

JavaScript Functions

- ❖ Modular program construct
 - ◆ Supports *Divide and Conquer* method
 - ◆ Individual functions tested before assembly
 - ◆ Code Reuse
- ❖ JavaScript Library Functions
 - ◆ JavaScript has seven **Global Functions**
 - ◆ JavaScript library functions are usually accessed as **Methods** contained in an **Object**
- ❖ User defined functions can be created

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Library Functions

- ❖ **Global Functions** can be called anywhere
 - ◆ **number** `parseInt(string)`
Converts the string and returns an integer (whole number) value.
 - ◆ **number** `parseFloat(string)`
Converts the string and returns a floating point (real number) value.
- ❖ **Object.Method** functions
 - ◆ `document.write(string);` // Output
 - ◆ `window.alert(string);` // Alert Window
 - ◆ **number** `Math.PI` // The Number 3.1415...
 - ◆ **string** `window.prompt(string, default);` // Prompt
 - ◆ `return Object.Method(parameters)`

Output Noun Verb Input

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Math Object Methods

- ❖ **number** `Math.PI` Returns 3.141592654558979
- ❖ **number** `Math.max(num1, num2)` Returns greater
- ❖ **number** `Math.min(num1, num2)` Returns lesser
- ❖ **number** `Math.pow(x, y)` Returns X^y power
- ❖ **number** `Math.floor(num)` Rounds down to integer
- ❖ **number** `Math.random()` Returns value between 0 to 1
- ❖ **number** `Math.sqrt(num)` Returns square root of num
- ❖ **number** `Math.sin(num)` Returns sine of num
- ❖ **number** `Math.asin(num)` Returns arc sine of num
- ❖ And many more methods...

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Library Function Example

```
<head> <title>Square Root and Power</title>
<script type="text/javascript">
  var NumA, NumB = 4;
  document.writeln("<h3>" + NumA + " " + NumB + "</h3>");
  NumA = Math.sqrt(NumB);
  document.writeln("<h3>" + NumA + " " + NumB + "</h3>");
  NumA = Math.sqrt(NumA);
  document.writeln("<h3>" + NumA + " " + NumB + "</h3>");
  NumA = Math.pow(Math.pow(NumA, NumB), 3);
  document.writeln("<h3>" + NumA + " " + NumB + "</h3>");
</script>
</head>
```

```
undefined 4
2 4
1.4142135623730951 4
64.000000000000004 4
```

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User Defined Functions

- ❖ User functions can be created that modularize a program
- ❖ Good divide and conquer approach for large programs
- ❖ Functions also allow you to reuse code for repeated sections
- ❖ Best for blocks with only one result
- ❖ Important for Event Driven actions
- ❖ Naming Convention:
 - ◆ Use TitleCase for User Functions (no spaces)
 - ◆ VerbNoun is best
 - ◆ CalcArea(X) PrintGraph(X, Y) GetData()

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User Function Parts

- ❖ **Function Definition** is function code
 - ◆ Place in head after program code area
 - ◆ Parameter list
 - ◆ Inputs to the function from function calls
 - ◆ Parameters have *Local Scope (Visible in function only)*
 - ◆ Do Not use `var` to declare parameters variables
 - ◆ May return only one value or nothing
 - ◆ `return;` `return area;` `return diceroll;`
 - ◆ Variables in function have *local scope*
- ❖ **Function Call** invoked in program or function
 - ◆ Arguments are values which are passed to function
 - ◆ Position and data type match required
 - ◆ If variables it passes contents of variable

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```

<head>
<title>A Programmer-Defined square Function</title>
<script type="text/javascript">
  // MAIN PROGRAM
  document.writeln("<h3>Square numbers 1 to 9</h3>");
  for ( var x = 1; x <= 9;x++)
    document.writeln("<b>The square of " + x+ " is "
      + SquareNumber(x)+"</b><br />");

  //SQUARE FUNCTION DEFINITION
  function SquareNumber(y)
  {
    return y*y;
  }
</script>
</head>
<body>
</body>
    
```

Calling function SquareNumber and passing it the value of x.

Variable y gets the value of variable x.

Square numbers 1 to 9

The square of 1 is 1
The square of 2 is 4
The square of 3 is 9
The square of 4 is 16
The square of 5 is 25
The square of 6 is 36
The square of 7 is 49
The square of 8 is 64
The square of 9 is 81

The return statement passes the value of y * y back to the calling function.

```

<head> <title>Square Root and Power</title>
<script type="text/javascript">
  // MAIN PROGRAM
  var sA = 1;
  document.writeln("<h3>Start of Main Program<br />");
  PrintA(sA++);
  PrintB(++sA);
  document.writeln("<h3>End of Main Program</h3>");

  function PrintA( A ) //FUNCTION DEFINITION
  {
    document.writeln("Function A: "+A+"<br />");
    return;
  }
  function PrintB( B ) //FUNCTION DEFINITION
  {
    document.writeln("Function B: "+B+"<br />");
    return;
  }
</script>
</head> <body> </body>
    
```

← **Function Calls**

Main

PrintA(sA++)

PrintB(++sA)

Start of Main Program
Function A: 1
Function B: 3
End of Main Program

```

<head>
<title>Nested function calls</title>
<script type="text/javascript">
// MAIN PROGRAM
var sA = 1;
document.writeln("<h3>Start of Main"
+ " Program<br />");
PrintA(++sA); ← Function Call
document.writeln("End of Main Program</h3>");
function PrintA( A ) //FUNCTION DEFINITION
{
  document.writeln("Function A: "+A+"<br />");
  PrintB(7); ← Function Call
  return;
}
function PrintB( B ) //FUNCTION DEFINITION
{
  document.writeln("Function B: "+B+"<br />");
}
</script>
</head> <body> </body>
        
```

Main

PrintA(++sA)

PrintB(7)

Start of Main Program
Function A: 2
Function B: 7
End of Main Program

```

<head> <title>Many Function Calls</title>
<script type="text/javascript">
// MAIN PROGRAM
document.writeln("<h3>Start of Main" +
" Program<br />");
PrintA(2);
PrintB(4);
PrintA(6);
document.writeln("End of Main Program</h3>");
function PrintA( A ) //FUNCTION DEFINITION
{
  document.writeln("Function A: "+A+"<br />");
  PrintB("Nested in A"); ← Function Call
  return;
}
function PrintB( B ) //FUNCTION DEFINITION
{
  document.writeln("Function B: "+B+"<br />");
  return;
}
</script></head> <body> </body>
        
```

Start of Main Program
Function A: 2
Function B: 4
Function A: 6
Function B: Nested in A
End of Main Program

Main

PrintA(2)

PrintB(Nest)

PrintB(4)

PrintA(6)

PrintB(Nest)

Exercise

Create a JavaScript program that will:

- ❖ Prompt for the radius from the user
- ❖ Calculate and display the circumference and area of a circle with this radius
- ❖ Create three functions in your program
 - ◆ CircumferenceCircle
 - ◆ AreaCircle
 - ◆ SquareNumber

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