Javascript: A scripting language designed to be integrated into HTML code to produce enhanced, dynamic, interactive web pages.

**DATA TYPES**

*Definition:* The classification of values based on the specific categories in which they are stored.

*Primitive Types:* String, Boolean, Integer, Floating Point, Null, Void

*Composite Types:* Object, Array, Function. Composite data types are in separate sections of the code.

**NUMERIC**

*Integer:* Positive or negative numbers with no fractional parts or decimal places.

*Floating Point:* Positive or negative numbers that contain a decimal point or exponential notations.

*String:* A sequence of readable characters or text, surrounded by single or double quotes.

*Boolean:* The logical values True/False, etc. used to compare data or make decisions.

*Null:* The variable does not have a value; nothing to report. Null is not the same as zero, which is a numeric value.

*Casting:* Moving the contents of a variable of one type to a variable of a different type. You don't move the contents to a different variable; it stays in the same variable but the data type is changed or "re-cast".

**VARIABLES**

*Definition:* A placeholder for storing data. In JavaScript, a declaration statement consists of the reserved word var and the name (identifier) of one or more variables.

*Format:*

```
var variable_name
[var command is used to declare (create) variables]
```

*Examples:*

```
var myHouseColor
var myAddress
var vacation_house, condominium, primaryResidence
```

*Rules for Naming Variables:*

1. Variables cannot be reserved words.
2. Variables must begin with a letter or underscore and cannot begin with symbols, numbers, or arithmetic notations.
3. Spaces cannot be included in a variable name.

*Hints:*

1. Although variables in JavaScript can be used without being declared, it is good programming practice to declare (initialize), all variables.
2. Variable names are case sensitive; for example X does not equal x.
INITIALIZING VARIABLES
Use the declaration statement to assign a value to the variable. The value is on the right of the equal sign; the variable is on the left.

Format:
```
var variable_name = value
```

Examples:
```
var myHouseColor = "yellow"
[literal string value yellow assigned to variable myHouseColor]

var myAddress = 473
[numERIC value 473 assigned to variable myAddress]

var bookTitle = "Time Capsule", cost = 28.95, publisher = "Tucker Bay"
[multiple variables can be assigned in one statement]
```

DECISION MAKING AND CONTROL STRUCTURES

Definition: Statements and structures used to change the order in which computer operations will occur.

Types:
Conditional Branching IF, IF-ELSE, IF-ELSE IF, SWITCH, WHILE, DO, FOR

CONDITIONALS

IF Statement: A conditional branching statement used to determine whether a stated condition is TRUE.

Format:
```
if (condition) {
    statements if condition is TRUE
}
```

Example:
```
if (score >= 65) {
    grade = "Pass"
    message = "Congratulations"
}
```

IF-ELSE Statement: A conditional branching statement that includes a path to follow if the condition is TRUE and a path to follow if the condition is FALSE.

Format:
```
if (condition) {
    statements if condition is TRUE;
}
else {
    statements if condition is FALSE;
}
```

Example:
```
if (score >= 65) {
    grade = "Pass"
    message = "Congratulations"
}
else {
    grade = "Fail"
    message = "Try again"
}
```

IF-ELSE IF Statement: A conditional branching statement that allows for more than two possible paths. The first time a true condition is encountered, the statement is executed and the remaining conditions will not be tested.

Format:
```
if (condition) {
    Statements if condition is TRUE;
}
else if (condition) {
    Statements if condition is TRUE;
}
else {
    Statements if no prior condition is true;
}
```

Example:
```
if (score >= 65) {
    grade = "Pass"
    message = "Congratulations"
}
else if (score < 65) {
    grade = "Fail"
    message = "Try again"
}
else {
    grade = "Successful"
    message = "Well done"
}
```
Example:

```javascript
if (score >= 90) {
    grade = "A";
}
else if (score >= 80) {
    grade = "B";
}
else if (score >= 70) {
    grade = "C";
}
else if (score >= 65) {
    grade = "D";
}
else {
    grade = "F";
}
```

**SWITCH Statement:** An alternative to the IF-ELSE IF statement for handling multiple options. Compares the expression to the test values to find a match.

**Format:**

```
switch (expression or variable name) {
    case label:
        statements if expression matches
        this label;
        break;
    case label:
        statements if expression matches
        this label;
        break;
    default:
        statements if expression does not
        match any label;
        break;
}
```

**Example:**

```javascript
switch (colorchoice) {
    case "red":
        document.bgColor = "red";
        break;
    case "blue":
        document.bgColor = "blue";
        break;
    default:
        document.bgColor = "white";
        break;
}
```

**LOOPS**

Loops cause a segment of code to repeat until a stated condition is met. You can use any loop format for any type of code.

**FOR LOOP**

**Format:**

```
for (initialize; conditional test;
     increment/decrement) {
    Statements to execute;
}
```

**Example:**

```javascript
for (var i = 0; i <= 10; i++) {
    document.write("This is line "+ i);
}
```

**DO/WHILE LOOP**

**Format:**

```
do {
    Statements to execute;
} while (condition);
```

**Example:**

```javascript
var i = 0;
do {
    document.write("This is line "+ i);
    i++;
} while (i <= 10);
```
WHILE LOOP:

Format:
```
while (condition) {
    Statements;
    Increment/decrement;
}
```

Example:
```
var i = 0;
while (i<=10) {
    document.write ("This is line " + i);
    i++;
}
```

Hint: Watch out for infinite loops, which do not have a stopping condition or have a stopping condition that will never be reached.

OBJECTS

Definition: Objects are a composite data type which contain properties and methods. JavaScript contains built-in objects and allows the user to create custom objects.

Creating Objects: Use the `new` constructor
```
var X = new Array()
```

Examples:
- date, time, math, strings, arrays

ARRAY OBJECT

Definition: Array object is a variable that stores multiple values. Each value is given an index number in the array and each value is referred to by the array name and the index number. Arrays, like simple variables, can hold any kind of data. You can leave the size blank when you create an array. The size of the array will be determined by the number of items placed in it.

Format:
```
var arrayname = new Array(size)
```

Hint: When you create an array, you create a new instance of the array object. All properties and methods of the `Array` object are available to your new array.

Example:
```
var days = new Array (7)
```

This creates an array of seven elements using the `Array` constructor. The first item is `days[0]`, the last item is `days[6]`.

Initializing Arrays:
Array items can be treated as simple variables:
```
days[0] = "Sunday";
days[1] = "Monday";
```

etc.

STRING OBJECT

Definition: String object is created by assigning a string to a variable, or by using the `new` object constructor.

Example:
```
var name = "Carol";
var name = new String("Carol");
```

Properties:
- `Length`: returns the number of characters in the string
- `Prototype`: allows the user to add methods and properties to the string

Methods:
- String formatting methods (similar to HTML formatting tags)
  - `String.big`
  - `String.blink`
  - `String.italics`
- Substring methods (allow user to find, match, or change patterns of characters in the string)
  - `indexOf()`
  - `charAt()`
  - `replace()`

MATH OBJECT

Definition: Math object allows arithmetic calculations not supported by the basic math operators. Math is a built-in object that the user does not need to define.

Examples:
```
Math.abs(number)     returns absolute value of the numeric argument
Math.cos(number)     returns the cosine of the argument, in radians
Math.round(number)   rounds number to the nearest integer
```

DATE/TIME OBJECTS

Date object provides methods for getting or setting information about the date and time.

Note: Dates before January 1, 1970 are not supported.
**FUNCTIONS**

*Definition:* A pre-written block of code that performs a specific task. Some functions return values; others perform a task like sorting, but return no value. Function names follow the same rules as variables names. There may or may not be an argument or parameter in the parenthesis, but the parenthesis has to be there.

*User-defined Functions:*

*Example:*

```javascript
parseInt() or parseFloat() convert a string to a number.
```

*To create a function:*

*Format:*

```javascript
function name_of_function (arguments) {
    statements to execute when function is called;
}
```

*Example:*

```javascript
function kilosToPounds (){
    pounds=kilos*2.2046;
}
```

This new function takes the value of the variable kilos, multiplies it by 2.2046, and assigns the result to the variable pounds.

*To call a function:* Give the name of the function followed by its arguments, if any

```javascript
parseInt(X); converts the data stored in the variable X into a numeric value.
kilosToPounds(17); converts 17 kilos to the same mass in pounds, returning the value 37.4782.
```

**METHODS**

*Definition:* A special kind of function used to describe or instruct the way the object behaves. Each object type in JavaScript has associated methods available.

*Examples:*

```javascript
array.sort();
document.write();
string.length();
```

*Calling:* To call or use a method, state the method name followed by its parameters in parentheses.

*Example:*

```javascript
document.write(“Hello, world!”);
```
OPERATORS

ARITHMETIC
+ addition adds two numbers
- subtraction subtracts one number from another
* multiplication multiplies two numbers
/ division divides one number by another
% modulus returns the integer remainder after dividing two numbers
++ increment adds one to a numeric variable
-- decrement subtracts one from a numeric variable

STRING
+ concatenation concatenates or joins two strings or other elements
+= concatenation/assignment concatenates two string variables and assigns the result to the first variable

LOGICAL
&& logical AND compares two operands; returns true if both are true, otherwise returns false
|| logical OR compares two operands; returns true if either operand is true, otherwise returns false
! logical NOT returns false if its operand can be converted to true, otherwise returns false

COMPARISON
== Returns true if the operands are equal
!= Returns true if the operands are not equal
=== Returns true if the operands are equal and the same data type
!== Returns true if the operands are not equal and/or not the same data type
> Returns true if the first operand is greater than the second
>= Returns true if the first operand is greater than or equal to the second
< Returns true if the first operand is less than the second
<= Returns true if the first operand is less than or equal to the second

ASSIGNMENT
= Assigns the value of the second operand to the first operand
+= Adds two numeric operands and assigns the result to the first operand
-= Subtracts the second operand from the first, and assigns the result to the first
*= Multiplies two operands, assigns the result to the first
/= Divides the first operand by the second, assigns the result to the first
%= Finds the modulus of two numeric operands, and assigns the result to the first

RESERVED WORDS
abstract else instanceof switch
boolean enum int synchronized
break export interface this
byte extends long throw
case false native throws
catch finally new transient
double float package try
default for private typeof
do while
double in super

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