**jQuery**

**Q:** How would you implement a custom plugin in jQuery?  
**A:** Extend $.fn with a new method that operates on the selected elements.

1. **Q:** What is the difference between $.ajax() and $.get() in jQuery?  
   **A:** $.ajax() is a low-level method with more options, while $.get() is a shorthand for GET requests.
2. **Q:** How would you implement event delegation in jQuery?  
   **A:** Use on() to attach an event handler to a parent element and filter events for child elements.
3. **Q:** What is the difference between $(document).ready() and $(window).load() in jQuery?  
   **A:** $(document).ready() runs when the DOM is ready, while $(window).load() runs after all assets are loaded.
4. **Q:** How would you implement a custom animation in jQuery?  
   **A:** Use animate() to create custom CSS animations or chain jQuery effects.
5. **Q:** What is the difference between $.each() and $(selector).each() in jQuery?  
   **A:** $.each() iterates over arrays and objects, while $(selector).each() iterates over jQuery objects.
6. **Q:** How would you implement a custom event in jQuery?  
   **A:** Use trigger() to fire custom events and on() to handle them.
7. **Q:** What is the difference between $.extend() and $.fn.extend() in jQuery?  
   **A:** $.extend() merges objects, while $.fn.extend() adds methods to jQuery objects.
8. **Q:** How would you implement a deferred object in jQuery?  
   **A:** Use $.Deferred() to create a deferred object and resolve or reject it as needed.
9. **Q:** What is the difference between $.when() and $.then() in jQuery?  
   **A:** $.when() waits for multiple deferred objects, while $.then() handles the result of a single deferred object.
10. **Q:** How would you implement a custom selector in jQuery?  
    **A:** Use $.expr[':'] to define a custom pseudo-selector.
11. **Q:** What is the difference between $.data() and $.attr() in jQuery?  
    **A:** $.data() stores data in memory, while $.attr() manipulates HTML attributes.
12. **Q:** How would you implement a custom AJAX prefilter in jQuery?  
    **A:** Use $.ajaxPrefilter() to modify AJAX requests globally.
13. **Q:** What is the difference between $.trim() and String.prototype.trim() in jQuery?  
    **A:** $.trim() is a cross-browser utility, while String.prototype.trim() is a native method.
14. **Q:** How would you implement a custom easing function in jQuery?  
    **A:** Use $.easing to define a custom easing function for animations.
15. **Q:** What is the difference between $.parseJSON() and JSON.parse() in jQuery?  
    **A:** $.parseJSON() is a jQuery utility, while JSON.parse() is a native method.
16. **Q:** How would you implement a custom error handler for AJAX requests in jQuery?  
    **A:** Use $.ajaxSetup() to define a global error handler or handle errors in individual requests.
17. **Q:** What is the difference between $.proxy() and Function.prototype.bind() in jQuery?  
    **A:** $.proxy() is a jQuery utility for binding context, while bind() is a native method.
18. **Q:** How would you implement a custom queue in jQuery?  
    **A:** Use $.queue() to manage a custom queue of functions.
19. **Q:** What is the difference between $.noConflict() and $.noop() in jQuery?  
    **A:** $.noConflict() releases the $ alias, while $.noop() is a no-operation function.

**JavaScript**

**Q:** How does the JavaScript event loop work, and what is the role of the call stack, task queue, and microtask queue?  
**A:** The event loop processes tasks from the call stack, task queue (macrotasks), and microtask queue (e.g., Promises). It prioritizes microtasks over macrotasks.

1. **Q:** What is the difference between let, const, and var in terms of scope, hoisting, and reassignment?  
   **A:** let and const are block-scoped and not hoisted, while var is function-scoped and hoisted. const cannot be reassigned.
2. **Q:** How would you implement a deep clone of an object in JavaScript without using libraries?  
   **A:** Use JSON.parse(JSON.stringify(obj)) for simple objects or write a recursive function to handle complex objects.
3. **Q:** What is the difference between == and ===, and how does type coercion work in JavaScript?  
   **A:** == performs type coercion (e.g., "5" == 5 is true), while === checks both value and type ("5" === 5 is false).
4. **Q:** How does JavaScript handle asynchronous operations, and what are the differences between callbacks, Promises, and async/await?  
   **A:** Callbacks are functions passed as arguments, Promises handle asynchronous results with .then and .catch, and async/await provides syntactic sugar for Promises.
5. **Q:** What is the difference between null, undefined, and undeclared in JavaScript?  
   **A:** null is an intentional absence of value, undefined means a variable is declared but not assigned, and undeclared means a variable is not declared.
6. **Q:** How would you implement a debounce function in JavaScript?  
   **A:** Use setTimeout to delay the execution of a function and clear the timeout on subsequent calls.
7. **Q:** What is the difference between Object.create() and new in JavaScript?  
   **A:** Object.create() creates an object with a specified prototype, while new creates an instance of a constructor function.
8. **Q:** How would you implement a custom iterator in JavaScript?  
   **A:** Define a Symbol.iterator method that returns an object with a next() method.
9. **Q:** What is the difference between map(), filter(), and reduce() in JavaScript?  
   **A:** map() transforms elements, filter() selects elements based on a condition, and reduce() accumulates elements into a single value.
10. **Q:** How would you implement a singleton pattern in JavaScript?  
    **A:** Use a closure or a module pattern to ensure only one instance of an object is created.
11. **Q:** What is the difference between bind(), call(), and apply() in JavaScript?  
    **A:** bind() creates a new function with a fixed this, call() invokes a function with a specified this and arguments, and apply() does the same but accepts arguments as an array.
12. **Q:** How would you implement a memoization function in JavaScript?  
    **A:** Use a closure to cache results of expensive function calls.
13. **Q:** What is the difference between prototype and \_\_proto\_\_ in JavaScript?  
    **A:** prototype is a property of constructor functions, while \_\_proto\_\_ is a property of instances that points to the prototype.
14. **Q:** How would you implement a custom event emitter in JavaScript?  
    **A:** Create a class with methods to register, emit, and remove event listeners.
15. **Q:** What is the difference between async and defer in script loading?  
    **A:** async loads scripts asynchronously, while defer delays execution until the DOM is ready.
16. **Q:** How would you implement a polyfill for Array.prototype.flat() in JavaScript?  
    **A:** Use recursion or reduce() to flatten nested arrays.
17. **Q:** What is the difference between WeakMap and Map in JavaScript?  
    **A:** WeakMap holds weak references to keys, allowing garbage collection, while Map holds strong references.
18. **Q:** How would you implement a custom Promise in JavaScript?  
    **A:** Create a class with resolve, reject, and then methods to handle asynchronous operations.
19. **Q:** What is the difference between Generator functions and regular functions in JavaScript?  
    **A:** Generator functions use yield to pause execution and return an iterator, while regular functions run to completion.

**HTML, CSS, JavaScript, jQuery, and APIs**

1. **Q:** How would you implement a responsive layout without using media queries?  
   **A:** Use CSS Grid or Flexbox with relative units (e.g., %, em, rem) to create a fluid layout.
2. **Q:** What is the difference between display: none and visibility: hidden?  
   **A:** display: none removes the element from the layout, while visibility: hidden hides it but retains its space.
3. **Q:** How would you implement a dark mode toggle using CSS variables?  
   **A:** Define CSS variables for light and dark themes and toggle them using JavaScript.
4. **Q:** What is the difference between == and === in JavaScript?  
   **A:** == performs type coercion, while === checks both value and type.
5. **Q:** How would you implement a debounce function in JavaScript?  
   **A:** Use setTimeout to delay the execution of a function and clear the timeout on subsequent calls.
6. **Q:** What is the difference between let, const, and var in JavaScript?  
   **A:** let and const are block-scoped, while var is function-scoped. const cannot be reassigned.
7. **Q:** How would you implement a custom scrollbar using CSS?  
   **A:** Use ::-webkit-scrollbar pseudo-elements to style the scrollbar.
8. **Q:** What is the difference between event.preventDefault() and event.stopPropagation()?  
   **A:** preventDefault() stops the default action, while stopPropagation() stops the event from bubbling up.
9. **Q:** How would you implement a sticky header in CSS?  
   **A:** Use position: sticky and define the top offset.
10. **Q:** What is the difference between async and defer in script loading?  
    **A:** async loads scripts asynchronously, while defer delays execution until the DOM is ready.
11. **Q:** How would you implement a custom dropdown menu using CSS and JavaScript?  
    **A:** Use :hover or :focus to toggle visibility and style the dropdown.
12. **Q:** What is the difference between flexbox and grid?  
    **A:** Flexbox is for one-dimensional layouts, while Grid is for two-dimensional layouts.
13. **Q:** How would you implement a responsive image gallery using CSS Grid?  
    **A:** Use grid-template-columns with repeat and minmax to create a flexible grid layout.
14. **Q:** What is the difference between margin and padding?  
    **A:** margin creates space outside an element, while padding creates space inside.
15. **Q:** How would you implement a custom checkbox using CSS?  
    **A:** Use :checked and ::before or ::after pseudo-elements to style the checkbox.
16. **Q:** What is the difference between localStorage and sessionStorage?  
    **A:** localStorage persists data until manually cleared, while sessionStorage clears data when the session ends.
17. **Q:** How would you implement a custom tooltip using CSS?  
    **A:** Use ::before or ::after pseudo-elements and :hover to display the tooltip.
18. **Q:** What is the difference between GET and POST requests?  
    **A:** GET retrieves data, while POST submits data to be processed.
19. **Q:** How would you implement a custom modal using JavaScript?  
    **A:** Use display: none to hide the modal and toggle it with JavaScript.
20. **Q:** What is the difference between JSON.parse and JSON.stringify?  
    **A:** JSON.parse converts a JSON string to an object, while JSON.stringify converts an object to a JSON string.