

1. How many callback queues in Node.js and what are they? Give examples to explain how different callbacks are enqueued in different queues.

1. Microtask Queue: The microtask queue is the highest priority queue and holds two types of callbacks:

- `process.nextTick()` callbacks: These callbacks are scheduled to run in the current iteration of the event loop after all synchronous code has finished executing but before the next phase of the event loop begins.
- Promise callbacks: When a promise resolves or rejects, its associated callback is enqueued in the microtask queue.

2. Timer Queue: The timer queue holds callbacks scheduled to run after a specific delay using `setTimeout()` or `setInterval()`. These callbacks are prioritized based on their scheduled delay time.

3. I/O Queue: The I/O queue holds callbacks associated with I/O operations, such as file system operations or network requests. These callbacks are executed when the corresponding I/O operation completes.

4. Check Queue: The check queue holds callbacks scheduled to run using `setImmediate()`. These callbacks are executed after the current iteration of the event loop completes, but before the next iteration begins.

5. Close Queue: The close queue holds callbacks associated with the `close` event emitted by streams or other objects. These callbacks are executed when the corresponding object is closed.

6. Poll Phase Queue: The poll phase queue holds callbacks specifically related to the poll phase of the event loop, which handles low-level I/O operations. These callbacks are executed during the poll phase.

2. Output

Start
end

nextTick 1
nextTick 2
Promise...1
Promise...2
timeout 1
timeout 2
nextTick 3
timeout 3

3. Timeout
readFile....
Immediate

4. undefined

This is because the `logMessage()` function is being called without an explicit context, and in Node.js, the default context is the global object, which does not have a `message` property.

5. Josh Edward

6. `TypeError: getName is not a function`

7. Josh Edward

8. `{ firstname: 'John', lastname: 'Smith' }`