Data Structures and Algorithms
<u>Project Phase 1 Report</u>

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Selected Data Structures:

List Name	Chosen DS	Inside Class	Justification
Earth Soldiers	Queue	Army	Soldiers need to be quickly accessed and ordered by join time. Queues provide FIFO behavior. Operations: Add soldier (O(1)), Pick soldier (O(1)), Attack alien soldier (O(1)).
Earth Gunnery	Stack	Army	Gunnery units may have varying priorities based on health, Priority queues ensure that the highest priority unit is picked first. Operations: Add gunnery (O(N)), Pick gunnery (O(1)), Attack drone (O(1)), Attack monster (O(N)).
Earth Tanks	Priority Queue	Army	Tanks need to be picked in a specific order (fresh tanks first). Stacks provide LIFO behavior. Operations: Add tank (O(1)), Pick tank (O(1)), Attack monster (O(N)).
Alien Soldiers	Queue	Army	Similar To Earth Soldiers, alien soldiers need quick access and order by join time. Queues are suitable for this purpose. Operations: Add alien soldier (O(1)), Pick alien soldier (O(1)), Attack earth soldier (O(1)).
Alien Monster	Linked List	Army	Monsters Need to be picked randomly but still follow the golden rule of order. Linked lists can support random access and maintain order. Operations: Add monster (O(1)), Pick monster (O(n)), Attack tank (O(n)).
Alien Drones	Deque	Army	Drones attack in pairs and may need efficient insertion and deletion operations. Deques provide efficient insertion and deletion at both ends. Operations: Add drone (O(1)), Pick drone (O(1)), Attack gunnery (O(1)).

List Name	Chosen DS	Inside Class	Justification
Killed Units	Stack	Army	Units that are killed can be stored in a stack for easy removal and sorting. Stacks provide LIFO behavior. Operations: Add unit (O(1)), Pick unit (O(1)).