



AUSTEN
TECH

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AUTONOMOUS CRANE FABRICATION UNIT SIMULATION

ELEMENTARY DATA STRUCTURE AND
LOGICAL THINKING

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PROBLEM STATEMENT



IN MODERN CONSTRUCTION YARDS, MANAGING AND ASSEMBLING CRANE COMPONENTS IN AN AUTONOMOUS AND OPTIMIZED WAY IS ESSENTIAL TO REDUCE MANUAL LABOR, PREVENT DELAYS, AND STREAMLINE ASSEMBLY AND DEPLOYMENT. THE GOAL IS TO DESIGN A SIMULATION FOR AN AUTONOMOUS CRANE FABRICATION UNIT THAT HANDLES THE FOLLOWING: PART DELIVERY AND LIFO-BASED ASSEMBLY CRANE STORAGE WITH FIFO-BASED DEPLOYMENT WHEN STORAGE IS FULL FAULTY CRANE TRACKING AND REPAIR PRIORITY UPGRADE MONITORING FOR SPECIFIC CRANES THIS PROBLEM INVOLVES USING MULTIPLE DATA STRUCTURES IN A UNIFIED SYSTEM TO SIMULATE REAL-TIME LOGISTICS AND OPERATIONS IN A CONSTRUCTION SITE.

LOGIC OF THE CODE

THE PROGRAM IS A MENU-DRIVEN C APPLICATION ALLOWING USERS TO PERFORM KEY TASKS INTERACTIVELY.

MAIN MENU FEATURES:

- 1. ADD PARTS AND ASSEMBLE CRANE**
- 2. STORE CRANE IN YARD**
- 3. MARK CRANE AS FAULTY**
- 4. REPAIR A FAULTY CRANE**
- 5. ADD PRIORITY UPGRADE**
- 6. VIEW STORAGE, FAULTY, AND REPAIRED CRANES**
- 7. TRAVERSE UPGRADE CRANES**

USERS INTERACT BY ENTERING OPTIONS AND DATA. DATA STRUCTURES OPERATE ACCORDINGLY TO SIMULATE THE CRANE UNIT BEHAVIOR.

SUMMARY OF DATA STRUCTURES AND USAGE

Data Structure	Real-World Use	C Representation
Queue	Parts arriving	Array with front, rear
Stack	Part stacking during assembly	Array with top
Array	Fixed-size crane storage	Array + counter
Singly Linked List	Faulty crane log	Node
Doubly Linked List	Repaired crane inspection log	DNode
Circular Linked List	Urgent upgrade loop	CNode

OUTPUT

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---- Crane Fabrication Unit ----
1. Add Parts & Assemble Crane
2. Store Crane in Yard
3. Mark Crane as Faulty
4. Repair a Faulty Crane
5. Add Priority Upgrade
6. View Storage, Faulty & Repaired Cranes
7. Traverse Upgrade Cranes
0. Exit
Choose an option: 1
Enter parts (up to 6):
Part 1: boom
Part 2: luffer
Part 3: counter weight
Part 4: jib
Part 5: hook
Part 6: base
Assembled Order (LIFO): base hook jib counter weight luffer
Choose an option: 5
Enter Crane Name for Priority Upgrade: jib
```