Military Institute of Science & Technology (MIST)
Department of Computer Science and Engineering
Evaluation - 2, Course: CSE 204: Computer Data Structure and Algorithms - I Sessional

Time: 40 minutes **Full marks: 20**

Name:	**Roll:**

Question

Have you seen the series *Game of Thrones*? It is widely regarded as one of the best television series ever made. In *Game of Thrones*, the Seven Kingdoms of Westeros are ruled from the Iron Throne in King's Landing. Among all the noble houses, the Lannisters have one of the most skilled and disciplined armies.

The Lannisters always organize their army in ascending order of height. They employ a more efficient approach to avoid the complexity of sorting the whole lineup whenever a new soldier joins the line. Upon a new soldier's arrival, they insert them directly into their appropriate position in the lineup. For instance, if the current lineup is [1, 2, 2, 3, 4] and a soldier of height 3 joins, they insert them at the third index after the last 2. The updated lineup becomes [1, 2, 2, **3**, 3, 4].

Discipline is strictly enforced within the Lannister ranks. If a soldier disobeys the Lord of Casterly Rock, the Lord will identify the soldier by their index (**the Lord prefers zero indexing**). That soldier will be sentenced to death and removed from the lineup. For example, if the lineup is [1, 2, 2, 3, 3, 4] and the soldier at index 3 disobeys the Lord's command, the Lord will point out that soldier. Consequently, the disobedient soldier will be executed, resulting in a new lineup [1, 2, 2, 3, 4].

The Lannisters also maintain two separate armies. When facing large opposing forces, they merge these armies into a single, unified force, which remains organized in ascending order of height. For example, if the two armies are [1, 2, 3, 3, 4] and [1, 2, 2, 5], after merging, the combined army becomes [1, 2, 2, 2, 3, 3, 4, 5].

The Lord of Casterly Rock has discovered that you are a skilled programmer. In Westeros, a new data structure known as the **Linked List** is becoming increasingly popular. The Lord of Casterly Rock has approached you to create an efficient system to manage their armies using this new technology. Your task is to develop three functions:

`InsertSoldier()`, `ExecuteTheTraitor()`, and `MergeArmies()`.

At first, the Lord of Casterly Rock approached a programmer to develop this system. However, when it was discovered that he was not competent enough and failed to properly implement any of the three functions, he was executed. The Lord has now turned to you, **offering some reward for each completed function**. He has provided you with the unfinished code from the previous programmer and tasked you with properly developing the system within 40 minutes to avoid execution and earn your rewards.

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Sample Input	**Sample Input (cont.)**	
Greetings!!! Options: 1. Insert a Soldier 2. Execute the Traitor 3. Merge forces 4. ShowLineups 5. Exit Select your option: 1 On which army? 1 Enter soldier height: 1 Options: 1. Insert a Soldier 2. Execute the Traitor 3. Merge forces 4. ShowLineups 5. Exit Select your option: 1 On which army? 1 Enter soldier height: 1 Options: 1. Insert a Soldier 2. Execute the Traitor 3. Merge forces 4. ShowLineups 5. Exit Select your option: 1 On which army? 1 Enter soldier height: 2 Options: 1. Insert a Soldier 2. Execute the Traitor 3. Merge forces 4. ShowLineups 5. Exit Select your option: 1 On which army? 1 Enter soldier height: 2 Options: 1. Insert a Soldier 2. Execute the Traitor 3. Merge forces 4. ShowLineups 5. Exit	Select your option: 1 On which army? 1 Enter soldier height: 3 Options: 1. Insert a Soldier 2. Execute the Traitor 3. Merge forces 4. ShowLineups 5. Exit Select your option: 1 On which army? 2 Enter soldier height: 3 Options: 1. Insert a Soldier 2. Execute the Traitor 3. Merge forces 4. ShowLineups 5. Exit Select your option: 1 On which army? 2 Enter soldier height: 3 Options: 1. Insert a Soldier 2. Execute the Traitor 3. Merge forces 4. ShowLineups 5. Exit Select your option: 1 On which army? 2 Enter soldier height: 4 Options: 1. Insert a Soldier 2. Execute the Traitor 3. Merge forces 4. ShowLineups 5. Exit Select your option: 4 Lineup: [1, 1, 2, 2, 3,] Lineup: [3, 3, 4,]	Options: 1. Insert a Soldier 2. Execute the Traitor 3. Merge forces 4. ShowLineups 5. Exit Select your option: 2 On which army? 1 Enter soldier index: 3 Options: 1. Insert a Soldier 2. Execute the Traitor 3. Merge forces 4. ShowLineups 5. Exit Select your option: 4 Lineup: [1, 1, 2, 3,] Lineup: [3, 3, 4,] Options: 1. Insert a Soldier 2. Execute the Traitor 3. Merge forces 4. ShowLineups 5. Exit Select your option: 3 Options: 1. Insert a Soldier 2. Execute the Traitor 3. Merge forces 4. ShowLineups 5. Exit Select your option: 4 Lineup: [1, 1, 2, 3, 3, 3, 4,] Lineup: []

Marking Criteria	**Marks**
InsertSoldier() implementation	08
ExecuteTheTraitor() implementation	06
MergeArmies() implementation	06