

Question 1: Answer the Following Questions (10 points)

1- What is an Event Loop?

The event loop is a mechanism that allows the runtime environment to execute code, collect and process events, and execute queued sub-tasks. It is responsible for handling asynchronous operations in JavaScript.

When a JavaScript program starts running, it creates a **call stack** to keep track of the functions that are being executed. When a function is called, it is added to the top of the call stack. When the function returns, it is removed from the stack.

The event loop works in conjunction with other JavaScript runtime concepts such as **heap -a region where objects are allocated-** and **queue -a list of messages to be processed-**.

When an asynchronous operation is initiated, it is added to the queue. The event loop continuously checks if there are any messages in the queue. If there are, it removes the oldest message from the queue and processes it by calling its associated function.

This process continues until the queue is empty. The event loop then waits for new messages to arrive in the queue before processing them.

2- How do you add an element at the beginning of an array? How do you add one at the end? Hint [2 ways]

- a- Add at the beginning: `unshift()`
- b- Add at the end: `push()`.