduced at the receiver's location. List three key issues and two main considerations that justify why this task can be classified as multimedia task [5 Marks]

Three key issues are:

i. ***Reproduction accuracy:*** *The aroma of a rose is a complex mixture of different volatile organic compounds, and reproducing it accurately requires precise measurement, analysis, and synthesis of these compounds. Ensuring that the aroma is accurately transmitted and reproduced at the receiver's location is a significant challenge.*
ii. ***Transmission bandwidth****: Transmitting the aroma of a rose over the internet requires a high amount of data to be transmitted, which can pose bandwidth and latency challenges. The transmission of large amounts of data can cause delays and packet loss, which can impact the quality of the transmitted aroma.*
iii. ***Receiver compatibility****: The ability to reproduce the aroma of a rose at the receiver's location depends on the availability of suitable equipment, such as aroma synthesizers and receivers, which may not be widely available or compatible with existing internet infrastructure.*

Two main considerations that justify why this task can be classified as a multimedia task are:

i. ***Multi-sensory experience****: Transmitting the aroma of a rose over the internet adds a new dimension to the traditional multimedia experience, which typically involves the transmission of visual, audio, and textual information. By adding the sense of smell, the multimedia experience becomes more immersive and engaging, creating a more vivid and memorable experience for the user.*
ii. ***Multiple media types****: Transmitting the aroma of a rose over the internet involves the use of multiple media types, such as chemical compounds, digital data, and sensory equipment. This highlights the interconnectedness and interdependence of different media types in creating a multimedia experience, emphasizing the need for careful integration and management of these media types to ensure a high-quality experience.*

d) The concerns of multimedia researchers impact almost every branch of computer science. State four applications of multimedia in the computer science fields of language, moving Pictures, networks and audio [5 marks]

i. ***Language:*** *Speech recognition and natural language processing are two applications of multimedia in language. Speech recognition involves converting spoken language into text, which is then processed by the computer. Natural language processing is the ability of a computer to understand human language and respond in a way that is natural and meaningful to humans.*
ii. ***Moving Pictures****: Computer graphics and computer vision are two applications of multimedia in moving pictures. Computer graphics involves the creation and manipulation of images and video using computer algorithms. Computer vision involves the analysis and interpretation of images and video using computer algorithms.*
iii. ***Networks:*** *Video streaming and video conferencing are two applications of multimedia in networks. Video streaming involves the real-time transmission of video over the internet. Video conferencing involves real-time communication between two or more people using video and audio.*
iv. ***Audio:*** *Music information retrieval and speech synthesis are two applications of multimedia in audio. Music information retrieval involves the extraction of information from audio signals, such as identifying the artist or genre. Speech synthesis involves the generation of speech by a computer, often used in text-to-speech applications.*

e) Name four characteristics of multimedia systems [4 marks]

i. ***Integration of multiple media types:*** *Multimedia systems are designed to integrate various media types such as text, images, audio, and video, which are often presented in a synchronized and interactive way. The combination of these media types allows for a more immersive and engaging user experience.*
ii. ***Large amount of data****: Multimedia systems often deal with large amounts of data, which can include high-quality images, video, and audio files. Managing and processing these large amounts of data requires specialized hardware and software.*
iii. ***Real-time interactivity:*** *Multimedia systems allow for real-time interactivity between the user and the system, enabling the user to interact with the multimedia content in a dynamic and responsive way. This can include actions such as clicking on a button, playing a video, or pausing an audio file.*
iv. ***Compression and decompression:*** *Multimedia systems use compression algorithms to reduce the size of media files, which helps in efficient storage, transmission, and retrieval of multimedia data. Decompression algorithms are then used to convert the compressed data back into its original format for playback. The use of compression and decompression algorithms is critical to ensure smooth and fast multimedia delivery.*

f) How does latency affect the billions dollar value of the worldwide computer and video gaming industry? [3 marks]

The gaming industry is a multi-billion-dollar industry, and any issue that negatively affects the gaming experience can have a significant impact on the industry's revenue. High-quality gaming experiences, with low latency and high-speed connections, are in demand, and players are often willing to pay for better connectivity or invest in high-end gaming hardware to improve their experience.

g) Correctly define the following terminologies used in Multimedia:

i) Streaming *Media streaming refers to the continuous transfer of multimedia data, such as video or audio, over a network from a server to a client device, allowing the content to be viewed or played back in real-time without requiring the user to download or store the entire file locally.*

ii) MIDI

MIDI (Musical Instrument Digital Interface) is a protocol used in multimedia applications and systems to communicate musical information between digital devices such as computers, synthesizers, and MIDI controllers. It allows musicians, producers, and composers to create and edit musical performances, by sending and receiving digital signals that represent musical notes, rhythms, and other performance data. [2 Marks]

h) Perform an image file size storage calculation for storing in kilobytes a 16-bit depth colour image with a resolution of 1024 by 768 pixels [4 marks]

Storage size = (image width) x (image height) x (bits per pixel) / 8 / 1024

In this case, the image has a resolution of 1024 by 768 pixels and a depth of 16 bits per pixel, so we can substitute these values into the formula:

Storage size = 1024 x 768 x 16 / 8 / 1024

Storage size = 1,572,864 / 1024

Storage size = 1536 KB

Therefore, the storage size of the image would be 1536 kilobytes (KB).

QUESTION TWO (20 MARKS)

a) i) Explain how data in Multimedia is compressed [2 marks]

Compression involves removing or reducing redundant or unnecessary data while preserving the essential information required to reconstruct the original content.

ii) Define lossy and lossless compression [2 Marks]

Lossless compression retains all the data in the original file and results in a smaller file size without any loss of quality, while lossy compression involves discarding some of the data to achieve a smaller file size, which may result in some loss of quality.

b) Correctly distinguish between the following colour terminologies

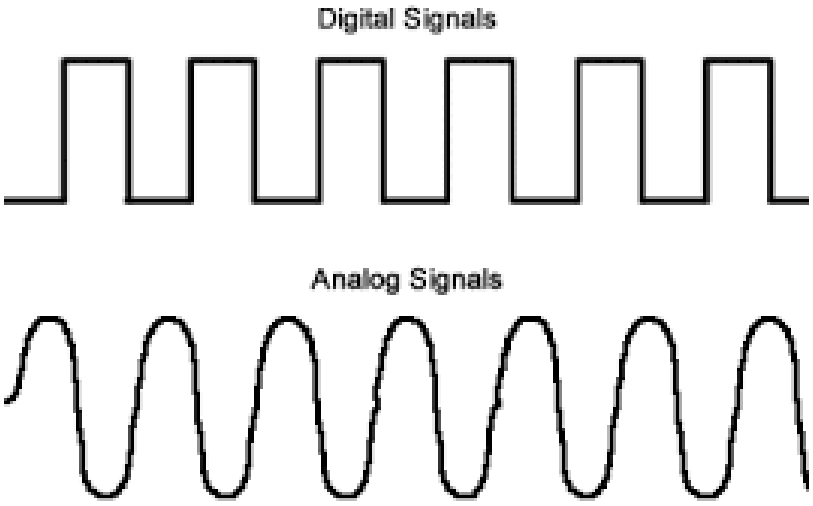
i. Wavelength. *Wavelength refers to the distance between successive peaks or troughs in a light wave. It determines the colour of the light, with longer wavelengths appearing as red or orange and shorter wavelengths appearing as blue or violet*

ii. Brightness. *Brightness, on the other hand, refers to the perceived intensity of light. It determines how light or dark an image appears, and is influenced by factors such as the amount of light emitted by a source, the reflectivity of the surface being illuminated, and the sensitivity of the human eye.* [4 marks]

c) Name two types of extra information spoken text is better at conveying compared to written text [4 marks]

i. ***Tone and intonation****: Spoken text conveys tone and intonation through changes in pitch, volume, and rhythm of speech. These elements can convey emotion, attitude, and emphasis, which can be difficult to express through written text alone.*

ii. ***Nonverbal cues:*** *Spoken text is accompanied by nonverbal cues such as facial expressions, body language, and gestures, which can provide additional information about the meaning and context of the message. These cues can be important in conveying sarcasm, irony, or humor, and can help to establish rapport and build relationships between communicators*



d) Differentiate between the two commonly used multimedia signal types shown in the diagram above. Describe how you would convert an analog audio signal into digital [2 marks]

Analog signals are continuous signals that vary in amplitude and frequency over time. They can be thought of as a continuous wave that smoothly changes over time. Examples of analog signals include sound waves, voltage in electrical circuits, and temperature readings.

Digital signals, on the other hand, are discrete signals that take on a specific value at a specific point in time. They are represented using binary code (0s and 1s) and can be interpreted by a computer. Examples of digital signals include data transmitted over the internet, digital images, and digital audio.

Here are the steps involved in the process:

i. *The analog signal is **first passed through a low-pass filter** to remove any frequencies above the Nyquist frequency (half the sampling rate).*
ii. *The analog signal is then **sampled at regular intervals using an analog-to-digital converter (ADC).** The sampling rate determines the number of samples per second.*
iii. *Each **sample is assigned a digital value using a process called quantization**. This involves rounding the analog value to the nearest digital value that can be represented by the bit depth of the ADC.*
iv. *The resulting digital values are then **encoded into a digital format**, such as WAV or MP3, which can be played back on a computer or other digital device.*

d) The ratio of picture width to height can be 4:3, 16:9, 1.8.5.1 or 2.0.1 used in video display. Which one does high definition TV (HDTV) use, and why it is preferred over the others? [3 marks]

i. *High Definition TV (HDTV) typically uses a picture width to height ratio of 16:9, also known as widescreen format. This aspect ratio has become the standard for HDTV because it closely matches the field of view of the human eye and allows for a more immersive viewing experience. The wider screen format also enables a more cinematic feel to movies and TV shows.*

ii. *The 4:3 aspect ratio was the standard for television for many years, but it is now considered outdated for modern high-resolution displays. This aspect ratio is still used for some non-HD programming, but it results in a smaller viewing area and black bars on the sides of the screen when viewed on a widescreen display.*

iii. *The 1.85:1 and 2.35:1 aspect ratio are commonly used in the film industry for widescreen movies. However, they are not typically used for television as they would result in significant black bars on a 16:9 display.*

In summary, the 16:9 aspect ratio is preferred for HDTV because it provides a more immersive and cinematic viewing experience, matches the field of view of the human eye, and is the standard aspect ratio for modern high-resolution displays.

f) What is a simulator and what is it used for in computer gaming? [3 marks]

A simulator is a computer program that mimics the behavior of a real-world system or process. In computer gaming, a simulator is used to create a realistic simulation of a real-world activity or experience.

Simulators in computer gaming can take many forms, ranging from flight simulators to driving simulators, and even sports simulators. They are designed to provide a realistic experience to the user, and often require specialized hardware, such as a steering wheel or joystick, to fully immerse the player in the game.

QUESTION THREE (20 MARKS)

a) One simple approach to video compression is to compress each frame of the video using the JPEG pipeline. This in fact, is done in the Motion JPEG (or M-JPEG) video format. Analyse this method of video compression and identify two disadvantages of this simple approach [4 marks]

The Motion JPEG (M-JPEG) video format compresses each frame of the video independently using the JPEG pipeline. While this approach has some advantages, it also has several disadvantages:

i. ***Large file sizes:*** *Since each frame is compressed independently, there is no compression across frames. As a result, the file size of M-JPEG videos can be quite large, which can be a problem for storage and bandwidth limitations.*
ii. ***Limited temporal compression:*** *Because each frame is compressed independently, there is no way to take advantage of redundancies across frames. As a result, M-JPEG provides limited temporal compression, which means that it may not be as efficient as other video compression methods that can take advantage of similarities between frames. This can lead to lower-quality videos or increased file sizes compared to other compression methods.*

b) A general hint for colour usage is not to use too many colours as this can be distracting. Given a background colour of pink, explain two considerations for the type of colour scheme that should be used for the text

When using a background color of pink, there are two key considerations to keep in mind when choosing a color scheme for the text:

i. ***Contrast:*** *Since pink is a relatively bright color, it's important to choose a text color that provides sufficient contrast. For example, using a dark color like black or navy blue can create a high contrast, making the text easy to read. On the other hand, using a light color like yellow or light green may not provide enough contrast and make the text difficult to read.*
ii. ***Color harmony****: While it's important to choose a text color that provides sufficient contrast, it's also important to consider the overall color harmony of the design. Using too many colors, even if they are high contrast, can still be distracting and make the design look unprofessional. As such, it's generally recommended to use a limited color palette with complementary colors that work well with pink. For example, using a light grey or white for the text can create a subtle contrast while maintaining a harmonious color scheme. Alternatively, using a complementary color like green or blue can create a more dynamic design while still providing good contrast.*

[2 Marks]

c) Name three different ways in which video signals can be organised [3 marks]

Video signals can be organized in several different ways, depending on the needs of the application. Here are three common methods:

i. ***Progressive Scan:*** *This method involves scanning each line of the image in sequence, from top to bottom, to create a full image frame. This is the most common method used in modern video signals and provides a high-quality image with smooth motion.*
ii. ***Interlaced Scan****: In this method, every other line of the image is scanned in one pass, then the remaining lines are scanned in a second pass, creating two "fields" that are combined to form a full image frame. This method is less common in modern video signals but was widely used in older analog television signals.*
iii. ***Multi-view Coding****: This method involves capturing multiple views of a scene simultaneously and encoding them into a single video signal. This can be useful for applications like 3D video or virtual reality, where multiple views are needed to create a more immersive experience. The multiple views can be organized in different ways, such as side-by-side, top-bottom, or in a grid pattern.*

d) List one difference each between NTSC video, PAL video and SECAM video standards

[3 marks]

1. ***Color Encoding****: One key difference between these standards is the method used to encode color information. NTSC uses a color encoding system called "NTSC-M", which is based on a 3.58 MHz color carrier frequency. PAL uses a color encoding system called "PAL-B", which is based on a 4.43 MHz color carrier frequency. SECAM uses a different color encoding system based on frequency modulation, which is incompatible with the other two standards.*

2. ***Frame Rate****: Another difference is the frame rate used by each standard. NTSC uses a frame rate of 29.97 frames per second, while PAL uses a frame rate of 25 frames per second. SECAM also uses a frame rate of 25 frames per second, but with a slightly different scanning pattern compared to PAL. This can affect the smoothness of motion in the video signal and can cause compatibility issues between different systems.*

e) Name two approaches to handling stored sampled audio and state how each work

[4 marks]

There are various approaches to handling stored sampled audio, depending on the specific requirements of the application. Here are two common approaches:

i. ***Uncompressed Audio:*** *In this approach, the audio is stored in a raw, uncompressed format, with each sample represented as a numerical value. Uncompressed audio provides high quality and fidelity, but it also requires a large amount of storage space. Uncompressed*

audio is commonly used in professional audio applications, such as studio recordings or live concerts.

ii. ***Lossy Audio Compression****: In this approach, the audio is compressed using an algorithm that removes redundant or irrelevant data, resulting in a smaller file size. The most common example of lossy audio compression is the MP3 format. MP3 uses a psychoacoustic model to identify and remove data that is less perceptually significant to the human ear, resulting in a smaller file size with a negligible loss of quality. However, since data is removed during compression, it is not possible to perfectly reconstruct the original audio signal. Other lossy compression formats include AAC and Ogg Vorbis. Lossy compression is widely used for music streaming services, digital music downloads, and other applications where storage space is a concern.*

f) Correctly define the following term as used in Multimedia

i) Storyboard [2 marks]

Storyboard is a visual representation of a project's narrative or structure. It is a sequence of images, sketches, or other visual elements that depict the key scenes, shots, or events in the project, along with any accompanying audio, text, or other media elements. Storyboards are often used in the pre-production phase of a project to plan and organize the content, to get feedback from stakeholders, and to make adjustments before the final production stage.

In multimedia applications and systems, storyboards are commonly used in video production, animation, and interactive media projects, such as video games and e-learning modules. A storyboard can help the project team to visualize the project, to identify potential issues or challenges, and to refine the project's structure and content. It can also help to ensure consistency in the project's visual style, pacing, and tone.

g) You run a diagnostic program on your PC and it reports that your storage, processing unit, memory and video card are worn out. How should you resolve this problem? [2 marks]

i. ***Backup Your Data****: Before making any hardware changes, it's important to backup your important files and data to an external drive or cloud-based service to avoid data loss.*

ii. ***Replace Worn Out Components****: Once you've backed up your data, you can start replacing the worn-out components. Depending on your level of expertise, you can either replace the components yourself or take your computer to a professional technician for repair. If you're not comfortable replacing components yourself, it's best to seek professional help to avoid damaging other parts of the computer.*

iii. ***Upgrade Components:*** *In addition to replacing the worn-out components, you may also want to consider upgrading them to improve your computer's performance. For example, upgrading to a solid-state drive (SSD) can significantly improve the speed of your computer, while upgrading your memory can allow you to run more applications simultaneously.*

iv. ***Test Your System:*** *After replacing or upgrading the components, you should run another diagnostic program to ensure that your computer is running properly. This can help you identify any other issues that need to be addressed.*

v. ***Regular Maintenance:*** *Finally, to avoid similar issues in the future, it's important to perform regular maintenance on your computer, such as cleaning the dust from the fans and heat sinks, and updating the software and drivers.*

QUESTION FOUR (20 MARKS)

a) Correctly define the following terminologies as used in multimedia

i. ***Chroma Subsampling****: Chroma subsampling is a technique used in digital video and image processing that reduces the amount of color information in the image. It involves sampling the chrominance (color) information at a lower resolution than the luminance (brightness) information, which can result in a smaller file size and faster processing times.*

ii. ***Sound:*** *Sound refers to the audible vibrations that travel through the air and are perceived by the human ear. In multimedia applications, sound is often used to enhance the user experience by providing audio cues, music, dialogue, or other types of audio content.*

iii. ***Text:*** *In multimedia, text refers to any type of written or visual communication that is displayed on a screen, such as titles, captions, subtitles, or other forms of textual content. Text is often used in multimedia applications to convey information, instructions, or other types of messages to the user.*

[3 marks]

b). The main impetus for the development of HDTV was not to increase definition but to increase visual field, especially width. Name two other salient differences between ordinary TV and HDTV wth regards to the type of aspect ratio and progressive scan [4 marks]

In addition to the increased visual field, there are two other salient differences between ordinary TV and HDTV with regards to the type of aspect ratio and progressive scan:

i. ***Aspect Ratio:*** *HDTV uses a widescreen aspect ratio of 16:9, while traditional TV uses a narrower aspect ratio of 4:3. This wider aspect ratio allows for a more cinematic viewing experience, with a greater sense of immersion and a more natural-looking image.*

ii. ***Progressive Scan:*** *HDTV uses progressive scan, which displays each frame of the image in its entirety, in a single pass, while traditional TV uses interlaced scanning, which displays only half of each frame at a time. Progressive scanning results in a smoother, more detailed image with less flicker and fewer artifacts than interlaced scanning.*

c) List the steps involved in creating electronic games [4 marks]

i. ***Concept and Planning****: The first step in creating an electronic game is to develop a concept and plan for the game. This involves defining the game mechanics, story, art style, and other important elements.*

ii. ***Game Design****: Once the concept and plan are in place, the next step is to create the game design. This involves creating a detailed outline of the game mechanics, levels, characters, and other key aspects of the game.*

iii. ***Prototyping:*** *After the game design is complete, a prototype of the game is developed. This involves creating a basic version of the game to test the mechanics and gameplay.*

iv. ***Art and Sound Design****: The next step is to create the visual and audio elements of the game, including the characters, environments, sound effects, and music.*

v. ***Programming****: The game is programmed using coding languages such as C++, Java, or Python. The programming includes building the game engine, AI, physics, and other game systems.*

vi. ***Testing:*** *Once the game is complete, it undergoes rigorous testing to ensure that it is stable, playable, and enjoyable.*

vii. ***Marketing and Distribution****: The final step is to market and distribute the game, which involves creating promotional materials, releasing the game on platforms such as Steam or the App Store, and promoting the game through social media and other channels.*

d) Name two picture expert groups standards for file compression formats, and list three multimedia types which they have developed standards for [4 marks]

i. ***JPEG:*** *This is the original JPEG standard that was developed for compressing still images. It uses lossy compression techniques to reduce the size of an image while preserving its visual quality.*
ii. ***MPEG****: This is the Moving Picture Experts Group standard, which is used for compressing video and audio content. It uses both lossy and lossless compression techniques to reduce the size of video and audio files while maintaining high-quality playback.*

The multimedia types for which JPEG and MPEG have developed standards include:

i. ***Still Images:*** *JPEG is widely used for compressing still images, such as photographs, digital art, and graphics.*
ii. ***Video****: MPEG is used for compressing video content, such as movies, television shows, and streaming video.*
iii. ***Audio:*** *MPEG is also used for compressing audio content, such as music, podcasts, and other types of audio recordings.*

e) Identify the type of equipment used to extinguish a computer hardware fire and discuss why it is appropriate [4 marks]

1. ***Halon Systems:*** *Halon is a colorless, odorless gas that was commonly used in fire suppression systems in the past. However, it has since been phased out due to its negative impact on the environment.*
2. ***FM-200 Systems****: FM-200 is a colorless, odorless gas that is non-toxic and non-corrosive. It is a popular choice for clean agent fire suppression systems because it is effective at extinguishing fires and has a low environmental impact.*
3. ***Novec 1230 Systems****: Novec 1230 is a chemical agent that is used in clean agent fire suppression systems. It is a non-toxic, non-corrosive, and eco-friendly alternative to halon.*

f) Correctly define the term disk checker and state what it does [1 marks]

The term "disk checker" refers to a software utility that is designed to scan and diagnose errors on a computer's hard disk drive (HDD) or solid-state drive (SSD). Also known as disk scanning software or disk diagnostic tools, disk checkers can detect a variety of issues that may be affecting the performance or functionality of a hard drive, such as bad sectors, file system errors, disk fragmentation, and hardware failures.

The primary function of a disk checker is to verify the integrity and health of a hard drive by scanning it for errors and reporting any issues that are found. Depending on the specific disk checker software used, the tool may offer different types of scans and tests, such as quick scans, full scans, surface scans, and SMART tests. Once the scan is complete, the disk checker may offer options for repairing the detected issues, such as fixing file system errors, attempting to recover data from bad sectors, and defragmenting the hard drive.

QUESTION FIVE (20 MARKS)

a) A game developer is a person or a team who develop and test computer games and can work either independently or for a publisher owned studio. State one reason why for each

[2 marks]

A game developer may work independently because they want to have creative freedom and control over the development process. By working independently, they can choose their own projects, design the game mechanics and storyline, and make decisions about the game's overall direction without having to answer to a publisher or larger organization.

b) State one example of a multimedia computing programming language [1 mark]

Java *is an example of a multimedia computing programming language. It is a high-level, object-oriented programming language that is used for developing multimedia applications such as games, interactive media, and virtual reality environments.*

c) Do you agree with the following statement "Web browsers come with all of the necessary plugins for playing multimedia content" discuss your answer in sufficient detail [3 marks]

I partially agree with the statement that web browsers come with all of the necessary plugins for playing multimedia content. While it is true that most modern web browsers come with built-in support for many common multimedia formats, there are still some multimedia formats that require additional plugins to be installed in order to play them in a web browser.

For example, some web browsers may not support certain video or audio codecs by default, which would require the user to install additional plugins or codecs in order to play those types of multimedia content. Additionally, some multimedia content may require specific plugins or technologies, such as Adobe Flash, which may not be included with all web browsers.

Furthermore, even if a web browser does come with all of the necessary plugins for playing multimedia content, these plugins may not always be up-to-date or compatible with the latest multimedia formats or web technologies. In such cases, the user may still need to manually update or install new plugins in order to ensure that they can play all types of multimedia content.

d) Correctly define the following terms as used in multimedia

i) App store - *An app store is an online marketplace where users can browse and download various applications (apps) for their mobile devices or desktop computers*.

ii) Hardware resource conflict - *A hardware resource conflict occurs when two or more hardware devices or components in a computer system attempt to use the same hardware resource at the same time.*

iii) 3D virtual reality - *3D virtual reality refers to a computer-generated environment that simulates a three-dimensional (3D) immersive experience for the user. In virtual reality, users can interact with and navigate through a digital environment as if it were real. The experience typically involves the use of a specialized headset or display device that covers the user's field of vision and provides a stereoscopic view of the virtual environment.* [6 marks]

e) A game storyboard can use different font types to convey certain themes or types of information in a game. Name three fonts you would use to convey happiness, danger and sadness [3 marks]

When choosing fonts for a game storyboard, it's important to consider the emotions or moods that you want to convey. Here are three examples:

i. ***To convey happiness,*** *a designer might choose a playful and cheerful font such as Comic Sans or Varela Round. These fonts have a casual and informal look that can evoke a sense of fun and joy.*
ii. ***To convey danger****, a designer might choose a bold and ominous font such as Impact or Bloodlust. These fonts have a strong and heavy look that can evoke a sense of threat or warning.*
iii. ***To convey sadness****, a designer might choose a soft and melancholy font such as Lucida Handwriting or Snell Roundhand. These fonts have a gentle and flowing look that can evoke a sense of sadness or introspection.*

f) What is meant by the following terms as used in multimedia: -

ii. *Static media: This refers to media that does not change or is non-interactive. It is typically pre-recorded and cannot be altered by the user.*

iii. *Dynamic media: This refers to media that is interactive and can be changed or updated by the user.*

Give two examples of each type [4 marks]

Examples:

1. *Static media:*
   - i) *A JPEG image of a landscape photo.*
   - ii) *ii) An MP3 file of a song.*
2. *Dynamic media:*
   - *i)* *A video clip of a movie trailer in MP4 format.*
   - *ii)* *ii) An interactive e-learning course.*

g) In a graphical user interface (GUI) system how would you go about changing the screen resolution? [1 mark]

i. ***Open the display settings:*** *This can usually be done by right-clicking on the desktop and selecting "Display settings" or "Screen resolution" from the menu.*
ii. ***Select the desired resolution****: In the display settings, there should be a list of available resolutions for the monitor. Select the desired resolution from the list.*
iii. ***Apply the changes****: After selecting the desired resolution, click on the "Apply" button to make the changes.*
iv. ***Confirm the changes****: After applying the changes, the screen will temporarily go black and the new resolution will be applied. A dialog box will appear asking if you want to keep the new resolution. If the new resolution looks good, select "Keep changes". If not, select "Revert" and try a different resolution.*
v. ***Restart the computer****: In some cases, changing the screen resolution may require a restart of the computer to fully apply the changes.*