Cairo University – Faculty of Engineering

CCE Department

CMPN102

Data Structure and Algorithms

**Data Structure and Algorithms**

**Project Phase 1 Report**

**Team Name: DS Note**

**Number of Members: 4**

**Team email:**

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| **List** | **Data Structure** | **Reason & Operations on list & Complexity Analysis** |
| Events | Pointers Queue | Each day the events will be executed by their sequence in the input file, we will need to use peek and dequeue which is provided in queue data structure too  **Operations:**  - Dequeue()  - Enqueue()  - Peek()  - Execute() (not yet determined ) |
| Waiting Emergency Missions | Priority Queue | Emergency missions have significance data member, and it gives it ‘priority’ to be assigned based on the weighted priority equation  **Operations:**  - Dequeue()  - Enqueue()  O(1)  - PrintInfo()  - CalculatePriority()  Both are O(n) |
| Completed Emergency missions | Bag | No need to keep a sorted sequence of complete missions as every mission object has its own **formulation day** and **completion day** and **waiting day** as a data member  **Operations**  PrintInfo() : O(n) prints IDs and Count of completed missions |
| In-execution Emergency missions | Bag | No need to keep a sorted sequence of in-execution missions **(used in interactive mode)**  **Operations**  PrintInfo() : O(n) prints IDs and Count of completed missions |
| Waiting Mountainous Missions list | Queue | -Due to Significance data member  Mountainous missions have auto-prompt data member, and it adds mountainous mission to the emergency mission queue after AutoP days  **Operations:**  - Dequeue()  - Enqueue()  O(1)  - PrintInfo()  - AutoPrompt()  Both are O(n) |
| Completed Mountainous missions | Bag | No need to keep a sorted sequence of complete missions as every mission object has its own **formulation** day and **completion** day and **waiting day** as a data member  **Operations**  PrintInfo() : O(n)  prints IDs and Count |
| In-execution mountainous missions | Bag | No need to keep a sorted sequence of in-execution missions **(used in interactive mode)**  **Operations**  PrintInfo() : O(n) prints IDs and Count of in-executed missions |
| Waiting Polar Missions | Queue | -Due to Significance data member  **Operations**  PrintInfo() : O(n) prints IDs and Count of in-executed missions  -Dequeue/ Enqueue : O(1) |
| Completed Polar Mission | Bag | No need to keep a sorted sequence of completed missions as every mission object has its own **formulation** day and **completion** day and **waiting day** as a data member  **Operations**  PrintInfo() : O(n)  prints IDs and Count of completed missions |
| In-execution polar missions | Bag | No need to keep a sorted sequence of in-execution missions **(used in interactive mode)**  **Operations**  PrintInfo() : O(n) prints IDs and Count of in-executed missions |
| Emergency rovers | Bag | To count them for output |
| In check-up emergency rover | Bag | To ease looping and accessing all data members and how many days left to move to available rovers (assumed checkup of rovers occurs in parallel) **Operations:**  Bool Fullcheck() : O(n)  Print\_Incheck() : O(n) |
| Available emergency rovers | Bag | To be printed  PrintRovers() : O(n) |
| Mountainous rovers | Bag | To count them for output |
| In check-up mountainous rover | Queue | To ease looping and accessing all data members and how many days left to move to available rovers (assumed checkup of rovers occurs in parallel) **Operations:**  Bool Fullcheck() : O(n)  Print() : O(n) |
| Available mountainous rovers | Bag | To be printed  PrintRovers() : O(n) |
| Polar rovers | Bag | To be printed  PrintRovers() : O(n) |
| In check-up polar rovers | Queue | To ease looping and accessing all data members and how many days left to move to available rovers (assumed checkup of rovers occurs in parallel) **Operations:**  Bool Fullcheck() : O(n)  Print() : O(n) |
| Available polar rovers | Bag | To be printed  PrintRovers() : O(n) |