

Tutorial 06

(ring buffer, FIFO, fixed size, circular behaviour)

01. What is circular queue? A circular queue also known as ring buffer is a data structure that follows first in first out (FIFO) principle. It is implemented as an array/queue with a fixed size, where the last position is connected to the first position forming a circular behaviour.

02. What are the characteristics of the circular queue?

Circular structure

Fixed size

Front and rear pointers

Enqueue operation

Dequeue operation

Overflow and underflow

Efficient operations

queues two pointers (rear, front). In circular queue maintains the order of the circular queue.

• The circular behaviour: when the data structure has reached its capacity the next element will be inserted into a vacant position in the front of the data structure.

03. Give applications of circular queue.

Memory management - Circular queue is used in memory management

Process scheduling - A CPU uses a queue to schedule processes

Traffic system - Circular queues are also used in traffic system

04. What is algorithm of circular queue?

Initialize the queue

Enqueue (insertion)

Dequeue (deletion)

Get the front element

Check if the queue is empty

Check if the queue is full

05. Write a simple program of circular queues?

Q. Compare and contrast linear queue and circular queue.

Linear queue

- Requires more memory space.
- Less efficient
- Not suitable for real time system where overflow can lead to data loss.
- It arrange data in linear order.

Circular queue

- Requires less memory space.
- More efficient
- Suitable for real time system where continuous data insertion is required.
- It arranges data in circular order.

• Fixed Size : The circular queue is of fixed size.