Tutorial 1
General Concepts about Multimedia

CS4185 Multimedia Technologies and Applications

1. What is the main difference between traditional contents and multimedia contents? List some applications and key features for multimedia technologies (at least two for each).

2. Multimedia files are often large in size. To speed up the transmission, what technique can we apply? What are the drawbacks of applying this technique?

3. There are two popular ways to obtain a movie from the Internet. One is to download the whole movie, and the other is to watch it online (i.e., streaming). Compare the advantages and disadvantages of these two approaches.

4. We have a 1GB video file that needs to be sent through a network with a transmission speed of 10Mbps. The length of the cable is 10Km. The signal propagation speed is 10^6 meters per second. How long is the interval between the moment when the sender is ready to send to the moment when the receiver receives the whole file?

1. What is the main difference between traditional contents and multimedia contents? List some applications and key features for multimedia technologies (at least two for each).

Multimedia contents convey information through two or more media, e.g., combination of text, images, videos.

Example applications: skype, webpages, and computer games.

Example key features:

– interactive

– integration of different media types

– diversity of media types

– very large data size.

2. Multimedia files are often large in size. To speed up the transmission, what technique can we apply? What are the drawbacks of applying this technique?

Compression can be applied to reduce the file size.

The compressed multimedia files are transmitted through the network. The receiver will then decompress the received files to obtain the original files. This helps speed up the overall process, since the bottleneck is typically due to the network delay.

To apply compression and decompression, both the sender and the receiver must use the same standard for compressing and decompressing files, e.g., both use **zip** and compatible versions to compress and decompress the files. There are also time overheads for compression and decompression.

3. There are two popular ways to obtain a movie from the Internet. One is to download the whole movie, and the other is to watch it online (i.e., streaming). Compare the advantages and disadvantages of these two approaches.

	Downloading	Streaming
Advantages	- Smooth playback without pausing - Can watch it offline afterwards	- Quick start, without a long downloading time - Low overheads for browsing
Disadvantages	- Long downloading time - High overheads for browsing	- Occasional pausing may occur due to bandwidth congestion - Quality may be affected by the network bandwidth and conditions - Must be online

4. We have a 1GB video file that needs to be sent through a network with a transmission speed of 10Mbps. The length of the cable is 10Km. The signal propagation speed is 10^6 meters per second. How long is the interval between the moment when the sender is ready to send to the moment when the receiver receives the whole file?

Transmission delay + propagation delay = $\frac{8 \times 1G\ bits}{10M\ bits} + \frac{10000}{10^6}$ (s)

Transmission delay is the amount of time to push all the packets of the file into the network cable. Propagation delay is the time required for the head of a message to travel through the network cable.

For large files, the transmission delay is likely much larger than the propagation delay. However, the propagation delay would affect user interactions in a streaming application.