

Module 3 - Lecture 6

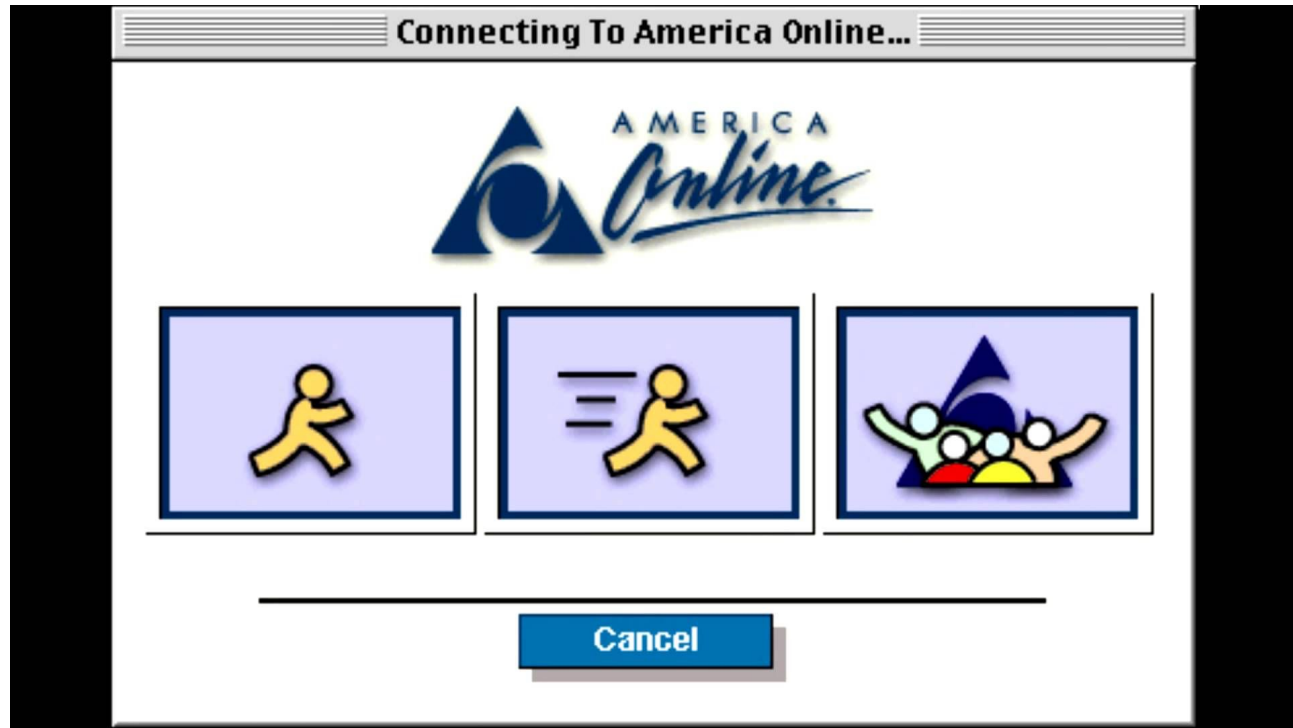
Introduction to JavaScript



Client-Side Scripting



The Internet revolution



Static HTML pages are boring

JavaScript enables dynamic behavior by executing code in the user's browser.

Use cases

- Responding to events (clicks, typing, scrolling, resizing window).
- Interact with web services (APIs).
- Manipulate HTML without refreshing!

Benefits:

- More responsive and interactive experience for the user.
- Can reduce stress on your web server.

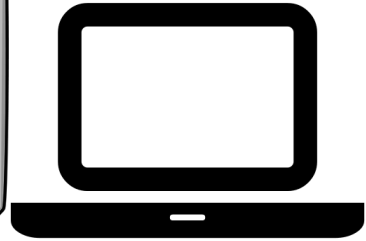
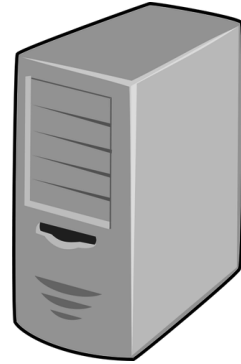


Web Application Architecture



CLIENT

JavaScript



WEB SERVER

Java / C# , SQL



DATABASE



Separation of Concerns

- **HTML** - Content
- **CSS** - Design
- **JavaScript** - Interactivity



JavaScript



JavaScript vs. Java / C#

- Java and C# require a **runtime** to execute.
- JavaScript requires a **runtime** (often in a **browser**) to execute.
- Java and C# code is **compiled (and interpreted)**.
- JavaScript is **interpreted**.
- Java and C# are **statically and strongly typed** languages.
- JavaScript is a **dynamically and loosely typed** language.



Static/Strong vs. Dynamic/Loose typing

- Static typing requires that the user declare variables with a type.
 - Compile-time type checking.
- Strong typing means the variable doesn't change types at run-time.
- Dynamic typing doesn't require users to declare a type.
 - Type checking occurs at run-time.
- Loosely/Weakly typed languages allow for a program to infer the data type of a variable based on what a variable holds at run-time.



Declaring Variables

- var, let, const
 - Don't use var. var allows redeclaration and var is function scoped via hoisting.
 - let and const are block-scoped, just like Java and C#.

```
{  
  var x = 2; // Don't use var  
  let dayOfWeek = "Sunday";  
  const PI = 3.14;  
}
```



Data Types

- Number
- String
- Boolean
- Object
- null
- undefined



Null vs. Undefined

- In JavaScript values can either be null or undefined.
- undefined is when a variable has been declared, but not assigned, similar to a reference type in Java.
- null is when a variable has been assigned a value of null, in order to represent emptiness.



Strict vs. Loose Equality

Strict Equality compares two operands for **both type and value**.
Strict equality uses `===`

```
{  
  let x = 1;  
  let y = 1;  
  let z = x === y; // z is true  
}
```

Loose Equality compares two operands for **value only after converting to a common type**.
Loose equality uses `==`

```
{  
  let x = "1";  
  let y = 1;  
  let z = x == y; // z is true  
}
```



Arrays

- Not fixed in size.
- Zero-based indexing.
- Have a length property to determine current size.
- Unlike Java and C#, arrays in JavaScript can contain different data types.



Arrays

Declaration

```
let myArray = [];           // Declare empty array  
let myArray = [1, 2, 5, 20]; // Declare and Initialize
```

Length

```
myArray.length; // length of myArray
```

Push/Pop- to use an array like a Stack.

```
myArray.push(1); // add 1 to the end  
myArray.pop();  // get last item in array
```

Accessing items or Assigning

```
let thirdItem = myArray[2]; // access third item in array  
myArray[2] = 5;             // reassign third item
```

Concat - to combine two arrays.

```
let myArray = [1, 2];  
let myOtherArray = [3, 4];  
let finalArray = myArray.concat(myOtherArray); // [1, 2, 3, 4]
```



Objects

```
let myObject = {};      // Declare an empty object
```

```
// Declare an object with data
```

```
let myObject = {  
  firstName: "John",  
  lastName: "Smith",  
  age: 40  
};
```

```
// Access data from an object
```

```
let theFirstName = myObject.firstName;
```

```
// Re-assign data in an object
```

```
myObject.firstName = "Jane";
```

```
// Assign data that doesn't exist yet
```

```
myObject.occupation = "Developer";
```



QUESTIONS?

