Cairo University
Faculty of Engineering

Credit Hours system
CCE CMPN102

DATA STRUCTURES PROJECT

Phase 1

Team Number: 1
Members number: 4

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1. Chosen DS and justifications

+ operation	**Justification	...Complexity

List Name	Chosen DS	Justification
Inactive Enemy list	Queue DS	+Dequeue the inactive enemies and categorize them into the active region lists (Freezer – Healer- Fighter) … O (1) as the Queue is implemented as a linked list. **Because the enemies need to move to the active region one by one so that the one who comes first is served first.
Active Healer	Stack DS	+ Push the dequeued inactive enemies to the active healer list ... O (1) as the stack is implemented as a linked list. + Pop the enemy to the killed list when his health < 0 or to the frosted list when he becomes frosted … O (1) as the stack is implemented as a linked list. + Peek the first enemy in the stack … O (1) as the stack is implemented as a linked list. **Because the castle attacks them as FILO.
Active Fighter	Priority Queue DS	+ Enqueue the dequeued inactive enemies to the active fighter list … O (1) as the Priority Queue is implemented as a linked list. + Dequeue the enemy to the killed list when his health < 0 or to the frosted list when he becomes frosted… O (1) as the Priority Queue is implemented as a linked list. + Peek Front to read the first enemy in the Priority Queue … O (1) as the stack is implemented as a linked list. **Because the castle attacks them by FIFO, depending on their distance, power, status and remaining time steps to end reload period
Active Freezer	Queue DS	+ Enqueue the dequeued inactive enemies to the active freezer list … O (1) as the Priority Queue is implemented as a linked list. + Dequeue the enemy to the killed list when his health < 0 or to the frosted list when he becomes frosted… O (1) as the Priority Queue is implemented as a linked list. + Peek Front to read the first enemy in the Priority Queue … O (1) as the stack is implemented as a linked list. **Because the castle attacks them as FIFO.
Frosted fighter	Priority Queue DS	+ Enqueue the dequeued active enemies to the frosted fighter list … O (1) as the Priority Queue is implemented as a linked list.

		+ Dequeue the enemy to the killed list when his health < 0 or to the active fighter list when the ice melts… O (1) as the Priority Queue is implemented as a linked list. + Peek Front to read the first enemy in the Priority Queue … O (1) as the stack is implemented as a linked list. **Because the castle picks frosted enemies to fight depending on their distance, power, and remaining time steps, and the enemies get back to the active region as the first one to join the frosted region is the first one to be out (FIFS)
Frosted Healer	Priority Queue DS	+ Enqueue the dequeued active enemies to the frosted healer list … O (1) as the Priority Queue is implemented as a linked list. + Dequeue the enemy to the killed list when his health < 0 or to the active healer list when the ice melts… O (1) as the Priority Queue is implemented as a linked list. + Peek Front to read the first enemy in the Priority Queue … O (1) as the stack is implemented as a linked list. **Because after the ice gets melted, the enemies go back to the active region as FIFO, but we also need to check if the enemy's health is <0 and then we make him as a priority and move him to the killed region.
Frosted Freezer	Priority Queue DS	+ Enqueue the dequeued active enemies to the frosted fighter list … O (1) as the Priority Queue is implemented as a linked list. + Dequeue the enemy to the killed list when his health < 0 or to the active freezer list when the ice melts… O (1) as the Priority Queue is implemented as a linked list. + Peek Front to read the first enemy in the Priority Queue … O (1) as the stack is implemented as a linked list. **Because after the ice gets melted, the enemies go back to the active region as FIFO, but we also need to check if the enemy's health is <0 and then we make him as a priority and pick move the killed region.
Killed Enemy list	Queue DS	+ Enqueue the enemies whose health becomes <0 into the killed list … O (1) as the Priority Queue is implemented as a linked list. + Dequeue the killed enemy to print the output file… O (1) as the Priority Queue is implemented as a linked list. **Because we need to output their statistics regarding their KTS (Killed Time Steps) ascendingly, so the one who is killed first will be on the top of the list.

2. Work Load Division

Member Name	Tasks
Ahmed Yasser Ali Dawaly	-GUI completion -Input file functions -Output files functions -Data structures implementations
Noureldin Khaled Said ElSeroui	-The logic and implementation of Battle class. - The castle class
Mohamed Ashraf Mohamed	-Interaction among regions (Inactive, active, frosted and killed)
Saif El-Eslam Abd El-Rahman Mahmoud El-Sayed	-Fighter class -Healer class -Freezer class