UNIT-IV

Express with Node.js: Routes, Request and Response objects, Template engine. Understanding middleware, Query middleware, Serving static files, Handling POST body data, Cookies, Sessions, Authentication.

1.What is Express.js? Explain the features of Express framework.

Express is a web server framework for Node.js, which is a server-side JavaScript runtime environment. It uses JavaScript for writing server-side code and provides a set of tools and features for building web applications and APIs.

Express is a lightweight module that wraps the functionality of the Node.js http module in a simple to use interface. Express also extends the functionality of the http module to make it easy for you to handle server routes, responses, cookies, and statuses of HTTP requests.

Features of Express framework:

- It can be used to design single-page, multi-page and hybrid web applications.
- It allows to setup middlewares to respond to HTTP Requests.
- It defines a routing table which is used to perform different actions based on HTTP method and URL.
- It allows to dynamically render HTML Pages based on passing arguments to templates.

State the differences between Node.js and Express.js

- Node.js is a platform for building the i/o applications which are server-side event-driven and made using JavaScript.
- Express.js is a framework based on Node.js which is used for building web-application using approaches and principles of Node.js event-driven architecture.

Feature	Express.js	Node.js
Usage	It is used to build web-apps using approaches and principles of Node.js.	It is used to build server-side, input-output, event-driven apps.
Level of features	More features than Node.js.	Fewer features.

Building Block	It is built on Node.js.	It is built on Google's V8 engine.
Written in	JavaScript	C, C++, JavaScript
Framework/Platform	Framework based on Node.js.	Run-time platform or environment designed for server-side execution of JavaScript.
Controllers	Controllers are provided.	Controllers are not provided.
Routing	Routing is provided.	Routing is not provided.
Middleware	Uses middleware for the arrangement of functions systematically server-side.	Doesn't use such a provision.
Coding time	It requires less coding time.	It requires more coding time.

2.Explain Express.js Routing

Routing is made from the word route. It is used to determine the specific behaviour of an application. It specifies how an application responds to a client request to a particular route, URI or path and a specific HTTP request method (GET, POST, etc.). It can handle different types of HTTP requests.

Implementing Routes

There are two parts when defining the route.

- ✓ First is the HTTP request method(typically GET or POST). Each of these methods often needs to be handled completely differently.
- ✓ Second, is the path specified in the URL—for example, / for the root of the website, /login for the login page, and /cart to display a shopping cart.

The express module provides a series of functions that allow you to implement routes for the Express server. These functions all use the following syntax:

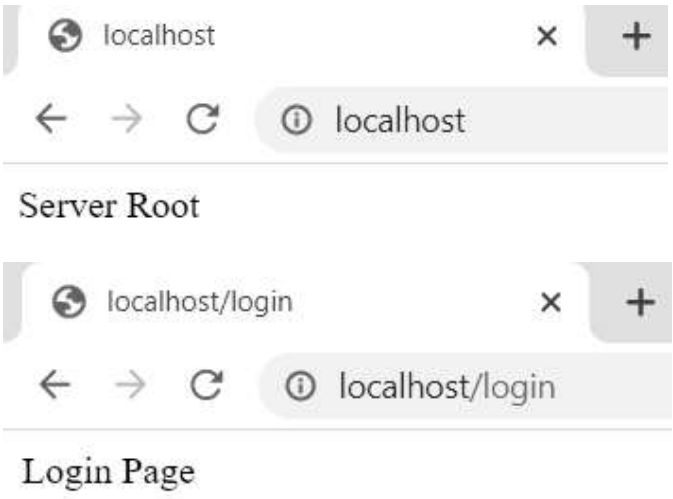
app.<method>(path, [callback . . .], callback)

The <method> portion of the syntax actually refers to the HTTP request method, such as GET or POST.
For example:
app.get(path, [middleware, ...], callback)
app.post(path, [middleware, ...], callback)

Eg.:

```
var express = require('express');
const app = express();
app.listen(80)
    app.get('/', function(req, res){
    res.send("Server Root");
    });
    app.get('/login', function(req, res){
    res.send("Login Page");
    });
    app.post('/save', function(req, res){
    res.send("Save Page");
    });
```

O/P:



3. Explain different route parameter in Express.js

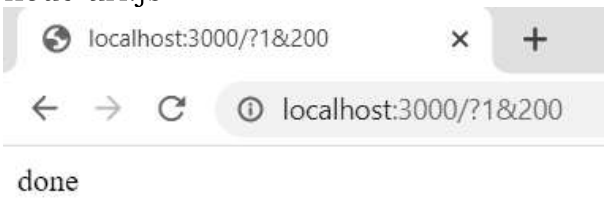
To reduce the number of routes, you can implement parameters within the URL. Parameters allow you to use the same route for similar requests by providing unique values for different requests that define how your application handles the request and builds the response.

There are four main methods for implementing parameters in a route:

Query string: Uses the standard ?key=value&key=value... HTTP query string after the path in the URL. This is the most common method for Implementing parameters, but the URLs can become long and convoluted.
Eg.
url.js

```
var express = require('express');
var app = express();

// Add middleware to parse query parameters
app.use('/', express.query());

// Handle GET requests to the root path
app.get('/', function(req, res) {
  var id = req.query.id;
  var score = req.query.score;

  console.log(JSON.stringify(req.query));

  res.send("done");

});

// Start the server
app.listen(3000, function() {
  console.log('Server listening on port 3000');
});
```

O/P:
node url.js




```
PS C:\Users\CHP\Desktop\Express\unit-4> node url.js
Server listening on port 3000
{"1":"","200":""}
```

POST params: When implementing a web form or other POST request, you can pass parameters in the body of the request.
Eg. Refer to Q4

regex: Defines a regular expression as the path portion of the route. Express uses the regex to parse the path of the URL and store matching expressions as an array of parameters.
Eg. Refer to Q5

Defined parameter: Defines a parameter by name using :<param_name> in the path portion of the route. Express automatically assigns that parameter a name when parsing the path.
Eg. Refer to Q6

4.Explain POST params route parameter in Express.js

In Express.js, a POST parameter is a value that is passed to a route handler through the POST request body. POST parameters are typically used to pass data to an application, such as user input or form data.

To define a route that accepts POST parameters, you can use the app.post() method and specify the parameters in the path of the route. For example, the following route defines a route that accepts a name parameter:

```
app.post('/users/:name', (req, res) => {
  // Use the `req.params.name` property to access the value of the `name` parameter.
});
```

1. When a user submits a POST request to this route, the value of the name parameter will be passed to the route handler. The route handler can then use this value to perform some action, such as creating a new user or updating an existing user.
2. POST parameters can be used to pass a variety of data to an application. Some common uses for POST parameters include:
3. Passing user input: POST parameters can be used to pass user input to an application, such as the name, email address, or password of a user.
4. Passing form data: POST parameters can be used to pass form data to an application, such as the values of input fields in a form.
5. Passing file data: POST parameters can be used to pass file data to an application, such as the contents of a file that is uploaded by a user.
6. POST parameters are a powerful way to pass data to an application. By using POST parameters, you can easily collect data from users and use it to perform actions in your application.

index.js:

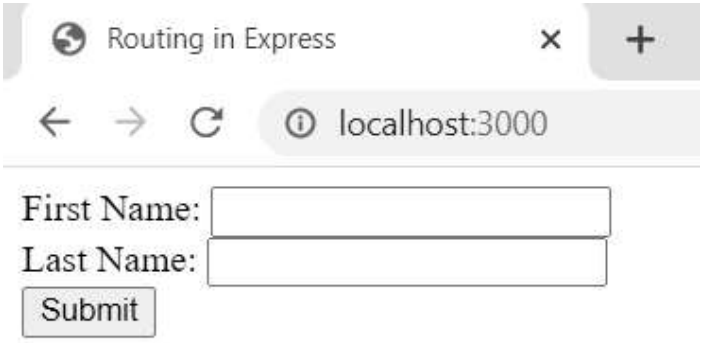
```
const path = require('path');
var express = require('express');
var app = express();

var bodyParser = require("body-parser");
app.use(bodyParser.urlencoded({ extended: false }));

app.get('/', function (req, res) {
    const filePath = path.join(__dirname, 'index1.html');
    res.sendFile(filePath);
});

app.post('/submit-student-data', function (req, res) {
    var name = req.body.firstName + ' ' + req.body.lastName;

    res.send(name + ' Submitted Successfully!');
});

var server = app.listen(3000, function () {
    console.log('Node server is running..');
});
```

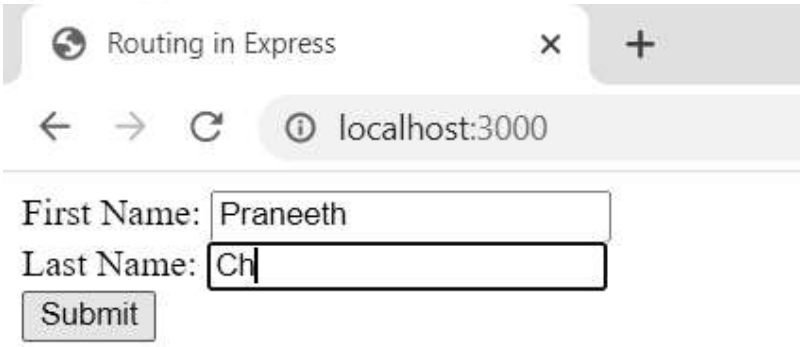
index1.html

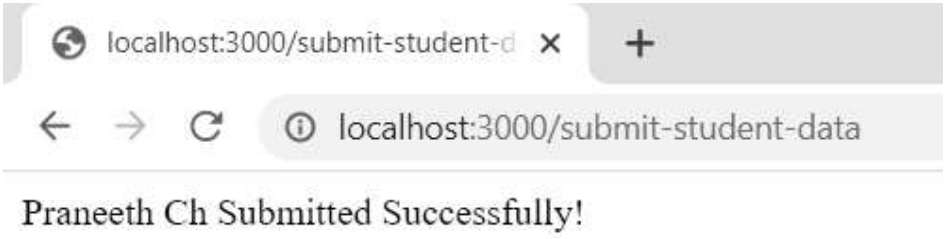
```
<!DOCTYPE html>

<html>
<head>
    <meta charset="utf-8" />
    <title>Routing in Express</title>
</head>
<body>
    <form action="http://localhost:3000/submit-student-data"
method="post">
        First Name: <input name="firstName" type="text" /> <br />
        Last Name: <input name="lastName" type="text" /> <br />
        <input type="submit" />
    </form>
</body>
</html>
```

O/P:

```
node index.js
Node server is running..
```







5. Explain Regular expression route parameter in Express.js

A regular expression route parameter in Express.js is a way to use regular expressions to validate the values of route parameters. This can be useful for ensuring that the values of the parameters are valid and within a certain range.
To use a regular expression route parameter, you need to specify the regular expression in the parentheses after the parameter name.

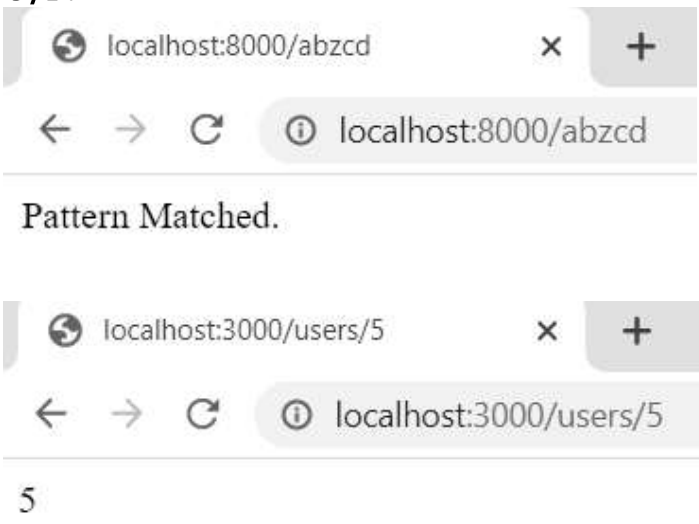
Eg. the following route uses a regular expression to validate parameter that it starts with ab and end with cd, the value of the id parameter is an integer:

Eg.

```
var express = require('express');
var app = express();
```

```
// This responds a GET request for abcd, abxcd, ab123cd, and so on
app.get('/ab*cd', function(req, res) {
   console.log("Got a GET request for /ab*cd");
   res.send('Pattern Matched.');
})

app.get('/users/:id([0-9]+)', (req, res) => {
   // `req.params.id` will be an integer
   res.send(req.params.id)
 });

var server = app.listen(3000, function () {
var host = server.address().address
var port = server.address().port
console.log("Example app listening at http://%s:%s", host, port)
})
```

O/P:



6. Explain defined parameter route parameter in Express.js

- Defined parameter route parameters are used to pass data to an Express route through the URL.
- Defined parameter route parameters are defined using colons (:) in the route path.

For example, the following route defines a defined parameter route parameter named id:

```
app.get('/users/:id', (req, res) => {
  // `req.params.id` will contain the value of the `id` parameter
});
```

When a user visits the URL /users/123, the id parameter will be set to the value 123.

- The value of the defined parameter route parameter can be accessed using the req.params object.
- The req.params object is an object that contains all of the defined parameter route parameters as key-value pairs.
- You can access the value of a defined parameter route parameter by using the key of the parameter.

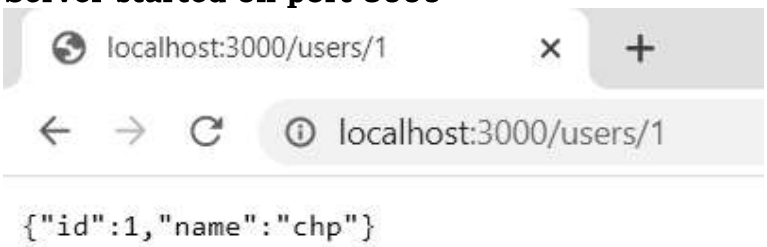
  For example, the following code will get the value of the id defined parameter route parameter and print it to the console:

const id = req.params.id;
console.log(`The id is ${id}`);

Eg.

```
const express = require('express');
const app = express();

// Define an array of users
const users = [
  { id: 1, name: 'chp' },
  { id: 2, name: 'vr' },
  { id: 3, name: 'pnr' },
];

// Define a route that retrieves a user by ID
app.get('/users/:id', (req, res) => {
  const id = parseInt(req.params.id);
  const user = users.find(user => user.id === id);
  if (!user) {
    return res.status(404).send('User not found');
  }
  return res.send(user);
});

// Start the server
app.listen(3000, () => {
  console.log('Server started on port 3000');
});
```

O/P:
node route_params.js
Server started on port 3000



7. **Explain HTTP Request objects in Express.js with an example.**

Express.js Request Object

Express.js Request and Response objects are the parameters of the callback function which is used in Express applications.

The express.js request object represents the HTTP request and has properties for the request query string, parameters, body, HTTP headers, and so on.

Syntax:

```
app.get('/', function (req, res) {
  // --
})
```

Properties and methods of the HTTP Request object:

Setting	Description
`originalUrl`	The original URL string of the request.
`protocol`	The protocol string, for example, `http` or `https`.
`ip`	IP address of the request.
`path`	Path portion of the request URL.
`hostname`	Hostname of the request.
`method`	HTTP method. `GET`, `POST`, etc.
`query`	Query string portion of the request URL.
`fresh`	A Boolean that is `true` when last-modified matches the current.
`stale`	A Boolean that is `false` when last-modified matches.
`secure`	A Boolean that is `true` when a TLS connection is established.
`acceptsCharset(charset)`	Returns `true` if the character set specified by `charset` is supported.
`get(header)`	Returns the value of the `header`.

Eg.:

```
var express = require('express');
var app = express();
app.listen(80);
app.get('/', function (req, res) {
console.log("URL:\t " + req.originalUrl);
console.log("Protocol: " + req.protocol);
console.log("IP:\t " + req.ip);
console.log("Path:\t " + req.path);
console.log("Host:\t " + req.host);
console.log("Method:\t " + req.method);
console.log("Query:\t " + JSON.stringify(req.query));
console.log("Fresh:\t " + req.fresh);
console.log("Stale:\t " + req.stale);
console.log("Secure:\t"+req.secure);
console.log("UTF8:\t"+req.acceptsCharset('utf8'));
console.log("Connection: "+req.get('connection'));
console.log("Headers: "+JSON.stringify(req.headers,null,2));
});
```

O/P:

URL: /

Protocol: http

IP: ::1

Path: /

express deprecated req.host: Use req.hostname instead http_req.js:9:30

Host: localhost

Method: GET

Query: {}

Fresh: false

Stale: true

Secure: false

express deprecated req.acceptsCharset: Use acceptsCharsets instead http_req.js:15:27

UTF8: utf8

Connection: keep-alive

Headers: {

"host": "localhost",

```
  "connection": "keep-alive",
  "sec-ch-ua": "\"Google Chrome\";v=\"113\", \"Chromium\";v=\"113\", \"Not-A.Brand\";v=\"24\"",
  "sec-ch-ua-mobile": "?0",
  "sec-ch-ua-platform": "\"Windows\"",
  "upgrade-insecure-requests": "1",
  "user-agent": "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/113.0.0.0 Safari/537.36",
  "accept": "text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7",
  "sec-fetch-site": "none",
  "sec-fetch-mode": "navigate",
  "sec-fetch-user": "?1",
  "sec-fetch-dest": "document",
  "accept-encoding": "gzip, deflate, br",
  "accept-language": "en-US,en;q=0.9"
}
```


8. Explain HTTP Response objects in Express.js with an example.

The Response object passed to the route handler provides the necessary functionality to build and send a proper HTTP response. The following sections discuss using the Response object to set headers, set the status, and send data back to the client.

Methods to get and set header values on the Response object:

Setting	Description
`get(header)`	Returns the value of the `header` specified.
`set(header, value)`	Sets the value of the `header`.
`set(headerObj)`	Accepts an object that contains multiple `'header':'value'` properties. Each of the headers in the `headerObj` is set in the `Response` object.
`location(path)`	Sets the location header to the `path` specified. The path can be a URL path such as `/login`, a full URL such as `http://server.net/`, a relative path such as `../users`, or a browser action such as `back`.
`type(type_string)`	Sets the `Content-Type` header based on the `type_string` parameter. The `type_string` parameter can be a normal content type such as `application/json`, a partial type such as `png`, or it can be a file extension such as `.html`.
`attachment([filepath])`	Sets the `Content-Disposition` header to attachment, and if a `filepath` is specified the `Content-Type` header is set based on the file extension.

the following lines set different statuses:
res.status(200); // OK
res.status(300); // Redirection
res.status(400); // Bad Request
res.status(401); // Unauthorized
res.status(403); // Forbidden
res.status(500); // Server Error

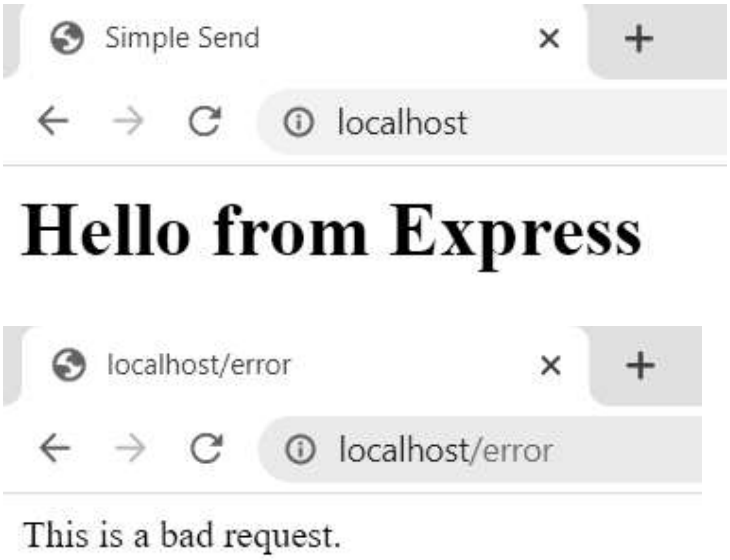
Eg.

```
var express = require('express');
var url = require('url');
var app = express();
app.listen(80);
 app.get('/', function (req, res) {
 var response = '<html><head><title>Simple Send</title></head>' +
 '<body><h1>Hello from Express</h1></body></html>';
 res.status(200);
 res.set({
 'Content-Type': 'text/html',
 'Content-Length': response.length
 });
```

```
 res.send(response);
 console.log('Response Finished? ' + res.finished);
 console.log('\nHeaders Sent: ');
 console.log(res.headerSent);
});
 app.get('/error', function (req, res) {
 res.status(400);
 res.send("This is a bad request.");
});
```

O/P:
node http_res.js
Response Finished? true

Headers Sent:
undefined



9. Identify the use of redirection addressing request on Express server.

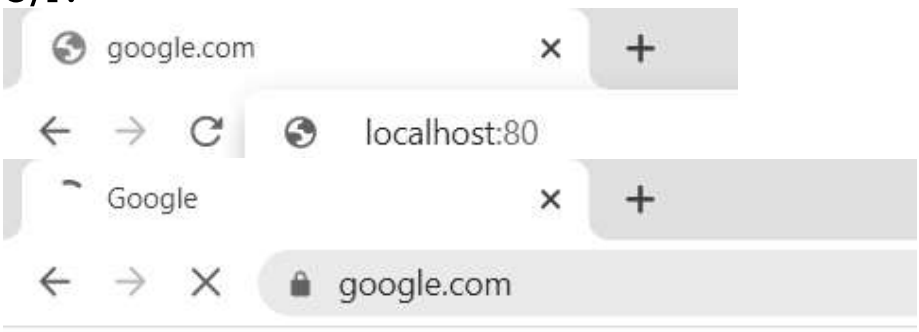
Redirecting the Response
A common need when implementing a webserver is the ability to redirect a request from the client to a different location on the same server or on a completely different server. The res.redirect(path) method handles redirection of the request to a new location.

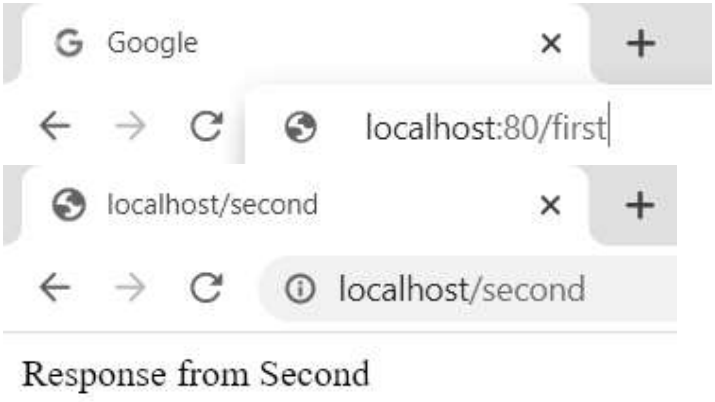
Redirecting requests on an Express Server

```
var express = require('express');
 var url = require('url');
```

```
var app = express();
app.listen(80);
app.get('/', function (req, res) {
res.redirect('http://google.com');
});
app.get('/first', function (req, res) {
res.redirect('/second');
});
app.get('/second', function (req, res) {
res.send("Response from Second");
});
```

O/P:





10. Implementing a Template Engine

A template engine is a software component that allows you to generate dynamic HTML pages by combining static template files with data. Template engines provide a way to separate the presentation of data from its content, making it easier to maintain and modify your application's user interface.

EJS (Embedded JavaScript) is one such template engine for JavaScript that allows you to embed JavaScript code directly into your HTML templates. It

provides a simple and efficient way to generate dynamic web pages by allowing you to add logic and iterate over data within your templates.

EJS uses a syntax similar to HTML, but with special tags that allow you to embed JavaScript code. For example, to output the value of a variable in your template, you would use the <%= %> tags.

Pug is a template engine for Node.js and for the browser that provides a clean, concise syntax for creating HTML templates. Pug was previously known as "Jade," but was renamed in 2016 due to a trademark dispute.

Pug uses indentation and whitespace to define the structure of an HTML document, rather than opening and closing tags. This makes Pug templates more concise and easier to read, especially for complex documents with nested elements.
Eg.
tengine.js

```
var express = require('express'),
 pug = require('pug'),
 ejs = require('ejs');
 var app = express();
 app.set('views', './views');
 app.set('view engine', 'pug');
 app.engine('pug', pug.__express);
 app.set('view engine', 'ejs');
 app.engine('html', ejs.renderFile);
 app.listen(80);
 app.locals.sname = 'chp';
 app.locals.id = '001';
 app.locals.branch = 'it';

 app.get('/pug', function (req, res) {
 res.render('user_pug');
 });

 app.get('/ejs', function (req, res) {
 app.render('user_ejs.html', function(err, renderedData){
    console.log("chp")
 res.send(renderedData);
 });
});
```

views/main_pug.pug:

```
doctype 5
html(lang="en")
 head
    title="Pug Template"
 body
```

```
    block content
```

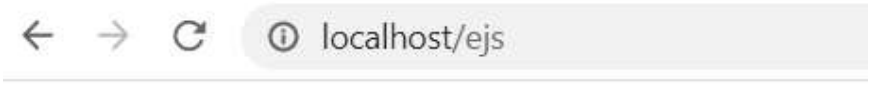
views/user_pug.pug:

```
extends main_pug
block content
    h1 User using Pug Template
    ul
        li Name: #{sname}
        li Roll No.: #{id}
        li Branch: #{branch}
```

views/user_ejs.html:

```
<!DOCTYPE html>
 <html lang="en">
 <head>
 <title>EJS Template</title>
 </head>
 <body>
    <h1>User using EJS Template</h1>
    <ul>
     <li>Name: <%= sname %></li>
     <li>Roll No.: <%= id %></li>
     <li>Branch: <%= branch %></li>
     </ul>
     </body>
</html>
```

Output:



User using EJS Template

- Name: chp
- Roll No.: 001
- Branch: it

Iterating over an array:
tengine_loop.js:

```
const express = require('express');
const app = express();

const items = [
  { name: 'Item 1', price: 10 },
  { name: 'Item 2', price: 20 },
  { name: 'Item 3', price: 30 }
];

app.set('view engine', 'pug');
app.set('views', './views');

app.set('view engine', 'ejs');

app.get('/pug', (req, res) => {
  res.render('index', { items });
});

app.get('/ejs', (req, res) => {
  res.render('index', { items });
});

app.listen(3000, () => {
  console.log('Server started on port 3000');
});
```

views/index.pug

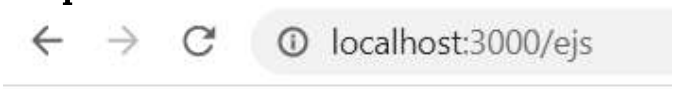
```
doctype html
html
```

```
head
  title My Pug App
body
  h1 My Shopping Cart
  ul
    each item in items
      li #{item.name} - Rs.#{item.price}
```

views/index.ejs

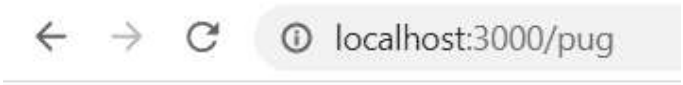
```
<!DOCTYPE html>
<html>
<head>
  <title>My EJS App</title>
</head>
<body>
  <h1>My Shopping Cart</h1>
  <ul>
    <% for (var i = 0; i < items.length; i++) { %>
      <li><%= items[i].name %> - Rs.<%= items[i].price %></li>
    <% } %>
  </ul>
</body>
</html>
```

Output:



My Shopping Cart

- Item 1 - Rs.10
- Item 2 - Rs.20
- Item 3 - Rs.30



My Shopping Cart

- Item 1 - Rs.10
- Item 2 - Rs.20
- Item 3 - Rs.30

Feature	Pug	EJS
Syntax	Uses indentation and whitespace	Uses <% %> tags and <%= %> tags
Conciseness	More concise syntax, less verbose	More verbose syntax, more code required
Code Execution	Limited JavaScript functionality	Full JavaScript functionality
HTML Output	Automatically indents and formats	Requires manual indentation
Debugging	Error messages can be hard to understand	Error messages are typically clearer
Performance	Slightly slower than EJS	Slightly faster than Pug
Community	Smaller community, fewer plugins	Larger community, many plugins

11.What is Middleware in Express.js? What are the different types of Middleware?

The following list describes some of the built-in middleware components that come with Express

static: Allows the Express server to stream static file get requests
basicAuth: Provides support for basic HTTP authentication
cookieParser: Allows you to read cookies from the request and set cookies in the response

cookieSession: Provides cookie-based session support

session: Provides a fairly robust session implementation

bodyParser: Parses the body data of POST requests into the req.body

property

query: Converts the query string to a JavaScript object and stores it as req.query

1.Using the query Middleware

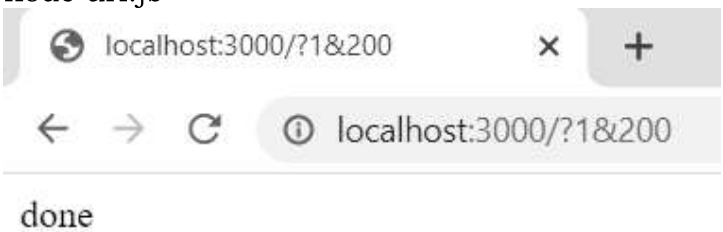
The query middleware converts the query string in the URL into a JavaScript object and stores it as the query property on the Request object.

url.js

```
var express = require('express');
var app = express();

// Add middleware to parse query parameters
app.use('/', express.query());

// Handle GET requests to the root path
app.get('/', function(req, res) {
  var id = req.query.id;
  var score = req.query.score;

  console.log(JSON.stringify(req.query));

  res.send("done");

});

// Start the server
app.listen(3000, function() {
  console.log('Server listening on port 3000');
});
```

O/P:

node url.js




```
PS C:\Users\CHP\Desktop\Express\unit-4> node url.js
Server listening on port 3000
{"1":"","200":""}
```

2. **A commonly used Express middleware is the static middleware**
The static middleware, which allows you to serve static files directly from disk to the client. You can use static middleware to support things like JavaScript files, CSS files, image files, and HTML documents that do not change. The static module is easy to implement and uses the following syntax:

express.static(path, [options])

The path is the root path to where the static files are referenced from in the requests. The options parameter allows you to set the following properties:
maxAge: Sets the browser cache maxAge in milliseconds. The default is 0.
hidden: A Boolean that, when true, indicates that transfer of hidden files is enabled. The default is false.
redirect: A Boolean that, when true, indicates that if the request path is a directory, the request is redirected to the path with a trailing /. The default is true.
index: Specifies the default filename for the root path. The default is index.html.
eg.:
static_files.js

```
var express = require('express');
var app = express();
app.use('/', express.static('assets'));
app.listen(80);
```

index.html(inside assets directory):

```
<html>
<head>
   <title>Static File</title>
   <link rel="stylesheet" type="text/css" href="css/static.css"/>
</head>
<body>
   <img src="images/outer.jpeg" height="200px"/>
   <img src="images/inner.jpeg" height="200px" />
</body>
</html>
```

static.css

```
img
{
display:inline;
margin:3px;
border:5px solid #000000;
}
```

3. Handling POST parameters in the request body using the bodyParser middleware

index.js:

```
const path = require('path');
var express = require('express');
var app = express();

var bodyParser = require("body-parser");
app.use(bodyParser.urlencoded({ extended: false }));

app.get('/', function (req, res) {
    const filePath = path.join(__dirname, 'index1.html');
    res.sendFile(filePath);
});

app.post('/submit-student-data', function (req, res) {
    var name = req.body.firstName + ' ' + req.body.lastName;

    res.send(name + ' Submitted Successfully!');
});

var server = app.listen(3000, function () {
    console.log('Node server is running..');
});
```

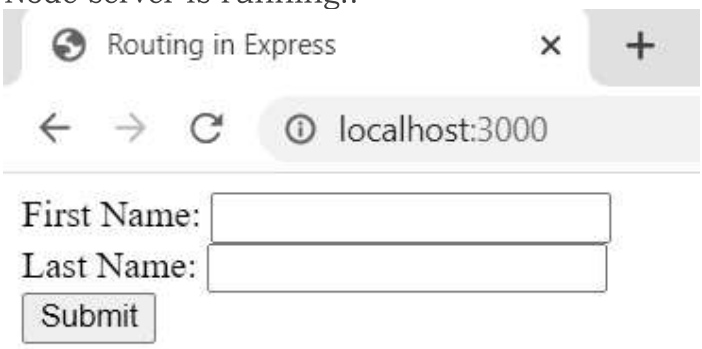
index1.html

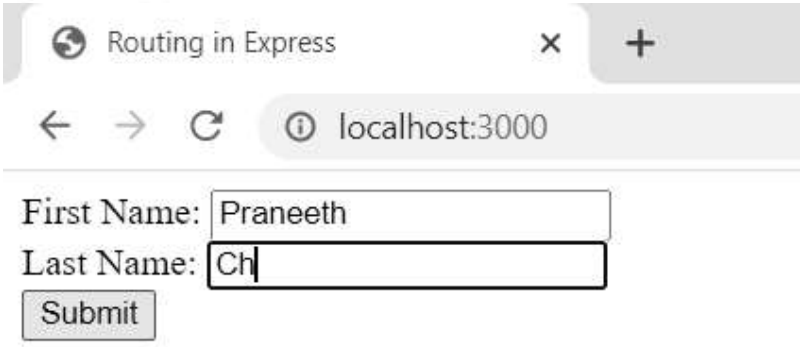
```
<!DOCTYPE html>

<html>
<head>
    <meta charset="utf-8" />
    <title>Routing in Express</title>
</head>
<body>
```

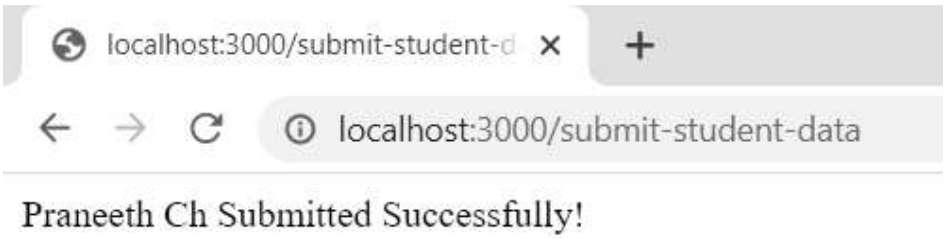
```
    <form action="http://localhost:3000/submit-student-data"
method="post">
        First Name: <input name="firstName" type="text" /> <br />
        Last Name: <input name="lastName" type="text" /> <br />
        <input type="submit" />
    </form>
</body>
</html>
```

O/P:

```
node index.js
Node server is running..
```







12. Implement cookies in express using Cookie parser.

The cookieParser middleware provided in Express makes handling cookies simple. The cookieParser middleware parses the cookies from the request and stores them in the req.cookies property as a JavaScript object.

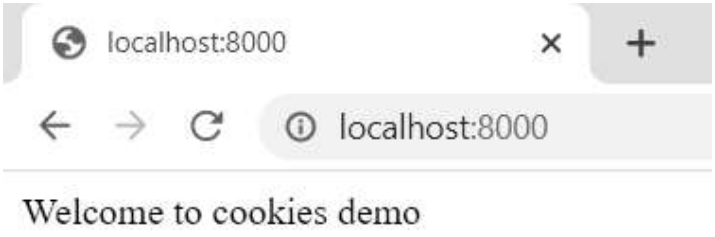
To set a cookie in a response, you can use the res.cookie() method shown below:
res.cookie(name, value, [options])
A cookie with the name and value specified is added to the response

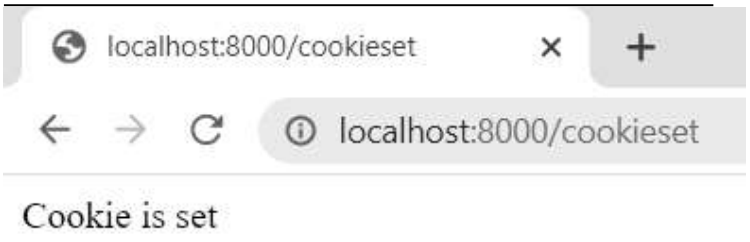
cookieexample.js:

```
var express = require('express');
var cookieParser = require('cookie-parser');
var app = express();
app.use(cookieParser());
app.get('/cookieset',function(req, res){
res.cookie('cookie_name', 'cookie_value');
res.cookie('college', 'pvpsit');
res.cookie('name', 'chp');

res.status(200).send('Cookie is set');
});
app.get('/cookieget', function(req, res) {
  res.status(200).send(req.cookies);
});
app.get('/', function (req, res) {
  res.status(200).send('Welcome to cookies demo');
});
var server = app.listen(8000, function () {
  var host = server.address().address;
  var port = server.address().port;
  console.log('Example app listening at http://%s:%s', host, port);
});
```

O/P:

node cookieexample.js
Example app listening at http://:::8000





13. Explain how sessions can be implemented using Express.

Session middleware

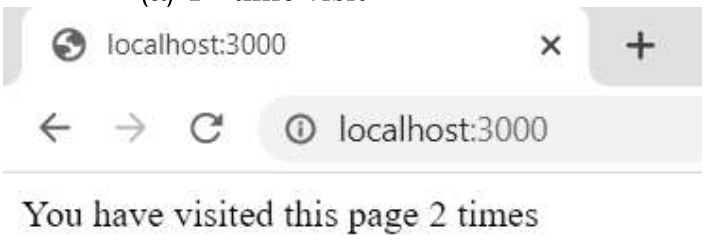
session.js:

```
const express = require('express');
const session = require('express-session');

const app = express();

app.use(session({
  secret: 'chp', //unique session id
  resave: false, // If true, the session will be saved on every request
  saveUninitialized: true, //If true, a new, empty session will be created for each new visitor. This is set to true so that we can track the number of visits.

}));
```

```
app.get('/', (req, res) => {
  if (req.session.views) {
    req.session.views++;
    res.send(`You have visited this page ${req.session.views} times`);
  } else {
    req.session.views = 1;
    res.send('Welcome to this page for the first time!');
  }
});

app.listen(3000, () => {
  console.log('Server listening on port 3000');
});
```

O/p:
node session.js
Server listening on port 3000

(a) 1st time visit



(b) after visiting the page for 2nd time

14. Explain Basic HTTP Authentication in Express

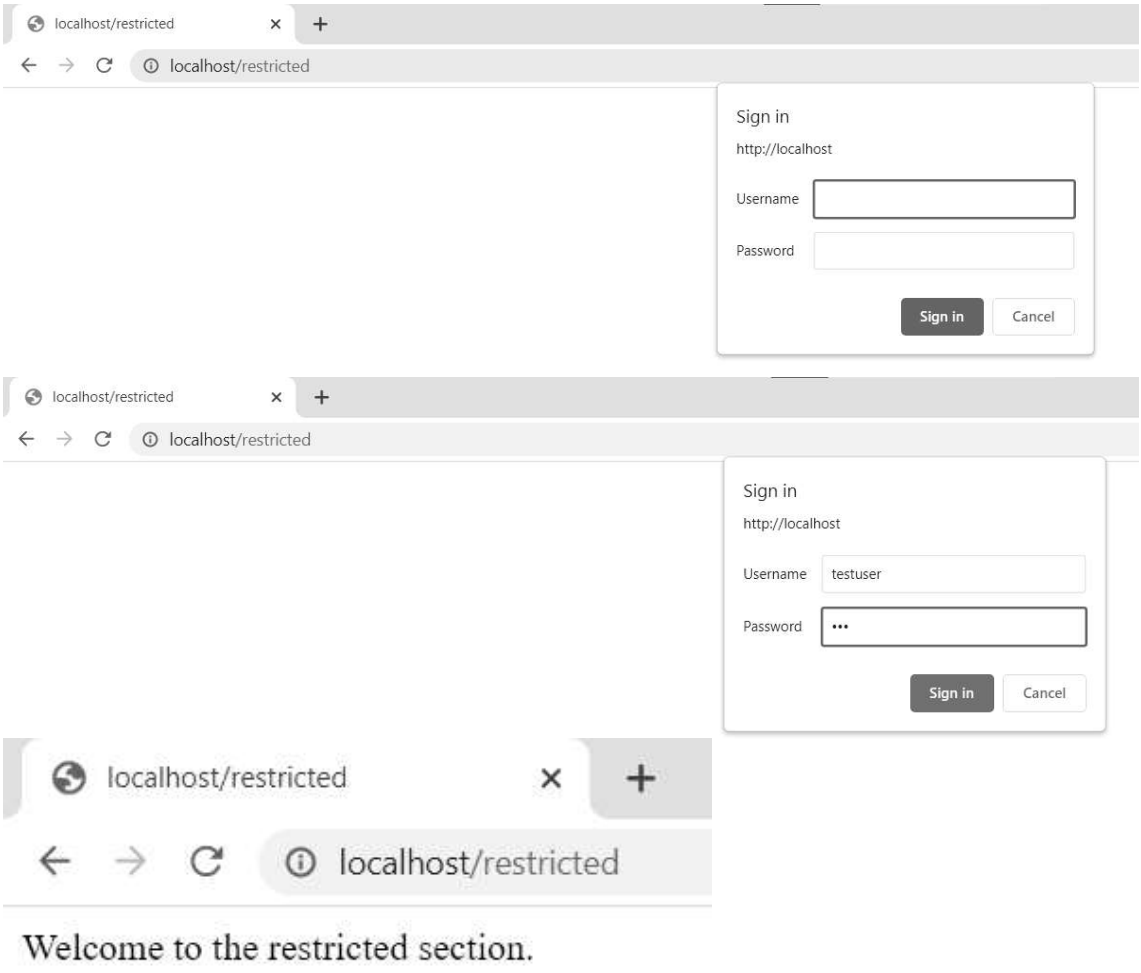
Basic authentication
basic_auth.js:

```
const express = require('express');
const app = express();
const basicAuth = require('express-basic-auth');

const auth = basicAuth({
  users: { 'testuser': 'tes' },
  challenge: true
});
```

```
app.get('/library', (req, res) => {
  res.send('Welcome to the library.');

});

app.get('/restricted', auth, (req, res) => {
  res.send('Welcome to the restricted section.');
});

app.listen(80, () => {
  console.log('Server running on port 80');
});
```

O/P:

```
node basic_auth.js
Server running on port 80
```



15. With session middleware in express explain session authentication using an example.

Session authentication:

session_auth.js

```
var express = require('express');
var crypto = require('crypto');
var bodyParser = require('body-parser');
var cookieParser = require('cookie-parser');
var session = require('express-session');

function hashPW(pwd) {
  return crypto.createHash('sha256').update(pwd).digest('base64').toString();
}

var app = express();
app.use(bodyParser.urlencoded({ extended: true }));
app.use(cookieParser('MAGICString'));


app.use(session({
  secret: 'MAGICString',
  resave: true,
  saveUninitialized: true
}));

app.get('/restricted', function(req, res) {
  if (req.session.user) {
    res.send('<h2>' + req.session.success + '</h2>' +
      '<p>You have Entered the restricted section<p><br>' +
      ' <a href="/logout">logout</a>');
  } else {
    req.session.error = 'Access denied!';
    res.redirect('/login');
  }
});

app.get('/logout', function(req, res) {
  req.session.destroy(function() {
    res.redirect('/login');
  });
});

app.get('/login', function(req, res) {
  var response = '<form method="POST">' +
    'Username: <input type="text" name="username"><br>' +
    'Password: <input type="password" name="password"><br>' +
    '<input type="submit" value="Submit"></form>';
  if (req.session.user) {
```

```
    res.redirect('/restricted');
  } else if (req.session.error) {
    response += '<h2>' + req.session.error + '<h2>';
  }
  res.type('html');
  res.send(response);
});

app.post('/login', function(req, res) {
  var user = { name: req.body.username, password: hashPW('myPass') };
  if (user.password === hashPW(req.body.password.toString())) {
    req.session.regenerate(function() {
      req.session.user = user;
      req.session.success = 'Authenticated as ' + user.name;
      res.redirect('/restricted');
    });
  } else {
    req.session.regenerate(function() {
      req.session.error = 'Authentication failed.';
      res.redirect('/restricted');
    });
    res.redirect('/login');
  }
});

app.listen(80);
```

O/P: