**INTE 412 ASSIGNMENT 1**

**INTE/MG/2399/09/21**

1. **Centralized architecture -** This architecture has a single central server that handles all data processing and storage. Clients connect to this central server to access resources or perform tasks.

**Replicated architecture -** This architecture involves multiple copies of data and services distributed across different servers or locations. Each replica can handle client requests, improving redundancy, load balancing, and fault tolerance.

1. **a)** **Broadcast -**  Messages are sent from one agent to all other agents in the group. This ensures all agents receive the same message but can be inefficient with large groups.

**b) Multicast -** Messages are sent from one agent to a specific subset of agents within the group.

**c) Uncast -** Messages are sent directly from one agent to another specific agent. This is efficient for one-to-one communication but not suitable for large-scale group communication.

1. **a) Session Establishment -** Handles the initiation of sessions, including authentication and setting up communication parameters.

**b) Session Maintenance -** Manages the ongoing session, ensuring connectivity, handling interruptions, and maintaining session state.

**c) Session Termination -** Properly closes sessions, ensuring that all resources are released and final data is saved.

1. **a) Cutting and Trimming -** Removing unwanted sections of the audio to focus on the desired content.

**b) Mixing -** Combining multiple audio tracks into a single track, adjusting levels and effects to create a balanced output

**c) Normalization -** Adjusting the audio levels to ensure consistent volume throughout the track.

**d) Adding Effects -** Applying filters and effects such as reverb, echo, and equalization to enhance the audio quality.

1. **a) Monophonic Audio Size**

Size = Sampling Rate x Sample Size x Duration

Size = 44,100 samples/sec x 16bit/sample x 10

Size = 44,100 x 16 x 10 bits = 7,056,000 bits

Size = 882,000bytes = 882KB

**b) Stereo Audio Size**

Size = Sampling Rate x Sample Size x Duration x 2(Channels)

Size = 44,100 x 16 x 20 x 2 bits = 28,224,000 bits

Size = 3,528,000 bytes = 3.53 MB

1. **a) Entropy of the given alphabets**

H(X) = - [0.5 log2 (0.5) + 0.3log2 (0.3) + 0.1log2 (0.1) + 0.075 log2 0.075 + 0.025 log2 0.025

H(X) = 1 + 0.521 + 0.332 + 0.280 + 0.133

H(X) = 2.266 bits

**b) Sketch Huffman code tree**

1.0

0.5

a

e

d

0.1

c

0.2

b

1. **Advantage:** Text is easily searchable, making it simple to locate specific information within multimedia content.

**Disadvantage:** Text can be less engaging than other multimedia elements like video or audio, potentially reducing user engagement and retention.