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MERN Stack Development

Course Module



About

MERN stands for MongoDB, Express, React, Node, after the four key technologies that make up the stack.

- MongoDB — document database
- Express(.js) — Node.js web framework
- React(.js) — a client-side JavaScript framework
- Node(.js) — the premier JavaScript web server

Express and Node make up the middle (application) tier. Express.js is a server-side web framework, and Node.js is the popular and powerful JavaScript server platform. Regardless of which variant you choose, ME(RVA)N is the ideal approach to working with JavaScript and JSON, all the way through. MERN is a full stack, following the traditional three-tier architectural pattern, including the front-end display tier (React.js), application tier (Express.js and Node.js), and database tier (MongoDB).

MongoDB, the document database at the root of the MERN stack. MongoDB was designed to store JSON data natively (it technically uses a binary version of JSON called BSON), and everything from its command line interface to its query language (MQL, or MongoDB Query Language) is built on JSON and JavaScript.

MongoDB works extremely well with Node.js, and makes storing, manipulating, and representing JSON data at every tier of your application incredibly easy. For cloud-native applications, MongoDB Atlas makes it even easier, by giving you an auto-scaling MongoDB cluster on the cloud provider of your choice, as easy as a few button clicks.

Express.js (running on Node.js) and React.js make the JavaScript/JSON application MERN full stack, well, full. Express.js is a server-side application framework that wraps HTTP requests and responses, and makes it easy to map URLs to server-side functions. React.js is a front end JavaScript framework for building interactive user interfaces in HTML, and communicating with a remote server.

The combination means that JSON data flows naturally from front to back, making it fast to build on and reasonably simple to debug. Plus, you only have to know one programming language, and the JSON document structure, to understand the whole system!

MERN is the stack of choice for today's web developers looking to move quickly, particularly for those with React.js experience.

Advantages

- 1. Cost-effective:** All the four technologies that are mentioned above, MERN (MongoDB, Express.js, React.js, and Node.js) are used in MERN Stack is built on JavaScript that makes it cost-effective and within less cost investment user will be able to get the better results or output.
- 2. SEO friendly:** Here, SEO (Search Engine Optimization) friendly means that Google, Yahoo and other search engines can search each page on the website efficiently and easily, interpret and correlate the content effectively with the searched text and easily index it in their database. As whenever websites are created using MERN technologies, then it is always SEO friendly.
- 3. Better performance:** Better performance refers to the faster response between backend and front-end and database, which ultimately improves the website speed and yields better performance, thus providing a smooth user experience.
- 4. Improves Security:** It mainly concerns the security of applications generated using MERN; here web application security refers to various processes, methods or technologies used for protecting web servers and various web applications, such as APIs (Application user interface) from the attack by internet-based threats. Generally, secured hosting providers can easily integrate applications created using the MERN stack. For more or better security MongoDB and Node.js security tools are also used.

5. **Provide the fastest delivery:** Any Web applications and mobile applications created by using MERN Stack are built much faster, which also helps to provide faster delivery to our clients.
6. **Provides faster Modifications:** MERN stack technologies supports quick modifications as per the client's request in the mobile and web applications.
7. **Open Source:** All the four technologies that are involved in MERN are open-source. This feature allows developers to get solutions to queries that may evolve from the open portals during development. As a result, it will be ultimately beneficial for a developer.
8. **Easy to switch between client and server:** MERN is very simple and fast because it is written in only one language. And also, it is very easy to switch between client and server.

Course Content

1. INTRO TO WEB DEVELOPMENT

- WHAT IS WEB DEVELOPMENT?
- HOW WEBSITES WORK?
- ADVANTAGES OF LEARNING WEB DEVELOPMENT
- HISTORY OF WEB DEVELOPMENT
- COURSE AND PROJECTS OVERVIEW

2. HTML – PART 1

- WHAT IS HTML?
- STRUCTURE OF WEBPAGE
- HTML TAGS
- ADDING AND FORMATTING TEXTS, TITLE, PARAGRAPH, BODY
- LISTS – ORDERED/UNORDERED
- IMAGES
- FORMS

3. HTML– PART 2 (CSS–PART 1) LINKS

- LINKS
- TABLES
- IFRAMES, VIDEOS
- ANCHOR TAGS
- HTML DIVS
- CSS INTRODUCTION
- INLINE VS INTERNAL VS EXTERNAL STYLING
- CSS DISPLAY
- PROJECT 1- TO-DO APP – FRONTEND USING BASIC HTML/CSS

4. CSS– PART 2 | ADVANCED CSS – PART 1

- CSS BACKGROUNDS, BORDERS, MARGINS, PADDING
- CSS FONT STYLING
- STYLINGS LISTS
- STYLING TABLES, FORMS
- GRADIENTS
- FONT AWESOME

5. ADVANCED CSS – PART 2 TOOL TIPS

- TOOL TIPS
- BUTTONS
- TRANSITIONS, TRANSFORMATION, ANIMATIONS
- BOX SIZING
- FLEX
- GRID
- PROJECT 1- TO-DO APP – ENHANCE FRONTEND USING CSS

6. PROJECT BUILDING

- RESPONSIVE MEDIA QUERIES
- DISCUSS TO-DO APP
- PROJECT 2 - BLOG – ADD BLOG FRONTEND USING HTML/CSS

7. BOOTSTRAP – PART 1 BOOTSTRAP CONTAINERS

- BOOTSTRAP CONTAINERS
- TABLES, IMAGES, COLORS
- ALERTS, BUTTONS
- SPINNERS, CARDS

8. BOOTSTRAP – PART 2

- PAGINATION, DROP DOWN
- CAROUSEL
- TO-DO APP – DEVELOP TO-DO APP FRONTEND USING BOOTSTRAP
- GITHUB OVERVIEW

9. JAVASCRIPT – PART 1

- INTRODUCTION TO JAVASCRIPT
- VARIABLES, SCOPING, DATA TYPE
- STRINGS AND NUMBERS
- OPERATORS AND LOOPS
- FUNCTIONS
- PROJECT 1 ADD FUNCTIONALITIES TO TO DO APP

10. JAVASCRIPT – PART 2 (DATA STRUCTURES) ARRAYS

- ARRAYS
- LINKED LIST
- STACKS
- QUEUES
- MAPS
- HASHING

11. JAVASCRIPT – PART 3

- UNDERSTANDING AND WORKING WITH DOM
- DEVELOPER TOOLS IN BROWERS
- JQUERY
- PROJECT 2 – ADD FUNCTIONALITIES TO BLOG

12. JAVASCRIPT – PART 4 PROTOTYPES

- PROTOTYPES
- CLOSURES
- LOCAL STORAGE
- AJAX
- PROMISES
- PROJECT 3 – DICE ROLLER GAME USING ANIMATION AND JAVASCRIPT

13. JAVASCRIPT – PART 5 ES5 VS ES6 VS ES7

- ES5 VS ES6 VS ES7
- EVENT LOOP IN JAVASCRIPT

14. REACT – PART 1 REACT INTRO

- REACT INTRO
- INSTALL NODE
- CREATE AN APP USING CREATE-REACT-APP
- UNDERSTANDING BASICS OF REACT APP
- UNDERSTANDING JSX
- UNDERSTANDING VIRTUAL DOMS, SINGLE PAGE APPS

15. REACT – PART 2 REACT LIFECYCLE

- REACT LIFECYCLE
- STATES
- CLASS COMPONENTS VS FUNCTIONS COMPONENTS
- EVENT HANDLING
- PROPS
- BUILDING A BASIC FORMS USING REACT
- PROJECT 4 – BUILD BLOG USING REACT

16. REACT – PART 3 ROUTES

- ROUTES
- CONDITIONAL RENDERING
- PURE COMPONENTS
- HIGH ORDER COMPONENTS
- CONTROLLED VS UNCONTROLLED COMPONENTS

17. REACT – PART 4 REDUX

- REDUX
- BABEL, WEBPACK
- ADD REDUX IN A PROJECT AND BUILD USING WEBPACK

18. REACT – PART 5

- CREATING A MOCK API SERVER
- AXIOS
- SERVER-SIDE RENDERING
- PROJECT 4 - FETCH DATA IN BLOG FROM AN API

19. REACT.JS – PART 6 SASS OVERVIEW

- SASS OVERVIEW

20. NODE.JS – PART 1 SIMPLE SERVER

- SIMPLE SERVER
- RESPONSE TYPES – HTML, JSON
- ROUTING
- EXPRESS INTRO
- MAKE A CALL FROM FRONTEND TO SERVER
- PROJECT 4 – CREATE API TO FETCH BLOGS FROM DB

21. NODE.JS – PART 2

- EXPRESS PARAMS AND QUERY STRING
- EXPRESS MIDDLEWARE
- API AUTHENTICATION
- JWT TOKEN, PASSPORTJS
- PROJECT 4 – ADD API AUTHENTICATION TO BLOG APP

22. NODE.JS – PART 3

- SOCKET PROGRAMMING
- PROJECT 5 - BUILD CHAT APP

23. DATABASE – PART 1 SQL VS NO SQL

- SQL VS NO SQL
- MONGODB / DYNAMODB OVERVIEW
- INSTALLING MONGODB
- CONNECTING AND INSERTING DATA
- UPLOAD / MODIFY TESTS OF ONLINE QUIZ SYSTEM USING DYNAMODB

24. DATABASE – PART 2

- DELETING AND UPDATING DATA
- CRUD
- WRITE FUNCTIONS TO ADD/UPDATE A BLOG

25. CODE REVIEW + DEPLOYMENT

- TOOLS FOR CODE REVIEW
- STANDARD CODING CONVENTIONS
- FIREBASE
- DEPLOY USING NETLIFY
- DEPLOY USING AWS EC2
- GET CODE REVIEWED BY SOFTWARE DEVELOPERS AND DEPLOY PROJECTS

26. GOOGLE ANALYTICS + WEBENGAGE GTM

- GTM
- GOOGLE ANALYTICS
- FACEBOOK ANALYTICS
- WEBENGAGE

27. MAJOR PROJECT ASSIGNMENT (4 WEEKS)

- SHOPPING APP PRD SHARING
- ONLINE ASSESSMENT APP PRD SHARING
- TIMELINE DISCUSSION (EVERY PROJECT IN TECH COMPANIES HAVE TIMELINES)
- WEEKLY PROGRESS DISCUSSIONS

28. INTERNSHIP

- THIS INTERNSHIP IS VALID ONLY FOR STUDENTS COMPLETING THE COURSE AND PROJECTS.
- STUDENTS WILL HAVE CHOICE TO OPT OUT.

Tools

- MongoDB (a non-SQL database)
- ExpressJS (an HTTP server that is excellent for APIs)
- ReactJS (a leading Web Application framework)
- NodeJS (a tool to manage your tools)

Future

MERN stack is the best option for professionals in web development in various sectors and students planning to make a career in full-stack application development.

To be able to become a full-stack developer, you should be able to handle all the development processes on the front-end, back-end, and database. So, in addition to the many job options available, this specific career option is also amongst the best-paid ones. That is why the future of MERN stack developers is quite secure.

As a MERN Stack Developer, IT professionals can work for various domains. Full-stack development is always the preferred one but working on the front-end or back-end is much easier.

Class Environment



Office Premises



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