Conditional Statements

- if-else
- switch
- ternary operator

```
if (condition) {
  // code block
} else if (condition) {
  // code block
} else {
  // code block
}
```

```
switch (expression) {
  case x:
    // code block
    break;
  case y:
    // code block
    break;
  default:
    // code block
}
```

Loops and Iteration

- for
- while

```
for (initialize; test; increment) {
  // code block
}
```

```
while (condition) {
  // code block
}

do {
  // code block
} while (condition);
```

Jump Statements

- break
- continue
- return
- throw

Miscellaneous Statements

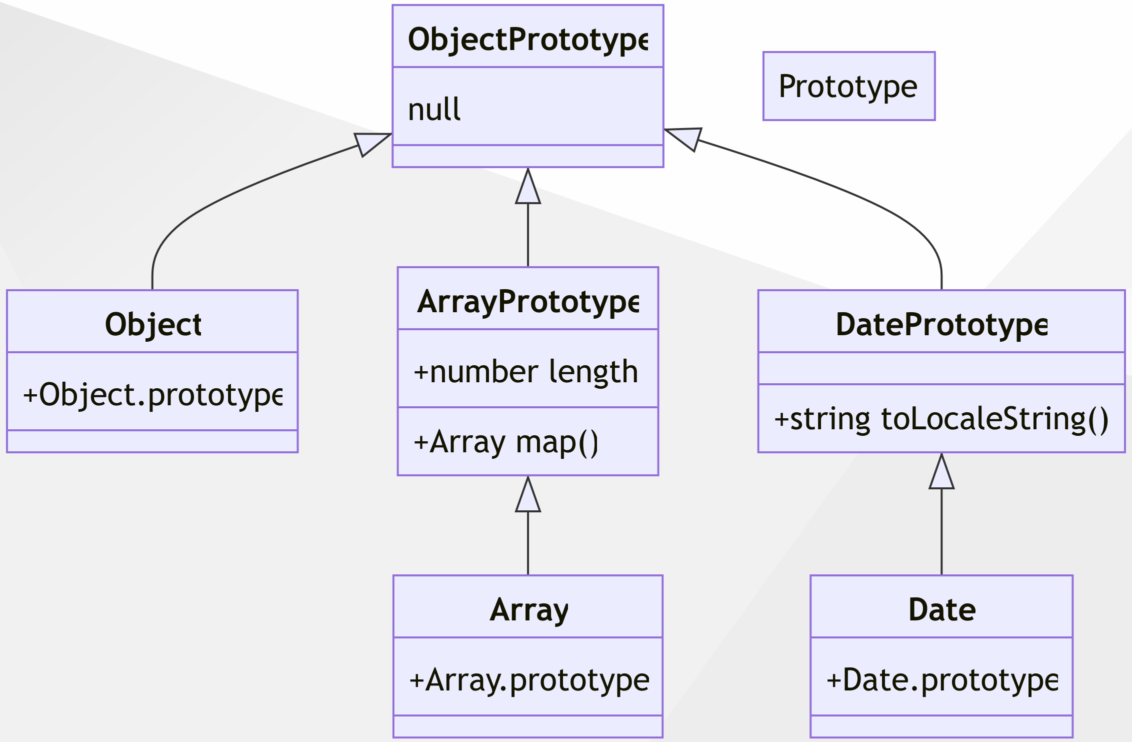
- debugger
- use strict
  - entire script or function, *not block*
  - all variables must be declared
  - functions invoked with `call` or `apply` must have a valid object for `this`
  - no duplicate property names in object literals
  - arguments object is not linked with parameters
  - ...

Objects

- creating objects
  - object literals
  - `new` keyword
  - `Object.create()`

Prototypes (easy version)

Every object has a second object (or null) associated with it, which is known as a prototype, and the first object inherits properties from the prototype.



Querying and Setting Properties

- dot notation
- bracket notation

property access errors

```
addressLine1 = user.address.line1 // error if user.address is undefined
addressLine1 = user.address && user.address.line1 // safe
addressLine1 = user.address?.line1 // ES2020 // safe
```

Deleting Properties

- `delete` operator
- `Object.seal()` - can be changed but not added or deleted
- `Object.freeze()` - *make real constant objects*

Enumerating Properties

- `for...in`
- `Object.keys()`
- `Object.values()`
- `Object.entries()`

Getters and Setters

- `get` and `set` keywords
- `Object.defineProperty()`
- `Object.defineProperties()`

Serializing Objects

- `JSON.stringify()`
- `JSON.parse()`

Arrays

- creating arrays
- accessing array elements
- adding and removing elements
- iterating over arrays
- searching arrays

Creating Arrays

- array literals
- `new` keyword
  - `new Array()`
  - `new Array(num)`
  - `new Array(arg1, arg2, arg3, ...)`
- `Array.of()`
- `Array.from()`

Accessing Array Elements

- `arr[index]`
- `arr.length`
- `arr[arr.length - 1]`
- `arr[index] = 1`

```
var arr = [1, 2, 3];
arr[-1] = 10;
console.log(arr); // [1, 2, 3, -1: 10]

arr['1'] == arr[1] // true
arr[1.0] == arr[1] // true
```

Array Length

- `arr.length`
- `arr.length = 0`
- `arr.length = 10`

```
var arr = [1, 2, 3, 4, 5];

arr.length = 3;
console.log(arr); // [1, 2, 3]

arr.length = 0;
console.log(arr); // []

arr.length = 10;
console.log(arr); // [empty × 10]
```

Adding and Removing Elements

- `push()`
- `unshift()`
- `concat()`
- `splice()`

- `pop()`
- `shift()`
- `slice()`
- `splice()`

Iterating Over Arrays

- `for...in`
- `for...of`
- `forEach()`
- `map()`, `filter()`, `reduce()` (ES6)

Multi-dimensional Arrays

- `arr[row][column]`

```
var arr = [
  [1, 2, 3],
  [4, 5, 6],
];

console.log(arr[0][1]); // 2
```

Functions and Scope

- function
- scope
- hoisting

Define a Function

- Function Declaration

```
function name([param[, param[, ... param]]]) {
   [statements]
}
```

- Function Expression

```
var name = function([param[, param[, ... param]]]) {
   [statements]
};
```

- Function Constructor

```
var name = new Function(arg1, arg2, ... argN, functionBody);
```

- **Arrow Function**

```
var name = ([param[, param[, ... param]]]) => {
   statements
}
```

Function Hoisting

Move declarations to the top of the current scope.
Only declarations are hoisted, not initializations.

```
foo(); // foo
fun(); // Error

function foo() {
  console.log('foo');
}

var fun = function() {
  console.log('fun');
}
```

Function Scope & Variable Masking

```
var x = 1;

function foo() {
  var x = 2;
  console.log(x); // 2
}
console.log(x); // 1
```

Function Invocation

- function invocation
- method invocation
  - `this` - context
- constructor invocation
  - If a function or method invocation is preceded by the keyword new, then it is a constructor invocation
- indirect invocation
  - `call` & `apply`

Function Arguments and Parameters

- optional parameters
- arguments object
  - `arguments` is an array-like object
- default parameters
- rest parameters

Using Object Properties As Arguments

```
function foo(options) {
  var name = options.name || 'default';
  var age = options.age || 0;
  console.log(name, age);
}

foo({name: 'John', age: 20});
foo({name: 'John'});
```

Functions As Values

- functions are first-class objects
- functions can be assigned to variables
- functions can be passed as arguments to other functions
- functions can be returned from functions

Closure

- A closure is a function that has access to the parent scope, even after the parent function has closed.
- IIFE - Immediately Invoked Function Expression

Functional Programming

- pure functions
- higher-order functions
- recursion