What is Priority Queue?

- A special type of queue where each element has a priority.
- The element with higher priority is served before lower priority ones.
- If two elements have the same priority, they are served in order of arrival (like normal queue).

Why & Where do we use Priority Queue?

- When order of processing depends on importance or urgency, not just arrival time.
- Useful when some tasks/jobs need to be completed before others.

Real Life Examples

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- Hospital Emergency Room: Critical patients are treated before minor injuries.
- Operating System (CPU Scheduling): High priority processes get CPU before low priority ones.
- Networking Routers: Important data packets are sent before less important ones.

Why implement using Heap?

- Heap (Binary Heap) allows efficient insertion and deletion based on priority.
- Insert operation = O(log n)
- Remove highest priority element = O(log n)
- Peek (find max/min priority element) = O(1)
- Much faster than using simple arrays or linked lists.