Unit 03: NodejS and NPM

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Objectives

After studying this unit, you will be able to:

- Understand NPM
- Install NPM
- Analyze nodejs
- Understand different front-end frameworks

Introduction

Node.js is a server-side platform built on Google Chrome's JavaScript Engine (V8 Engine). Node.js was developed by Ryan Dahl in 2009. An open source, cross-platform runtime environment called Node.js is used to create networking and server-side applications. Applications for Node.js can be created in JavaScript and run-on Linux, OS X, and Microsoft Windows using the Node.js runtime. In simple words, we can say nodejs is a collection of runtime environments and javascript libraries.

Node.js = Runtime Environment + JavaScript Library

3.1   Nodejs and NPM

Node.js is a framework that contains the V8 JavaScript engine, the standard library of packages, and some binaries. In reality, it is more complex than that as explained in the below diagram .
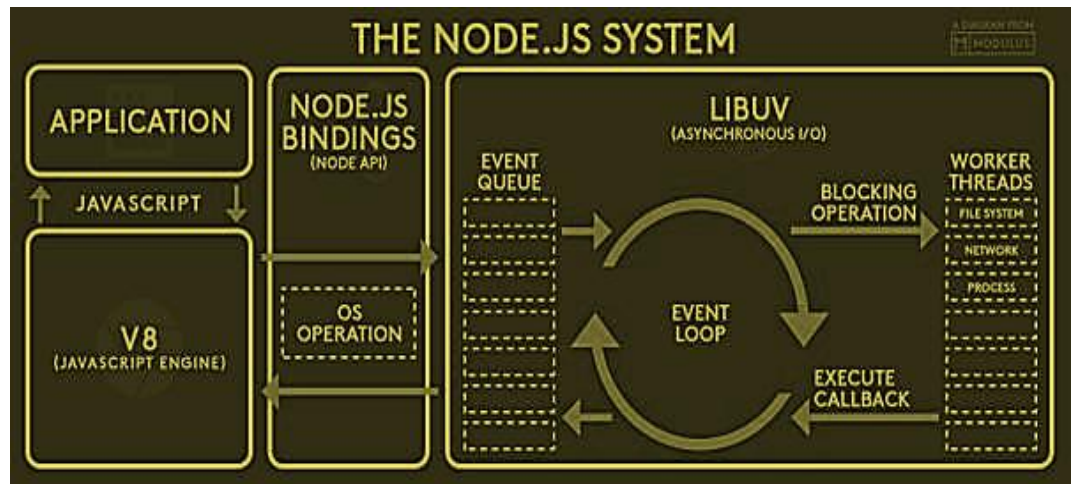
Like Web APIs in the browser, Node.js has a standard library that contains JavaScript packageswhich may also provide an interface to low-level APIs. For example, Node.js comes with fs package which contains readFile function among many. This function reads the file on the disk of the machine and returns file content back.The Node.js architecture is very complex and made of different parts as seen in the earlier diagram. It also contains an event loop that facilitates the execution of these callback functions.

Node Package Manager (NPM) provides two main functionalities −

1. Online repositories for node.js packages/modules which are searchable on search.nodejs.org
2. Command line utility to install Node.js packages, do version management and dependency management of Node.js packages.

Did you Know?

npm is installed with Node.js

This means that you have to install Node.js to get npm installed on your computer.
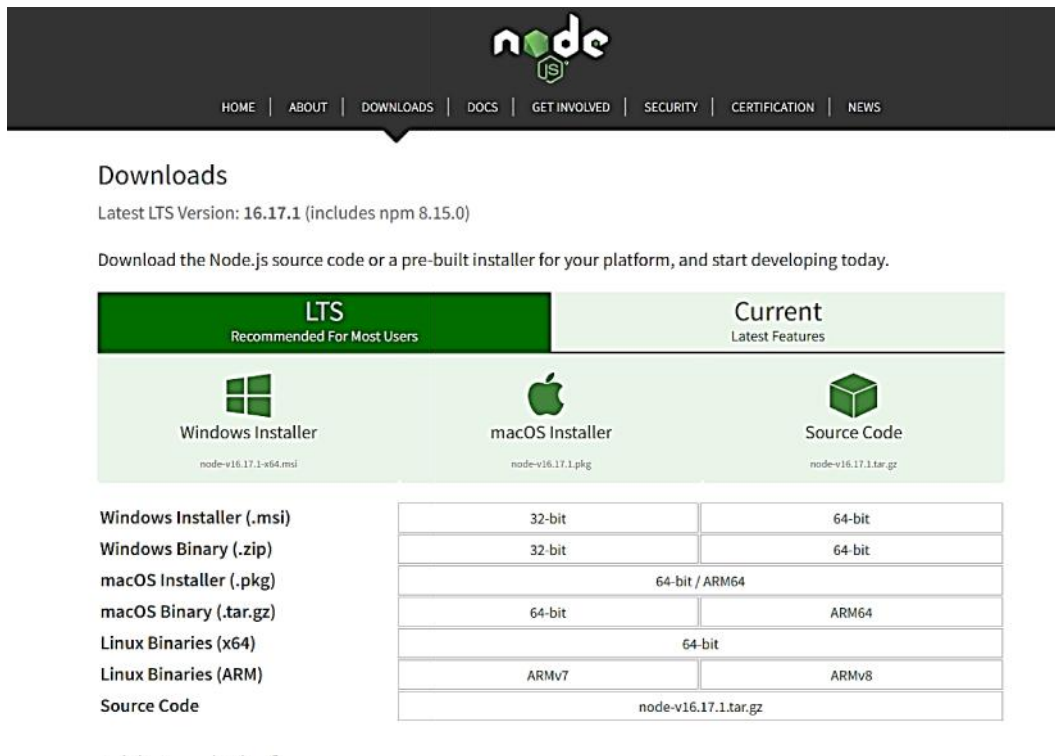
Installation of nodejs

Here are the steps to downloading Node.js for Windows:

Notes: Node js can be installed on Windows, macOS, and Linux. Nodejs is asynchronous.
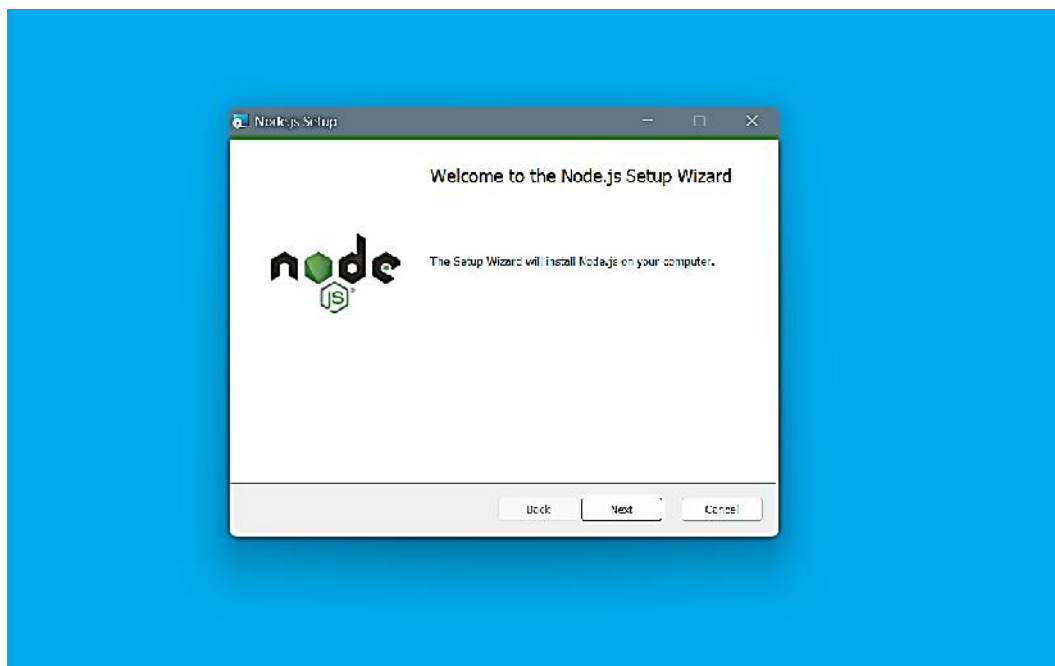
Download the latest version of a node from https://nodejs.org/en/download/

Step 1: Go to the Node.js website and find their downloads page.

Step 2: Click on the windows installer to download and open the file.

Step 3: Accept their license agreement by clicking 'Next.'

Front-End Web UI Frameworks and Technology Tools
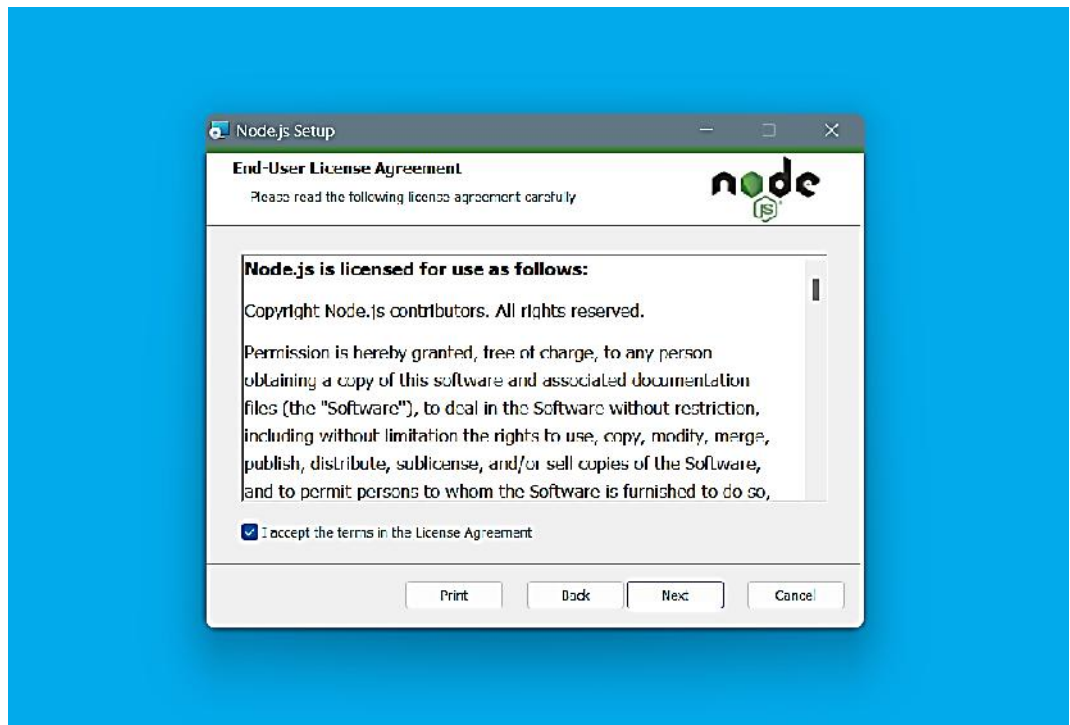
Step 4: Choose where you'd like to install Node.js, then click 'Next.'
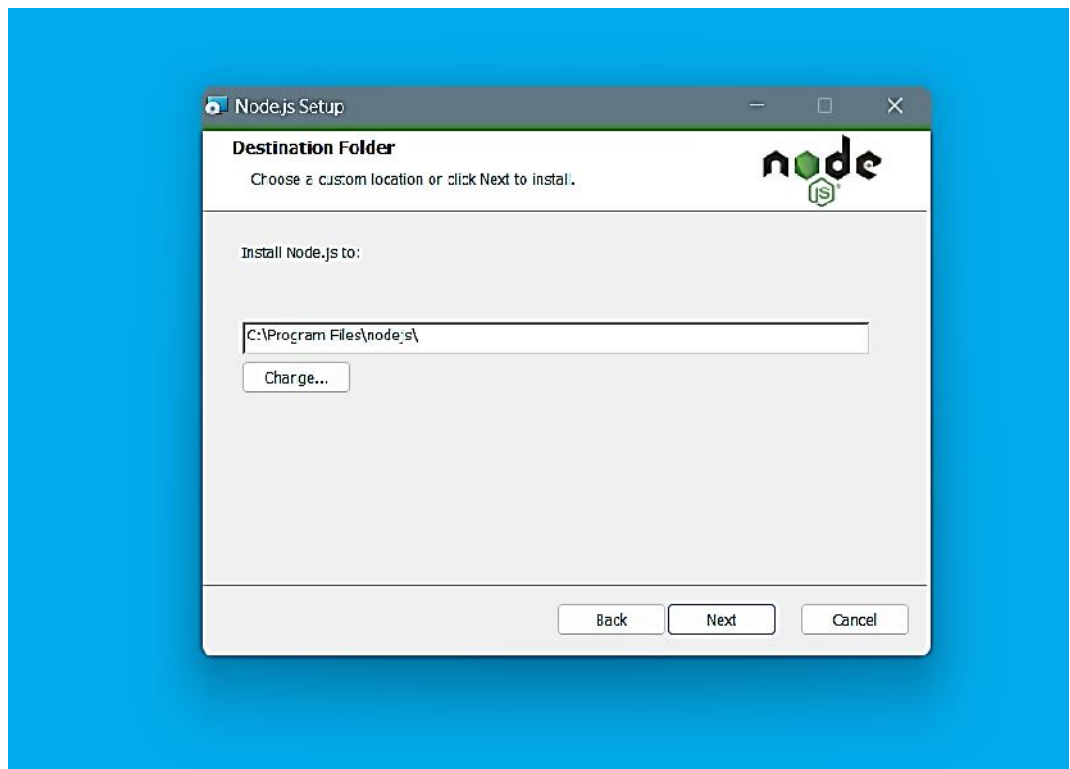
Step 5: If you're a beginner, stick with the default Node.js setup by clicking 'Next.' You can change the setting as per your needs if you know what impact it'd have on the application.

LOVELY PROFESSIONAL UNIVERSITY
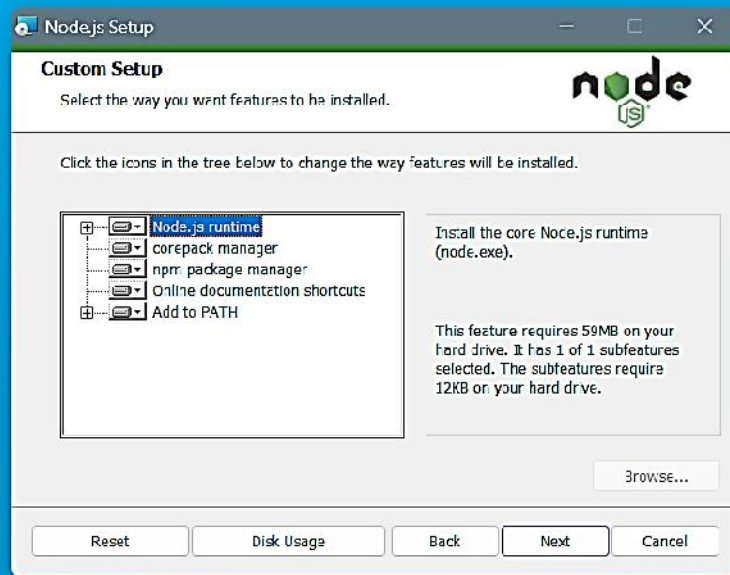
Step 6: Click next again on the Tool for Native Modules page, then click 'Install.'
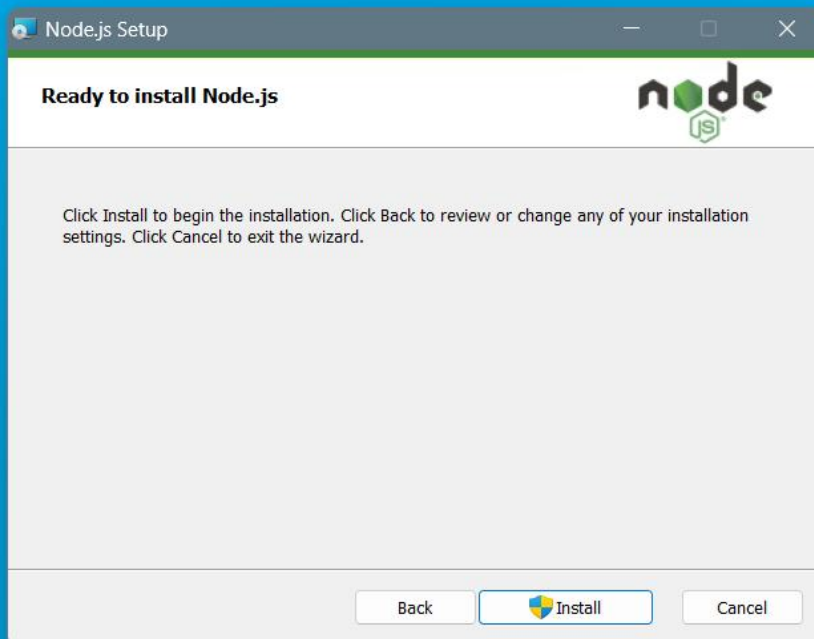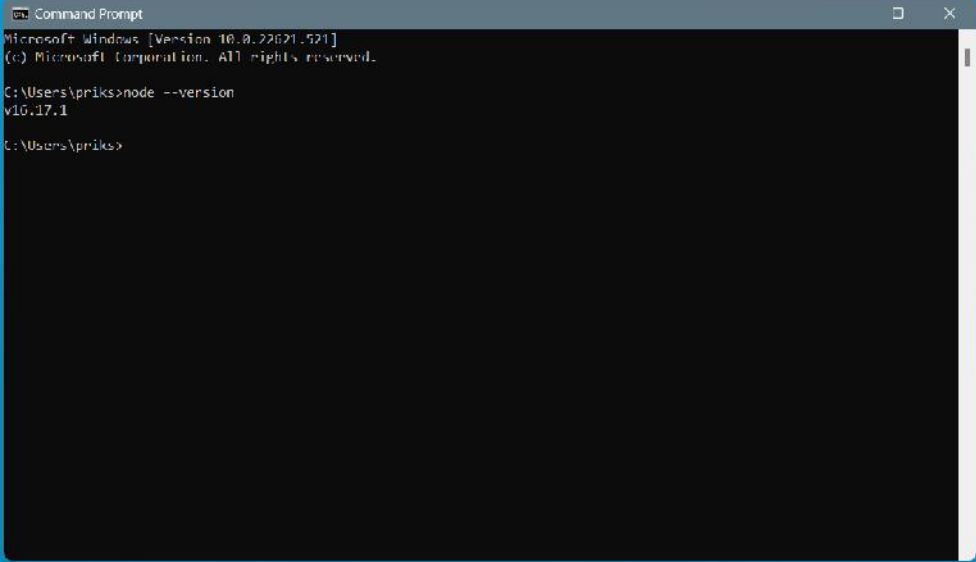
Click on install and wait for completion, node is successfully installed on your system.

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Notes:

After successful installation of the node. Check the installation version by

Step 1: Open command prompt

Step 2: Type node –version

3.2   Bootstrap

The most popular HTML, CSS, and JavaScript framework for creating responsive and mobile-friendly websites is called Bootstrap. Utilization and download are both completely free. It is a front-end framework used to make web development simpler and quicker. It offers design templates for typography, forms, buttons, tables, navigation, modals, image carousels, and many other things that are based on HTML and CSS.

Bootstrap includes HTML and CSS based design templates for typography, forms, buttons, tables, navigation, modals, image carousels and many other, as well as optional JavaScript plugins.

Did you Know?

Bootstrap is a free front-end framework for faster and easier web development. It also givesyou the ability to easily create responsive designs.

Why to Learn Bootstrap

Mobile first approach

Bootstrap 3, framework consists of Mobile first styles throughout the entire library instead them of in separate files.

Browser Support

It is supported by all popular browsers.

Easy to Get Started

With just the knowledge of HTML and CSS, anyone can get started with Bootstrap. Also, the Bootstrap official site has good documentation.

Responsive design

Bootstrap's responsive CSS adjusts to Desktops, Tablets and Mobiles. More about the responsive design is in the chapter Bootstrap Responsive Design. Provides a clean and uniform solution for building an interface for developers.It contains beautiful and functional built-in components which are easy to customize.It also provides web-based customization.And best of all it is open-source.

3.3   Applications of Bootstrap

- **Scaffolding**: Bootstrap provides a basic structure with Grid System, link styles, and background.

- **CSS**: Bootstrap comes with the feature of global CSS settings, fundamental HTML elements styled and enhanced with extensible classes, and an advanced grid system.

- **Components**: Bootstrap contains over a dozen reusable components built to provide iconography, dropdowns, navigation, alerts, pop-overs, and much more.

Setting up bootstrap

3.4   Where to Get Bootstrap?

The bootstrap is an open-sourcesoftware and it can be downloaded from getbootstrap.com

If you want to download and host Bootstrap yourself, go to getbootstrap.com, and follow the instructions there.

OR:

Include Bootstrap from a CDN

- If you don't want to download and host Bootstrap yourself, you can include it from a CDN (Content Delivery Network).

- MaxCDN provides CDN support for Bootstrap's CSS and JavaScript. You must also include jQuery.

3.5   Bootstrap CDN

You must include the following Bootstrap's CSS, JavaScript, and jQuery from MaxCDN into your web page.

<!—Latest compiled and minified Bootstrap CSS -->

<link rel="stylesheet"
href=https://cdn.jsdelivr.net/npm/bootstrap@4.0.0/dist/css/bootstrap.min.css>

<!-- Latest compiled Bootstrap JavaScript -->

<script src="https://cdn.jsdelivr.net/npm/bootstrap@4.0.0/dist/js/bootstrap.min.js" ></script>

<!-- latest jQuery library -->

<script src="https://code.jquery.com/jquery-3.2.1.slim.min.js" ></script>

Advantages of Using Bootstrap CDN

- Many users already have downloaded Bootstrap from MaxCDN when visiting another site.

- As a result, it will be loaded from cache when they visit your site, which leads to faster loading time.

- Also, most CDN's will make sure that once a user requests a file from it, it will be served from the server closest to them, which also leads to faster loading time.

Example:

<!doctype html>

<htmllang="en">

<head>

<!-- Required meta tags -->

<meta charset="utf-8">

<meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">

<!-- Bootstrap CSS -->

<linkrel="stylesheet"
href="https://cdn.jsdelivr.net/npm/bootstrap@4.0.0/dist/css/bootstrap.min.css" >

<title>Hello, world!</title>

</head>

<body>

<h1 class="jumbotron">Hello, world!</h1>

<!-- Jquery and java Scripts-->

<script src="https://code.jquery.com/jquery-3.2.1.slim.min.js"></script>

<script src="https://cdn.jsdelivr.net/npm/bootstrap@4.0.0/dist/js/bootstrap.min.js" ></script>

</body>

</html>

Output

Hello, world!

3.6 Front End Frameworks

In recent years, frontend frameworks appear to have swept the web development industry. Anyone working as a Web developer, designer, programmer, or architect will be fully aware of how quickly this industry evolves, especially those who are new to the field and even more so those who just do Web design as a hobby rather than as a full-time job. One of the most important and vital responsibilities someone in this field must perform is keeping up with the unrelenting pace at which new technologies are produced and outdated technologies are upgraded. We feel lost in a sea of information if we don't do it for more than a few months, unable to consume at a rate any faster than the technological output.

What are Frontend Frameworks?

You possibly know them as Bootstrap or Foundation.

Frontend frameworks themselves are nothing new. In their most basic form, they're nothing more than a predefined set of CSS classes and Javascript functions for a developer to quickly and easily tap into. Some are even more basic, stripping out the Javascript and just being a list of CSS classes.

This technique of pre-defining pieces of markup for reuse over time has happened for many years, but more often than not in private, whether it be an agency who have built their own classes, libraries and functions to speed up production, or a one-man hobbyist who wanted to work smarter, rather than harder. The difference now, of course, is that frontend frameworks have gone public, gone mainstream, and become accessible to the masses.

Why Would We Use a Frontend Framework?

Speed and Simplicity

The primary goal of frontend frameworks has always been to speed up production for the developer, reduce costs, increase yield, and do so while keeping it simple, concise, and straightforward for even the most novice of Web developers.

Responsive, Cross-Device Support Built In

There is very little justification for not creating a responsive website in a world where the bulk of Internet traffic to Web sites in the Western world originates from a portable device, be it a tablet or smartphone. It can be challenging to grasp from scratch creating a responsive CSS that targets all necessary screen sizes and devices.

Pre-Tested Markup

You may be sure that any quality frontend framework's markup has undergone rigorous testing and approval procedures before being sent to you, the end user. The majority of the defects, both common and uncommon, have already been found, evaluated, and fixed, so you won't have many bugs fixing to complete for the duration of your project.

Detailed Documentation and Wide Support Network

Frameworks are incredibly helpful when you have the supporting documentation, as we previously described. Without the documentation to describe the framework's structure and the classes and functions you can use, the tool is useless. Fortunately, all top-notch frontend frameworks come with first-rate documentation, and the majority also have outstanding community support systems made up of knowledgeable end users and framework developers.

Summary

- Bootstrap is a free front-end framework for faster and easier web development. It also gives you the ability to easily create responsive designs.
- Content delivery network (CDN) is a system of distributed servers (network) that deliver webpages and other Web content to a user based on the geographic locations of the user, the origin of the webpage and a content delivery server.
- Bootstrap provides a grid system, which creates a page layout through a series of rows and columns that can place the content. There is no Grid system in CSS.
- Node.js also provides a rich library of various JavaScript modules which simplifies the development of web applications using Node.js to a great extent.

Keywords

Bootstrap: Bootstrap is a free front-end framework for faster and easier web development. It also gives you the ability to easily create responsive designs.

Web Framework:A web framework (WF) or web application framework (WAF) is a software framework that is designed to support the development of web applications including web services, web resources, and web APIs.

HTML: The HyperText Markup Language or HTML is the standard markup language for documents designed to be displayed in a web browser.

NPM:npm is two things: first and foremost, it is an online repository for the publishing of open-source Node.js projects; second, it is a command-line utility for interacting with said repository that aids in package installation, version management, and dependency management.

Self Assessment

1. What is full form of CDN
A. Content Direct Network
B. Content Delivery Network
C. Content Delivery Node
D. Create Delivery Network

2. Which of the following class in bootstrap is used to create a big box for calling extra attention?
A. .box
B. .container
C. .container-fluid
D. .jumbotron

3. What are the advantages of Bootstrap
A. Easy to use
B. Responsive
C. Mobile first
D. All of the above

4. Which of the following statement is correct?
A. Nodejs is Server Side Language.
B. Nodejs is the Client Side Language.
C. Nodejs is both Server Side and Client Side Language.
D. None of the above.

5. Which of the following command is used to check the version of the installed node?
A. Node
B. Node -v
C. Node –version
D. None of above

6. Which of the following extension is used to save the Node.js files?
A. .js
B. .node
C. .java
D. .txt

7. Node.js is _____ by default.
A. Synchronous
B. Multi-threaded
C. Asynchronous
D. None of the above

8. What npm stands for?
A. Node Package Manager

B. Node Project Manager

C. New Project Manager

D. New Package Manager

9. HTML stands for _____

A. HyperText Markup Language

B. HyperText Machine Language

C. HyperText Marking Language

D. HighText Marking Language

10. What is the correct syntax of doctype in HTML5?

A. </doctype html>

B. <doctype html>

C. <doctype html!>

D. <!doctype html>

11. Which of the following is correct about Bootstrap?

A. Bootstrap's responsive CSS adjusts to Desktops, Tablets, and Mobiles.

B. Provides a clean and uniform solution for building an interface for developers.

C. It contains beautiful and functional built-in components which are easy to customize.

D. All of the above.

12. Which of the following is correct about Bootstrap?

A. Bootstrap is a sleek, intuitive, and powerful, mobile-first front-end framework for faster and easier web development.

B. It uses HTML, CSS, and Javascript.

C. Bootstrap was developed by Mark Otto and Jacob Thornton at Twitter.

D. All of the above.

13. What is the full form of NPM?

A. Node Program Manager

B. Node Performance Manager

C. Node Package Manager

D. None of above

14. What is the default scope in Node.js Application?

A. Global

B. Local

C. Global Function

D. Local to object

15. Node.js runs on _____

A. Client

B. Server

C. Both, server and client

D. None of the above

Answers for Self Assessment

1. B   2. D   3. D   4. A   5. C

| 6. | A | 7. | C | 8. | A | 9. | A | 10. | D |
| 11. | D | 12. | D | 13. | C | 14. | B | 15. | B |

Review Questions

1. What do you mean by front end framework? Explain.
2. Write down the steps to install node js on windows operating system.
3. Write advantages of bootstrap.
4. What do you mean by CDN?
5. How bootstrap connected with HTML. Explain the process with suitable example.

Further Readings

Beginning Node.js, Book by Basarat Ali Syed

Learning Bootstrap 4, Book by Matt Lambert

Bootstrap in 24 Hours, Book by Jennifer Kyrnin

Web Links

https://nodejs.org/en/download/

https://getbootstrap.com/