

SCRIPTING LANGUAGE

A solid yellow square containing the letters 'JS' in a bold, black, sans-serif font.

JS

USE CASE

PhoneBook

Id	Name	Number	Operations
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Add Contact

Save Contact

View/Update

Update Contact



USE CASE DESCRIPTION

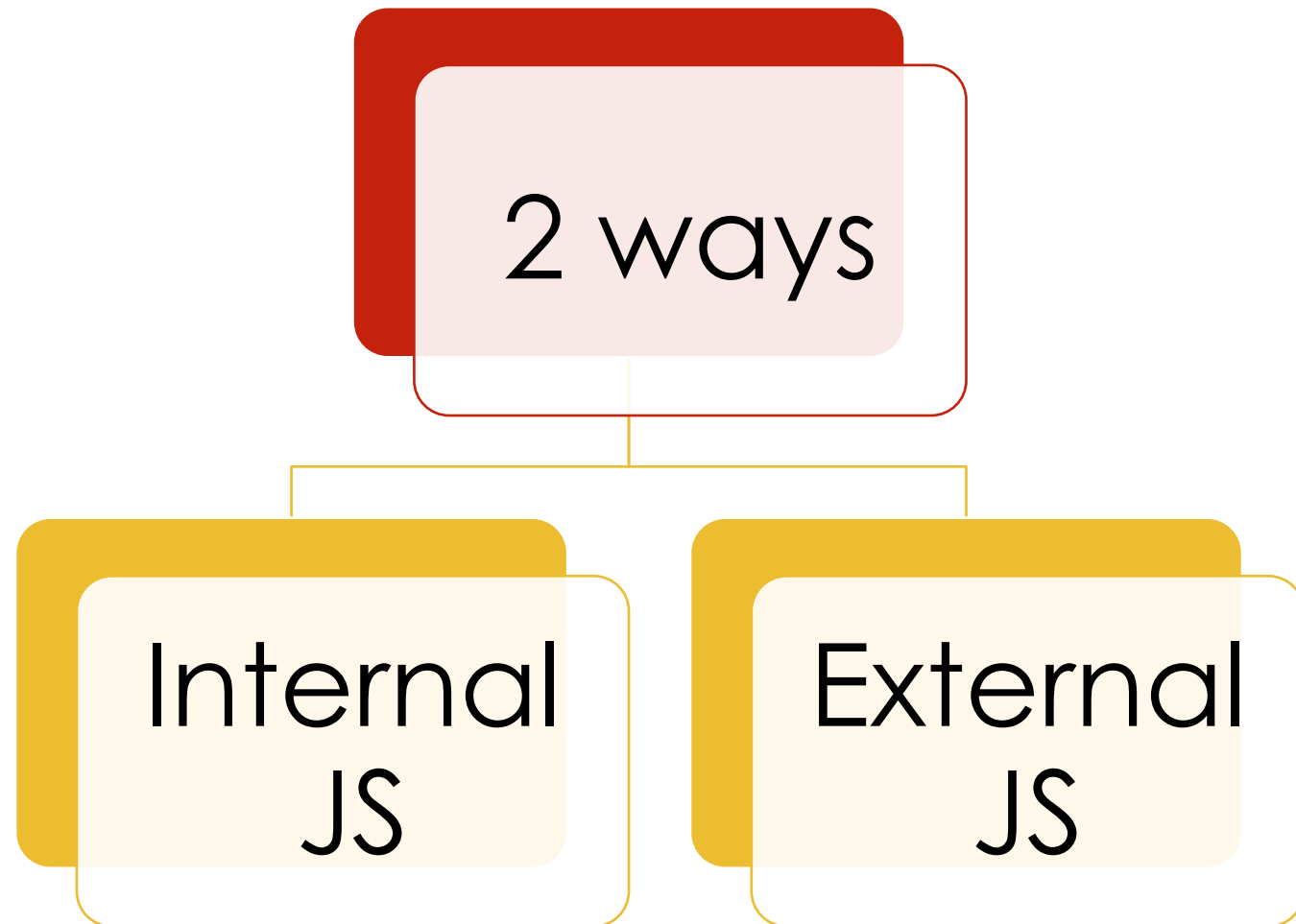
- Create one index.html page with bootstrap included and the layout of the application shown in screenshot.
- The User can add phone number, can see all added phone numbers, edit them and delete as well



WHAT IS JAVASCRIPT

- JavaScript is a versatile programming language primarily used for adding interactivity and dynamic behavior to web pages.
- It is also called as client side scripting
- We can use JS as server side scripting as well.

HOW TO INCLUDE JS IN HTML?



SYNTAX

- JavaScript syntax consists of statements, variables, operators, expressions, and comments.
- Example:
- `var x = 5;`
- `var y = 6;`
- `var z = x + y;`



VARIABLES

- Variables are used to store data values.
- var: function-scoped
- let: block-scoped
- const: block-scoped, constant values



DATATYPES

- JavaScript supports different data types:
- String
- Number
- Boolean
- Array
- Object
- Null
- Undefined

OPERATORS

- JavaScript operators are used to perform operations on variables and values:
- Arithmetic operators: +, -, *, /
- Assignment operators: =, +=, -=
- Comparison operators: ==, ===, !=, !==
- Logical operators: &&, ||, !



CONDITIONAL STATEMENTS

- If statement
- If else statement
- Switch case statement
- Break & continue



ITERATION

- Repetitive task we can complete using Loops
- 3 types
 - For loop
 - Do while loop
 - While loop

FUNCTIONS

- Functions are reusable blocks of code designed to perform a particular task.

- Example:

```
function myFunction(p1, p2) {  
    return p1 * p2;  
}
```

FUNCTION DECLARATION

- A function declaration consists of the function keyword, followed by:
 - The name of the function.
 - A list of parameters to the function, enclosed in parentheses and separated by commas.
 - The JavaScript statements that define the function, enclosed in curly brackets, { }.

```
function square(number) {  
    return number * number;  
}  
  
square(10);|
```

FUNCTION EXPRESSION

- Function declares as a variables

```
var factorial = function fac(n) {  
  return n < 2 ? 1 : n * fac(n - 1);  
};  
  
console.log(factorial(3)); //output will be 6
```



VARIABLE SCOPING

- When you declare a variable outside of any function, it is called a *global* variable, because it is available to any other code in the current document.
- When you declare a variable within a function, it is called a *local* variable, because it is available only within that function.

HANDS ON

- Write a JavaScript function which calculate simple Interest ($I = p * r * n / 100$)
- Write a JavaScript program which calculate area and circumference of circle.
 - $A = \pi * r * r$
 - $C = 2 * \pi * r$
- Create a function which display the table of 7.
- Create a function which displays the Fibonacci series for 10 numbers: 0,1,1,2,3,5,8,13,21,25
- Write a function which takes input from user and based on that perform operations like addition, subtraction, multiplication, division.

ARRAYS

- Arrays in JavaScript are used to store multiple values in a single variable. An array is a special variable that can hold more than one value at a time.
- Array creation
- Literal:
 - `let fruits = ["Apple", "Banana", "Cherry"];`
- Array Constructor:
 - `let fruits = new Array("Apple", "Banana", "Cherry");`

WORKING WITH ARRAY

- Accessing Array Elements:
 - `let firstFruit = fruits[0]; // Apple`
 - `let secondFruit = fruits[1]; // Banana`
- Modifying Array Elements:
 - `fruits[0] = "Mango";`
- Array Properties: `length`
 - `let numberOfFruits = fruits.length; // 3`

ARRAY METHODS

- **push()**: Adds a new element to the end of an array.
- **pop()**: Removes the last element from an array.
- **shift()**: Removes the first element from an array.
- **unshift()**: Adds a new element to the beginning of an array.





ARRAY METHODS

- **concat()**: Joins two or more arrays.
- **slice()**: Returns selected elements in an array as a new array.
- **splice()**: Adds/removes elements from an array.
- **indexOf()**: Returns the first index at which a given element can be found in the array.
- **includes()**: Checks if an array contains a specified element.



ACTIVITY:


- Create an array of numbers and write a logic to remove duplicate numbers from an array.
- Create js file which takes numbers from the user and calculates the average of all numbers.

WORKING WITH STRINGS

- Strings in JavaScript are sequences of characters used for storing and manipulating text.
- JavaScript provides several methods to work with strings effectively.
- Creating Strings:
 - `let singleQuoteString = 'Hello, world!';`
 - `let doubleQuoteString = "Hello, world!";`
 - `let templateLiteralString = `Hello, world!`;`
- String property:
 - `length`: Returns the length of a string.

STRING METHODS

- `charAt()`: Returns the character at a specified index.
- `indexOf()`: Returns the index of the first occurrence of a specified value, or -1 if not found.
- `slice()`: Extracts a part of a string and returns it as a new string.
- `substring()`: Similar to `slice()` but cannot accept negative indices.
- `substr()`: Similar to `slice()`, but the second parameter specifies the length of the extracted part.

- 
- `replace()`: Replaces a specified value with another value in a string.
 - `toUpperCase()`: Converts a string to uppercase letters.
 - `toLowerCase()`: Converts a string to lowercase letters.
 - `trim()`: Removes whitespace from both ends of a string.
 - `split()`: Splits a string into an array of substrings.
 - `includes()`: Checks if a string contains a specified value.
 - `startsWith()`: Checks if a string starts with a specified value.
 - `endsWith()`: Checks if a string ends with a specified value.

HANDS ON

- Create an array of Strings which contains the values like ["Mind","SpRInT","Pvt","Ltd"] then replace the array values with corresponding Uppercase values only.

["MIND","SPRINT","PVT","LTD"]

- Write a JS program which takes input from the user in string and print all values and its length as well.
 - Sonam: 5
 - Alex : 4
 - Catherine: 9



OBJECTS

- Objects in JavaScript are collections of key-value pairs, where the keys (properties) are strings (or symbols) and the values can be any type of data, including other objects and functions.
- Objects are fundamental to JavaScript and are used to represent and manipulate complex data.

CREATING OBJECTS

```
let person = {  
  firstName: 'John',  
  lastName: 'Doe',  
  age: 30,  
  isEmployed: true,  
  address: {  
    street: '123 Main St',  
    city: 'New York',  
    zip: '10001'  
  },  
  greet: function() {  
    console.log('Hello, ' + this.firstName + ' ' + this.lastName);  
  }  
};
```

ACCESS OBJECTS DATA

- Using Dot:

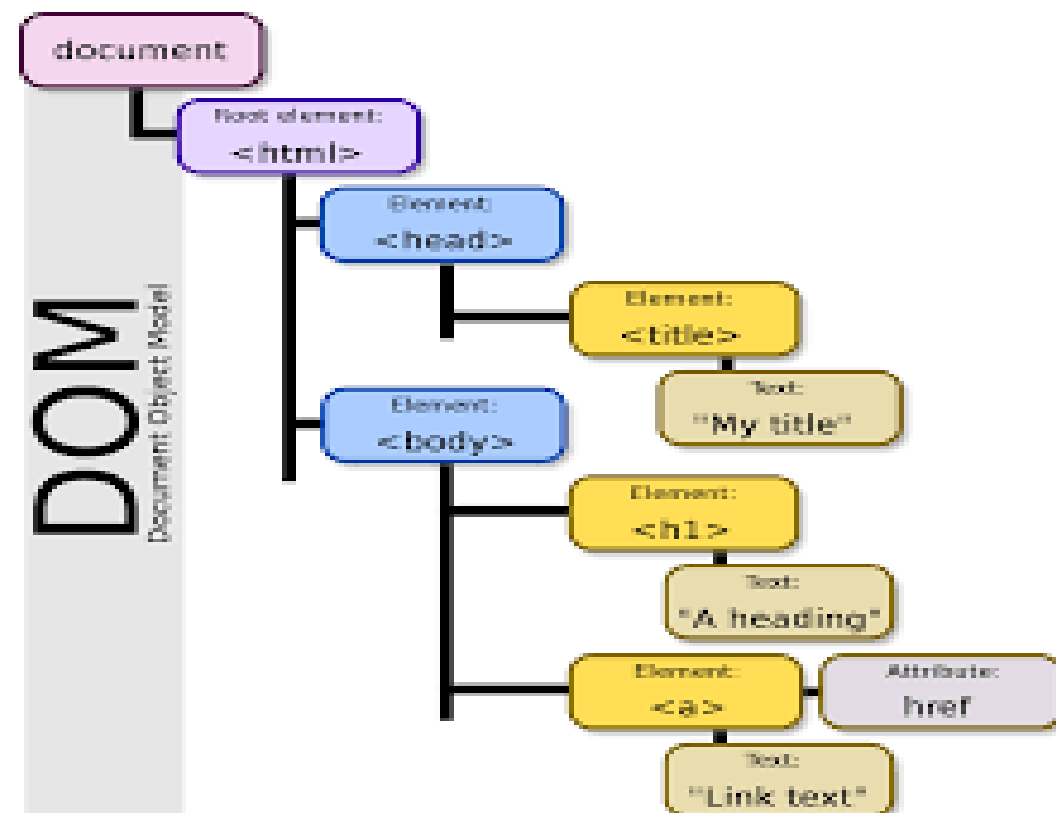
```
console.log(person.firstName); // Output: John  
person.age = 31;  
console.log(person.age); // Output: 31
```

- Using Brackets:

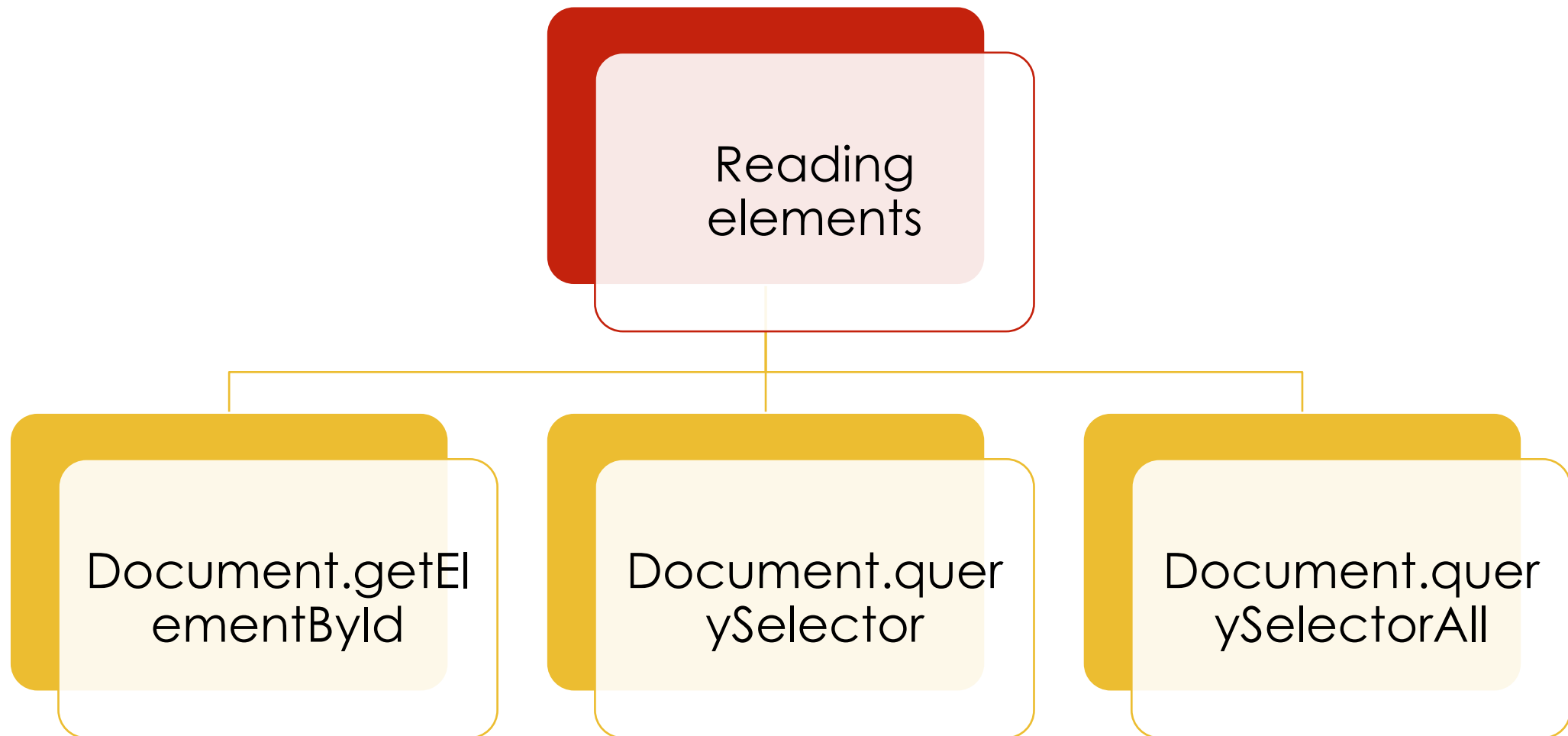
```
console.log(person['lastName']);      person['isEmployed'] = false;  
console.log(person['isEmployed']);  
let propName = 'age';  
console.log(person[propName]);
```

DOM

- The Document Object Model (DOM) is a cross-platform and language-independent application programming interface that treats an HTML document as a tree structure wherein each node is an object representing a part of the document.
- The DOM represents a document with a logical tree.

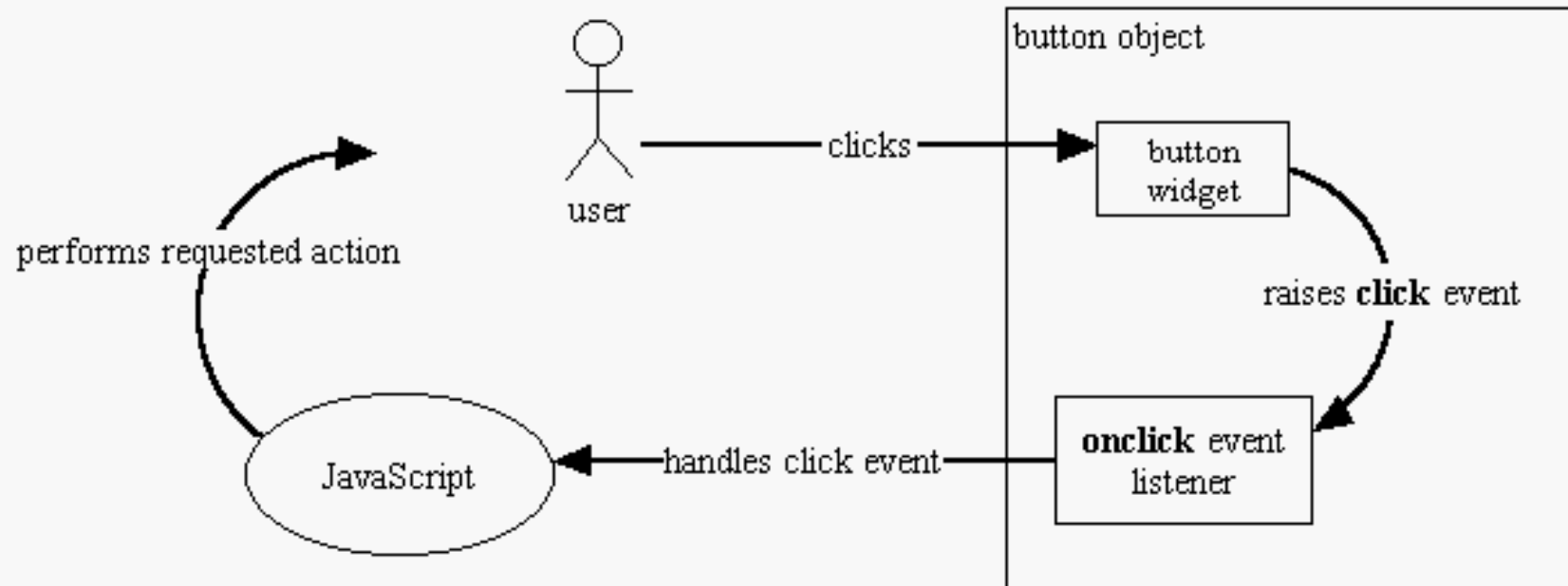


DOM MANIPULATION



EVENT HANDLING

```
<button value="Click Me" onclick="alert('Thank you')" />
```





FORM VALIDATION

- Data validation using JavaScript conditional logics

IMPLEMENT BELOW USE CASE

Enter 5-digit number:

123456

Print Pattern

6
65
654
6543
65432
654321

Enter 5-digit number:

0

Print Pattern

This page says

Please enter a 5-digit number

OK



HANDS ON DOM AND EVENT

- Create Simple todo Application
- Add todo
- Get All todos
- Delete todo



ADVANCED JS

- Advanced topics introduced in ES6
- Arrow functions
- Class & Object
- OOPs Pillars
- Map
- Set

ARROW FUNCTIONS

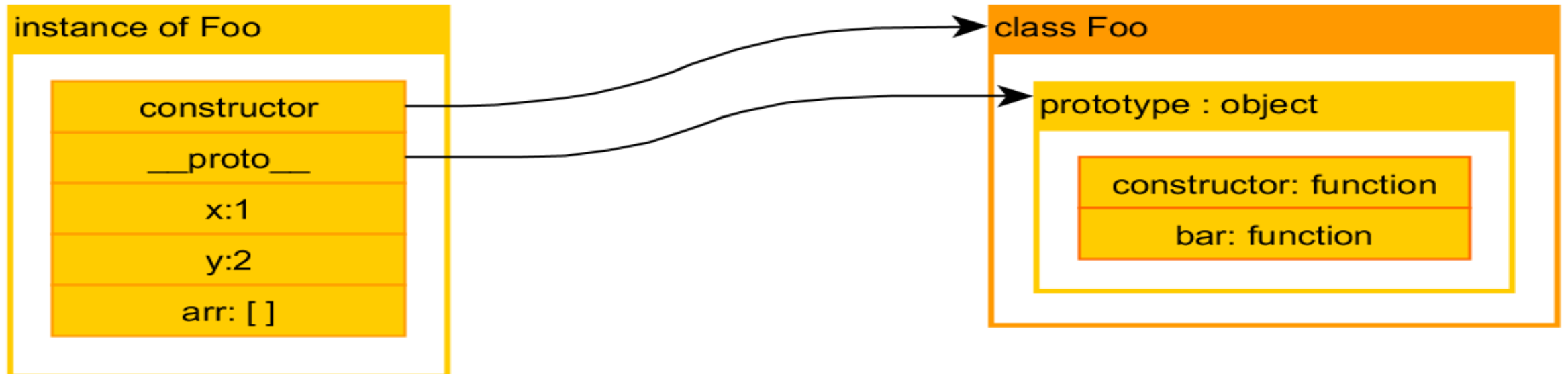
- How to declare:

```
Const greeting = ()=>{  
  console.log('Good Morning');  
}
```
- With return value & parameters

```
Const greeting = (name)=>{  
  return 'welcome '+name  
}
```

CLASS & OBJECTS

- Earlier in Old JS when we have no options to creating class we are declaring the functionalities using functional constructor & prototypes.
- Later on when ES6 introduced we can use it by creating class and making its instances for usage.



ACTIVITY ON CLASS & OBJECT

- Create a class of Account which is having properties:
 - Acc_holder_name
 - Acc_no
 - balance
- Methods:
 - Diposit
 - Withdraw
 - Check balance
- Access those methods and check the output



SET & MAP

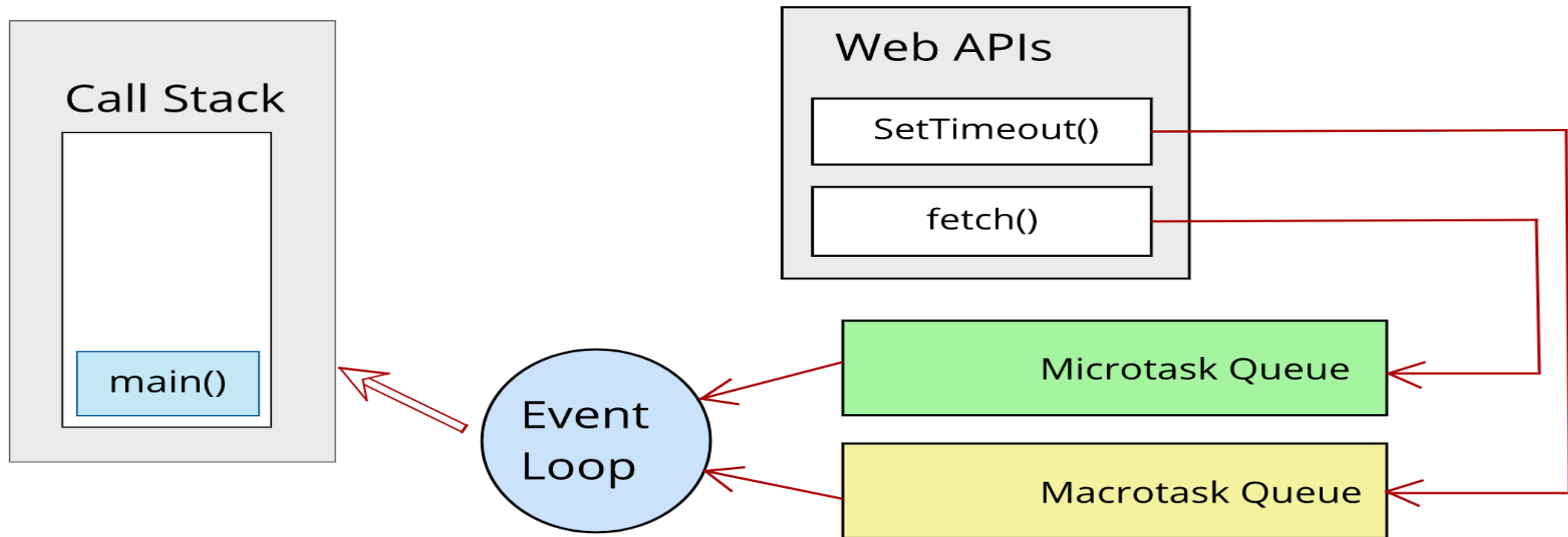
- Set is an inbuilt class provided by JS which is used to create unique set of data
- No duplicates allowed.
- Map is an inbuilt class provided by JS which is used to store data in the form of key value pairs.
- In map duplicate values allowed but not duplicates keys allowed, it will override



ASYNCHRONOUS JS

- Asynchronous functionality: one task will not wait for the other task
- JavaScript is single threaded which is non blocking
- So you can execute multiple task in parallels.

EVENT LOOP





HIGHER ORDER FUNCTIONS

- Map()
- Filter()
- Find()
- findIndex()
- Reduce()



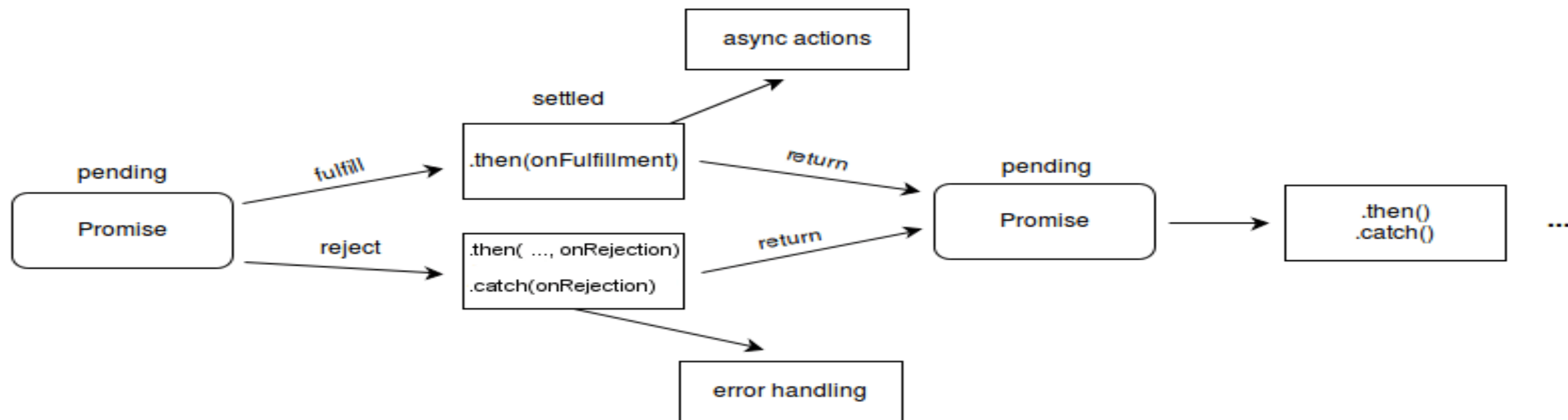
CALLBACKS

- Passing functions as parameters
- Why we need callbacks?
- To manage asynchronous functionality of JavaScript.

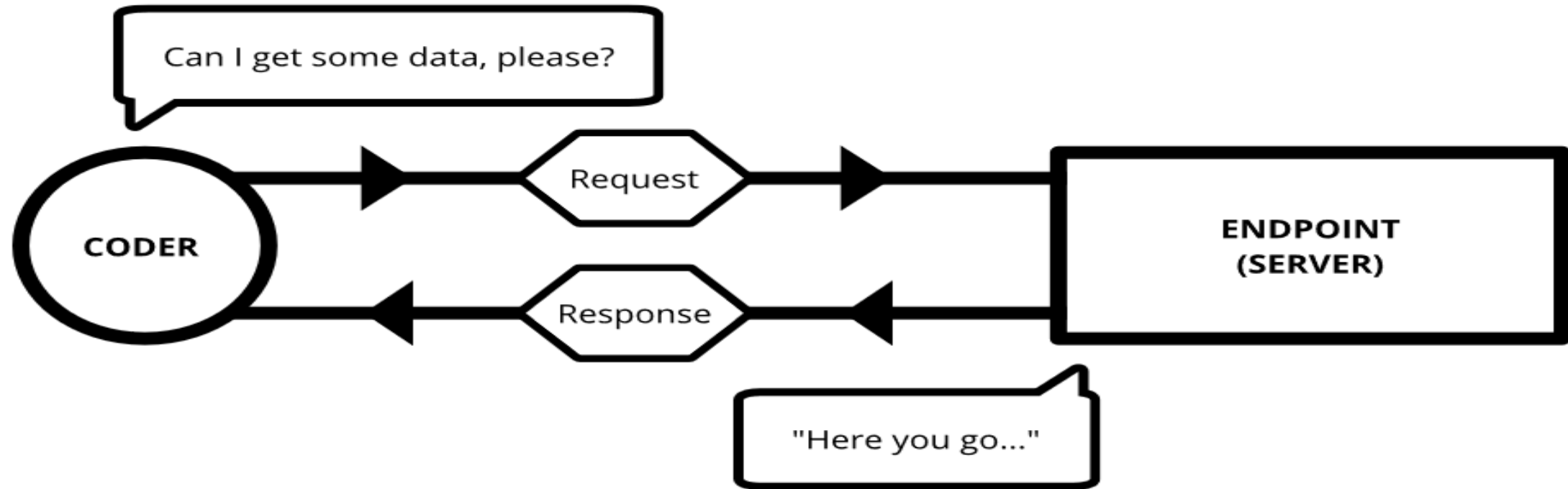
CALLBACK HELL

```
doSomething(param1, param2, function(err, paramx){
  doMore(paramx, function(err, result){
    insertRow(result, function(err){
      yetAnotherOperation(someparameter, function(s){
        somethingElse(function(x){
          });
        });
      });
    });
  });
});
```

PROMISES



FETCH API





ACTIVITY

- Fetch Data from API
- Integrate with HTML
- Represent your data using DOM



USE CASE IMPLEMENTATION

- Implementing same Usecase using class and Objects
- Phonebook project
- Create class contact and implementing all functionalities with methods
- Utilize that class object for implementation

EXPECTED OUTPUT

PhoneBook

Id	Name	Number	Operations
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Add Contact

View/Update