Practical 1

Aim: Introduction and Installation of Node.js

1. Differentiate JavaScript and Node.js

Features	JavaScript	Node JS
Definition	It is an open-source, cross-platform, interpreted, lightweight scripting programming language that is used todevelop dynamic and web applications.	It is a cross-platform, open-source JavaScript runtime environment that allows JavaScript to be run on the server.
Type	It is a programming language. It worksin any browser that has a proper browser engine.	It's a JavaScript interpreter and environment with some valuable libraries that JavaScript programming can useseparately.
DedicatedServer	It is generally used on the client-sideserver.	It is generally used on the server-side.
Community	All the JavaScript is not important tothe node community.	All node projects represent the JavaScriptcommunity.
Running Engines	JavaScript can be run on any engine,including Spider Monkey, V8, and JavaScript Core.	Node JS is only supported by the V8 engine, which Google Chrome mostly uses. Any JavaScript program written with Node JS will always be run in the V8 engine.
Used for	It is designed to build network-centricapplications.	It's designed for data-intensive real-time applications that run on several platforms.
Languages	It's a newer version of the ECMAscript that runs on Chrome's V8 engine, which is written in C++.	It uses C, C++, and JavaScript.
Modules	Few JavaScript frameworks are **TypedJS, RamdaJS**, etc.	Lodash, express are examples of Nodejs modules. These all modules are to beimported from **npm**.
CompaniesUses	Various companies use JavaScript like **Google, Shopify, Udacity, Sendgrid,Groupon, Okta, Instacart**, etc.	Various companies use Node Js like **Netflix, Hapi, Walmart, Paypal, Linkedin, Trello, Medium, eBay**, etc.

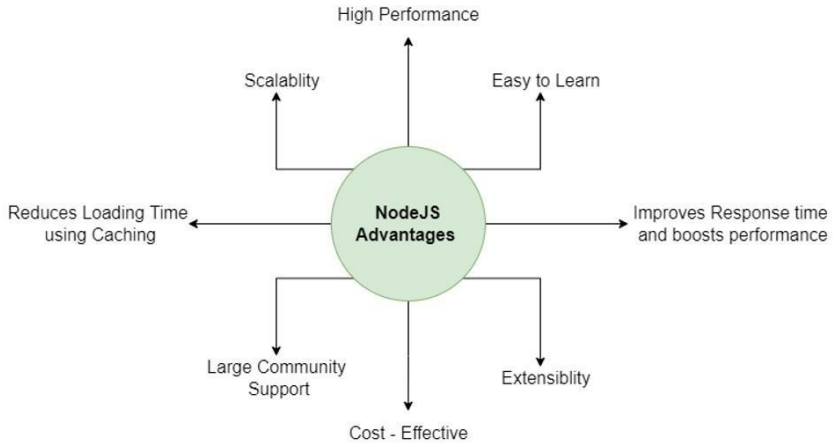
2. What is the difference between 'front-end' and 'back-end' development?

Basis	Front End	Back End
Definition	Front end development involves theeffective implementation of visual components of a web application	Back end development involves the effective implementation of functionsof a web application that includes databases, server management, etc.
Skills Required	The skill set required for the front end includes HTML, CSS, SASS, JavaScript, etc.	The skill set required for the back end development includes Python, Ruby,Java, PHP, etc.
Independence	Front end development cannot work independently except in the case of staticsites.	Back end development works independently of the front end asBack end
Goal	The goal of the front end development isto ensure that the application is accessible by everyone and it remains responsive on all the platforms such as desktop, talbot, and phone.	The goal of the back end development is to ensure that the application runs under all the provided cases, be scalable, and workefficiently with low latency without fail.
DevelopmentTeam	The work of the front end developmentteam is to design and develop the appearance of the application based onthe user's input and test it.	The work of the back end development team is to assist the front end in linking pages up, providesecurity and support to the users.
FrameworksUsed	AngularJS, React, vue.js, etc.	Django, Flask, CakePHP, Laravel,Ruby on Rails, etc.
Additionalskills	A good understanding of UI and UXdesigning.	Logical reasoning and problem-solving.

3. What is Node.js?

Node.js is an open source, cross-platform runtime environment for developing server-side and networking applications. Node.js applications are written in JavaScript, and can be run within the Node.js runtime on OS X, Microsoft Windows, and Linux. It is a server-side platform built on GoogleChrome's JavaScript Engine (V8 Engine) and was developed by Ryan Dahl in 2009 and its latest version is v0.10.36.
It also provides a rich library of various JavaScript modules which simplifies the development of webapplications using Node.js to a great extent.

4. Write down advantages of Node.js



High Performance

Its event-driven, single-threaded design rapidly processes several simultaneous requests withoutclogging the RAM.

Scalability

developers can easily grow applications in both horizontal and vertical orientations.

Easy to Learn

Most frontend developers are familiar with JavaScript because it is one of the most extensively usedprogramming languages. It will be lot easier for them to get started using Node.js on the backend.

Cost Effective

One of the major node.js advantages is that it eliminates the need for two resource teams, saving time,money, and energy for overall project development.

Extensibility

It offers a lot of extensibility, which means it can be changed and improved to fit uniquerequirements.

Large Community Support

Millions of developers actively contribute to the Node.js community.

Improve Response Time And Boost Performance

When Netflix used Java and JavaScript, the startup time was 40 minutes. They then moved to node.jsand succeeded in cutting the startup time to under 40 seconds

Reduce Loading Time Using Caching

The Node.js Caching module makes it simple for developers to decrease task workload and code re-execution. It is one of the major node.js advantages.

5. How does Node.js differ with other languages?

Node.js sits in a category of its own in the development niche. It is neither a programming languagenor an individual framework. It can best be defined as a mixture of both. In the

eyes of some developers, Node.js may be a jack of all trades and a master of none, but there is more to this environment than is perceived.
Node.js is definitely among the best when it comes to programming languages as well as frameworks.Node.js is best defined as a JavaScript runtime that works on the famous and ultra-powerful V8 engine by JavaScript.
In simpler terms, Node.js can be defined as a programming language that works well as a development runtime. Node.js is recognized for its ability to work both as a frontend and backend development environment. The runtime can be amalgamed with React and Angular to work as a JavaScript frontend framework. The design for Node.js development is similar to Event Machine byRuby and Twisted by Python.

Who uses Node.js?

Here are some of the most popular applications and websites that use Node.js in the digital sphere,ones you've certainly interacted with. Top 10 companies using Node.js for backend are as follows:

PayPal, Uber, LinkedIn, eBay, Netflix, Trello, NASA, Twitter, Walmart, Groupon.

6. Which are the applications of Node.js?

Real-Time Chat Application
Social Media Platform
Internet Of Things (IOT)
Streaming App
Online Payment Processor
Remote Collaboration Tool

7. How to download & install Node.js?

Download the **Windows Installer** from NodeJs official website.

8. How to check installed version of node.js?

If you have a doubt whether you have installed everything correctly or not, let's verify it with "Command Prompt"

Command Prompt window will appear on the screen. To confirm Node installation, type node -v command.To confirm NPM installation, type npm -v command.

```
C:\Users\AMIT GOSWAMI>node -v
v20.4.0

C:\Users\AMIT GOSWAMI>npm -v
9.7.2
```

9. How to write and execute Node.js program to print “Hello World” in console?

To write and execute a Node.js program that prints "Hello World" in the console, follow these steps:

1. Open a text editor and create a new file with a .js extension (e.g., helloworld.js).

2. Inside the file, add the following line of code:

```javascript
console.log("Hello World");
```

3. Save the file.

4. Open a terminal or command prompt and navigate to the directory where you saved the file.

5. To execute the Node.js program, type the following command in the terminal:

```
node helloworld.js
```

6. Press Enter, and you should see "Hello World" printed in the console.

```
Hello World
```