Path Module

In Node.js, the path module provides utilities for working with file and directory paths. It is especially useful for handling file paths in a cross-platform way, as it takes care of differences between Windows (\) and POSIX (/) path separators.

To use the path module, you first import it with const path = require('path');. Here are some common methods and examples:

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```
const path = require('path');
```

1. Getting the Directory Name of a Path

- **path.dirname()**: Returns the directory name of a given path.

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```
const filePath = '/home/user/documents/file.txt';
console.log(path.dirname(filePath));  // Output: /home/user/documents
```

2. Getting the Base Name (File Name) of a Path

- **path.basename()**: Returns the last portion of a path, which is typically the file name. You can also specify an extension to remove.

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```
const filePath = '/home/user/documents/file.txt';
console.log(path.basename(filePath));       // Output: file.txt
console.log(path.basename(filePath, '.txt')); // Output: file
```

3. Getting the Extension of a File

- **path.extname()**: Returns the extension of the path (including the dot).

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```
const filePath = '/home/user/documents/file.txt';
console.log(path.extname(filePath)); // Output: .txt
```

4. Joining Paths

- **path.join()**: Joins multiple path segments together, normalizing the resulting path.

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```
const dir = '/home/user';
const file = 'documents/file.txt';
console.log(path.join(dir, file)); // Output: /home/user/documents/file.txt
```

5. Resolving an Absolute Path

- **path.resolve()**: Resolves a sequence of paths or path segments into an absolute path.

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```
console.log(path.resolve('user', 'documents', 'file.txt'));
// Output: /<current_working_directory>/user/documents/file.txt
```

6. Normalizing a Path

- **path.normalize()**: Normalizes a path by resolving .. and . segments.

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```
const weirdPath = '/home/user/../documents/./file.txt';
console.log(path.normalize(weirdPath)); // Output: /home/documents/file.txt
```

7. Checking if a Path is Absolute

- **path.isAbsolute()**: Returns true if the path is absolute; otherwise, false.

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```
console.log(path.isAbsolute('/home/user'));   // Output: true
console.log(path.isAbsolute('documents/file.txt')); // Output: false
```

8. Parsing a Path into an Object

- **path.parse()**: Returns an object with properties for the root, dir, base, name, and ext.

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```
const filePath = '/home/user/documents/file.txt';
const parsedPath = path.parse(filePath);
console.log(parsedPath);
/* Output:
{
  root: '/',
  dir: '/home/user/documents',
  base: 'file.txt',
  ext: '.txt',
  name: 'file'
}
*/
```

9. Formatting a Path Object into a String

- **path.format()**: Accepts an object with properties like dir, base, name, and ext and constructs a path string.

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```
const pathObject = {
 dir: '/home/user/documents',
  base: 'file.txt'
};
console.log(path.format(pathObject)); // Output: /home/user/documents/file.txt
```

10. Cross-Platform Path Separator

- **path.sep**: Provides the platform-specific path segment separator.

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```
console.log(path.sep); // Output: / on POSIX, \ on Windows
```

Example: Combining Multiple Path Operations

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```
const filePath = '/home/user/../documents/file.txt';
```

```
// Normalize and parse the path
```

```
const normalizedPath = path.normalize(filePath);
const parsed = path.parse(normalizedPath);
console.log('Directory:', parsed.dir);       // Output: /home/documents
console.log('Base:', parsed.base);           // Output: file.txt
console.log('File Extension:', parsed.ext);  // Output: .txt
console.log('File Name:', parsed.name);      // Output: file
```

```
// Join paths
```

```
const newFilePath = path.join(parsed.dir, 'newfile.md');
console.log('New File Path:', newFilePath);  // Output:
/home/documents/newfile.md
```

Summary

Method	Description
path.dirname()	Gets the directory name of a path
path.basename()	Gets the base name (file name) of a path
path.extname()	Gets the extension of a file
path.join()	Joins multiple path segments
path.resolve()	Resolves a sequence of paths to an absolute path
path.normalize()	Normalizes a path, resolving .. and . segments
path.isAbsolute()	Checks if a path is absolute
path.parse()	Parses a path into an object with components
path.format()	Formats a path object into a string
path.sep()	Provides the platform-specific path separator

The path module makes it easy to work with file paths in a reliable and platform-agnostic way in Node.js.