TYPESCRIPT ASSIGNMENT

1.

```
interface Student{
   name:string;
   rollNumber:number;
   course:string;
   phoneNumber:string;
}
function printStudentDetails(student:Student){
   console.log(`Name: ${student.name}`);
   console.log(`Roll Number: ${student.rollNumber}`);
   console.log(`Course: ${student.course}`);
   console.log(`Phone Number: ${student.phoneNumber}`);
   console.log('-------------------------');
}
const student1: Student = { name: 'Riya', rollNumber: 101,
course: 'TypeScript', phoneNumber: '1234567890' };
const student2: Student = { name: 'Arjun', rollNumber: 102,
course: 'Angular', phoneNumber: '9876543210' };
printStudentDetails(student1);
printStudentDetails(student2);
```

2.

```
class Book {
```

```
  title: string;
  author: string;
  price: number;

  constructor(title: string, author: string, price: number) {
    this.title = title;
    this.author = author;
    this.price = price;
  }

  getDetails(): string {
    return `Book: ${this.title} by ${this.author} - ₹${this.price}`;
  }
}

class PremiumBook extends Book {
  deliveryCharge: number;

  constructor(title: string, author: string, price: number,
deliveryCharge: number) {
    super(title, author, price);
    this.deliveryCharge = deliveryCharge;
  }

  // Override getDetails to include delivery charge
  getDetails(): string {
    const totalPrice = this.price + this.deliveryCharge;
    return `Book: ${this.title} by ${this.author} - ₹${totalPrice}
(Includes Delivery)`;
```

```
    }
  }

  // Sample Data
  const normalBook = new Book("Clean Code", "Robert C.
Martin", 500);
  const premiumBook = new PremiumBook("Design Patterns",
"Erich Gamma", 700, 50);

  // Display details
  console.log(normalBook.getDetails());
  console.log(premiumBook.getDetails());
```

3.

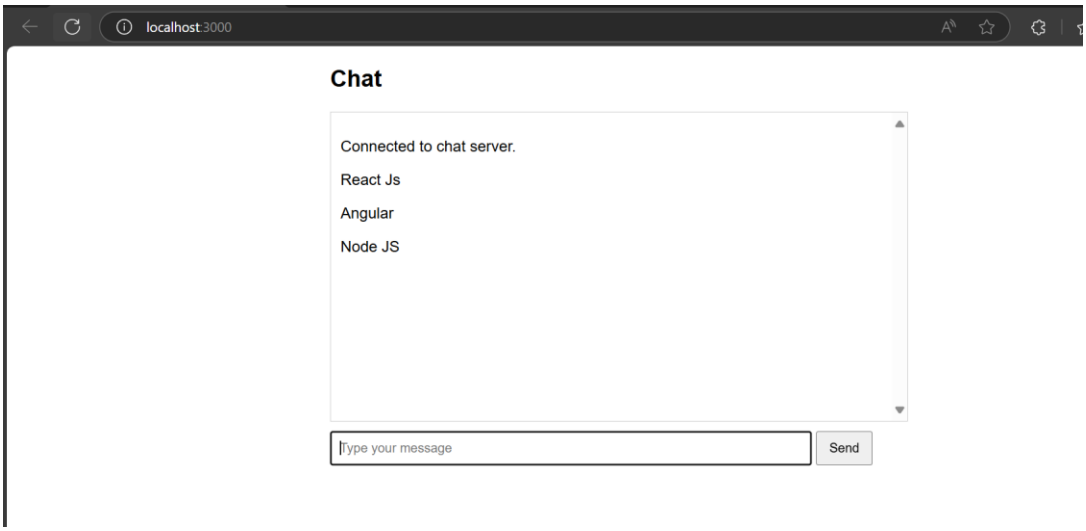
```
import express from "express";
import { createServer } from "http";
import WebSocket, { WebSocketServer } from "ws";
import path from "path";

const app = express();
const port = 3000;

// Serve static files (our client HTML)
app.use(express.static(path.join(__dirname, "public")));

const server = createServer(app);
```

```
// Set up WebSocket server
const wss = new WebSocketServer({ server });

wss.on("connection", (ws: WebSocket) => {
  console.log("Client connected");

  ws.on("message", (data: WebSocket.RawData) => {
    const message = data.toString().trim();
    if (!message) return; // Ignore empty messages

    // Broadcast to all clients
    wss.clients.forEach(client => {
      if (client.readyState === WebSocket.OPEN) {
        client.send(message);
      }
    });
  });

  ws.on("close", () => {
    console.log("Client disconnected");
  });
});

server.listen(port, () => {
  console.log(`Server started at http://localhost:${port}`);
});
```

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8" />
  <title>Simple Chat Client</title>
  <style>
    body { font-family: Arial, sans-serif; max-width: 600px;
margin: 20px auto; }
    #messages { border: 1px solid #ccc; height: 300px; overflow-
y: scroll; padding: 10px; margin-bottom: 10px; }
    #messageInput { width: 80%; padding: 8px; }
    #sendBtn { padding: 8px 12px; }
  </style>
</head>
<body>
  <h2>Chat</h2>
  <div id="messages"></div>
  <input type="text" id="messageInput" placeholder="Type your
message" />
  <button id="sendBtn">Send</button>

  <script>
    const ws = new WebSocket(`ws://${window.location.host}`);

    const messagesDiv = document.getElementById("messages");
    const input = document.getElementById("messageInput");
    const sendBtn = document.getElementById("sendBtn");

    ws.onopen = () => {
```

```
  appendMessage("Connected to chat server.");
};

ws.onmessage = event => {
  appendMessage(event.data);
};

ws.onclose = () => {
  appendMessage("Disconnected from chat server.");
};

sendBtn.onclick = sendMessage;
input.onkeydown = (e) => {
  if (e.key === "Enter") sendMessage();
};

function appendMessage(message) {
  const p = document.createElement("p");
  p.textContent = message;
  messagesDiv.appendChild(p);
  messagesDiv.scrollTop = messagesDiv.scrollHeight;
}

function sendMessage() {
  const msg = input.value.trim();
  if (!msg) return alert("Please enter a non-empty message");
  ws.send(msg);
  input.value = "";
}
```

```
  </script>
</body>
</html>
```



4.

```
interface Article {
  title: string;
  content: string;
}

// Create 15 dummy articles
const articles: Article[] = [
  { title: "TypeScript Basics", content: "Introduction to
TypeScript, its benefits, and basic types." },
```

```
  { title: "Understanding Interfaces", content: "How interfaces define object shapes in TypeScript." },
  { title: "Advanced Types", content: "Exploring union, intersection, and mapped types." },
  { title: "TypeScript and DOM", content: "Manipulating the DOM safely with TypeScript." },
  { title: "Generics in TypeScript", content: "Writing reusable components with generics." },
  { title: "TypeScript Enums", content: "Defining enums for better code clarity." },
  { title: "Modules and Namespaces", content: "Organizing code with modules and namespaces." },
  { title: "Async Programming", content: "Handling async operations using Promises and async/await." },
  { title: "Decorators in TypeScript", content: "Meta-programming with decorators." },
  { title: "Type Assertions", content: "Overriding inferred types using assertions." },
  { title: "Working with Classes", content: "OOP concepts in TypeScript with classes and inheritance." },
  { title: "TypeScript Configuration", content: "Customizing compiler options in tsconfig.json." },
  { title: "Error Handling", content: "Catching and managing errors in TypeScript apps." },
  { title: "Testing TypeScript", content: "Writing tests using Jest or Mocha." },
  { title: "Deploying TypeScript Apps", content: "Best practices for deployment and bundling." }
];
```

```
// Constants for pagination
const ARTICLES_PER_LOAD = 5;

const container = document.getElementById('articles-
container') as HTMLDivElement;

let currentIndex = 0;
let isLoading = false;

function renderArticles(): void {
  if (currentIndex >= articles.length) {
    // No more articles to load
    return;
  }

  isLoading = true;

  // Simulate async loading delay
  setTimeout(() => {
    const nextArticles = articles.slice(currentIndex, currentIndex
+ ARTICLES_PER_LOAD);
    nextArticles.forEach(article => {
      const articleDiv = document.createElement('div');
      articleDiv.className = 'article';

      const title = document.createElement('h2');
      title.textContent = article.title;
```

```
      const content = document.createElement('p');
      content.textContent = article.content;

      articleDiv.appendChild(title);
      articleDiv.appendChild(content);

      container.appendChild(articleDiv);
    });

    currentIndex += ARTICLES_PER_LOAD;
    isLoading = false;
  }, 500); // Delay for simulation
}

// Debounce helper function
function debounce(func: () => void, wait: number) {
  let timeout: number | undefined;
  return () => {
    if (timeout !== undefined) {
      clearTimeout(timeout);
    }
    timeout = window.setTimeout(() => {
      func();
    }, wait);
  };
}

function handleScroll(): void {
  if (isLoading) return;
```

```
  // Check if user scrolled near bottom (100px threshold)
  const scrollTop = window.scrollY;
  const viewportHeight = window.innerHeight;
  const fullHeight = document.documentElement.scrollHeight;

  if (scrollTop + viewportHeight >= fullHeight - 100) {
    renderArticles();
  }
}

// Initial render
renderArticles();

// Add scroll listener with debounce
window.addEventListener('scroll', debounce(handleScroll,
200));
```

index.html

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8" />
  <meta name="viewport" content="width=device-width, initial-
scale=1" />
  <title>Blog Article Viewer - Infinite Scroll</title>
  <link rel="stylesheet" href="styles.css" />
```

```
</head>
<body>
  <h1>Blog Articles</h1>
  <div id="articles-container"></div>

  <script src="script.js"></script>
</body>
</html>
```

Styles.css

```
body {
    font-family: Arial, sans-serif;
    max-width: 700px;
    margin: 0 auto;
    padding: 20px;
    background: #f7f7f7;
  }

  h1 {
    text-align: center;
    margin-bottom: 30px;
  }

  #articles-container {
    display: flex;
    flex-direction: column;
```

```
  gap: 20px;
}

.article {
  background: white;
  padding: 20px;
  border-radius: 6px;
  box-shadow: 0 2px 5px rgba(0,0,0,0.1);
}

.article h2 {
  margin: 0 0 10px;
  font-size: 1.4em;
}

.article p {
  margin: 0;
  line-height: 1.5;
  color: #333;
}
```