Task(16.3)

This Task simulates a basic gaming scenario where multiple Player objects share access to a GameSession but each player exclusively controls their own Character. The program demonstrates the use of smart pointers (std::unique_ptr and std::shared_ptr) to manage memory safely and efficiently.

Classes and Concepts:

1. Character Class:
   ○ Represents a player's in-game character.
   ○ When a Character is created, its name is passed to the constructor, and a message is displayed indicating the creation.
   ○ When a Character object is destroyed, a message is printed to indicate that.
   ○ The class also has an attack method, which outputs that the character is attacking.

2. GameSession Class:
   ○ Represents the overall game session that can be shared by multiple players.
   ○ When the session starts, a message is printed, and when the session ends, another message is shown.
   ○ It has a startSession method, which prints a message when the game session is active.

3. Player Class:
   ○ Each Player object has a name, a std::shared_ptr to a GameSession (allowing shared access), and a std::unique_ptr to a Character (exclusive ownership).
   ○ The Player class has a setCharacter method that assigns a Character to the player using a std::unique_ptr. The std::move operation is used to transfer ownership of the Character.
   ○ The play method prints that the player is playing, calls the attack method on the character (if it exists), and starts the game session by calling startSession.

Key Features:

- Memory Management:
  ○ std::shared_ptr<GameSession>: The GameSession object is shared among all players. Multiple players can hold a reference to the session, and it will only be destroyed when all references to it go out of scope.
  ○ std::unique_ptr<Character>: Each player has exclusive ownership of their character. The Character is destroyed automatically when the Player object goes out of scope or when a new character is assigned.

- Behavior:
  ○ When the program runs, a GameSession is created and shared between two players (Player1 and Player2).
  ○ Each player creates their own character: Player1 has a "Warrior" and Player2 has a "Mage."
  ○ Both players "play" the game by attacking with their respective characters and starting the shared game session.

Thank You