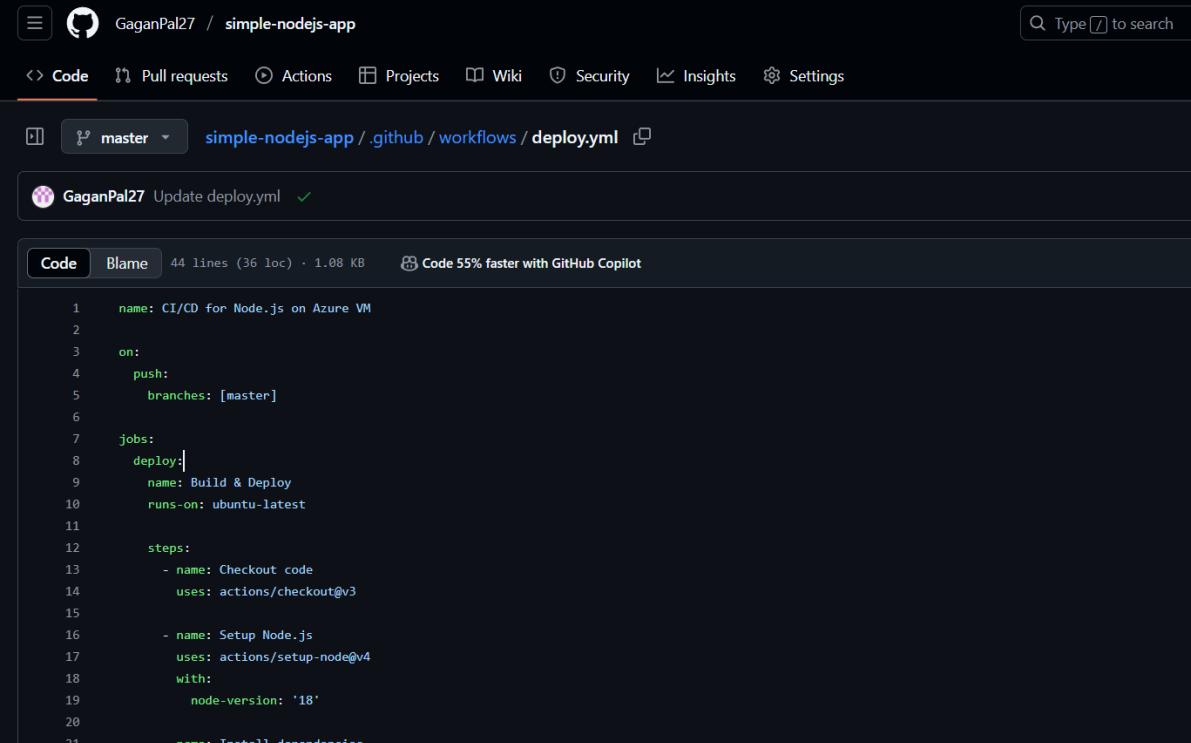


Task 2: Create a CI/CD pipeline using GitHub Actions/Jenkins/GitLab CI to automate the deployment of the above web application.

GitHub Repository Link

<https://github.com/GaganPal27/simple-nodejs-app/>

1.Create the file: .github/workflows/deploy.yml



The screenshot shows a GitHub repository page for 'simple-nodejs-app'. The 'Code' tab is selected. A file named 'deploy.yml' is open, showing the following YAML configuration:

```
name: CI/CD for Node.js on Azure VM
on:
  push:
    branches: [master]
jobs:
  deploy:
    name: Build & Deploy
    runs-on: ubuntu-latest
    steps:
      - name: Checkout code
        uses: actions/checkout@v3
      - name: Setup Node.js
        uses: actions/setup-node@v4
        with:
          node-version: '18'
      - name: Install dependencies
        run: npm install
```

The screenshot shows a GitHub repository page for 'simple-nodejs-app'. The 'master' branch is selected. The file path is '.github/workflows/deploy.yml'. The code editor displays the following YAML configuration:

```
17   uses: actions/setup-node@v4
18   with:
19     node-version: '18'
20
21   - name: Install dependencies
22     run: npm ci
23
24   # ## - name: Run tests
25   ## run: npm test
26
27   - name: Deploy to Azure VM via SCP
28     uses: appleboy/scp-action@v0.1.4
29     with:
30       host: ${{ secrets.AZURE_VM_IP }}
31       username: ${{ secrets.VM_USER }}
32       key: ${{ secrets.SSH_PRIVATE_KEY }}
33       source: "."
34       target: "/home/${{ secrets.VM_USER }}/simple-nodejs-app"
35
36   - name: Restart Node.js app on Azure VM
37     uses: appleboy/ssh-action@v1.0.0
38     with:
39       host: ${{ secrets.AZURE_VM_IP }}
40       username: ${{ secrets.VM_USER }}
41       key: ${{ secrets.SSH_PRIVATE_KEY }}
42       script: |
43         cd ~/simple-nodejs-app
44         pm2 reload all || pm2 start index.js --name node-app
```

2. Explanation of different pipeline stages (Build, Test, Deploy)

1. Trigger: Push to Master Branch

- The pipeline triggers when there's a push to the master branch.

2. Job: Build & Deploy

- **Runs on:** ubuntu-latest environment.

3. Steps:

1. **Checkout Code:** Clones the repository to the runner.
2. **Setup Node.js:** Installs Node.js version 18 for the build process.
3. **Install Dependencies:** Uses npm ci to install dependencies from package lock.json.
4. **Deploy to Azure VM:** Uses SCP to copy the project files to the Azure VM.
5. **Restart Node.js App:** Connects to the VM via SSH and restarts the app using PM2.

GitHub Repository Secrets

🔒 How Environment Variables / Secrets Are Managed

GitHub Actions allows secure handling of secrets using the Actions Secrets feature.

You stored sensitive data like:

SSH_PRIVATE_KEY – To connect securely to the Azure VM

VM_USER – The Azure VM username

VM_HOST – The public IP address of the Azure VM

The screenshot shows the GitHub repository settings page for 'simple-nodejs-app'. The left sidebar has 'Actions' selected under 'Code and automation'. The main area has two tabs: 'Secrets' (selected) and 'Variables'. Under 'Secrets', it says 'This environment has no secrets.' and has a 'Manage environment secrets' button. Below this is a table titled 'Repository secrets' with three entries:

Name	Last updated	Actions	More
AZURE_VM_IP	1 hour ago		
SSH_PRIVATE_KEY	1 hour ago		
VM_USER	54 minutes ago		

At the top right of the main area is a green 'New repository secret' button.

3. GitHub Actions Workflow Triggered

Screenshot of GitHub Actions page for repository `GaganPal27/simple-nodejs-app`.

The page shows the "Actions" tab selected. On the left, there's a sidebar for "CI/CD for Node.js on Azure VM" with sections for Management, Caches, Attestations, Runners, Usage metrics, and Performance metrics.

The main area displays "All workflows" with a table titled "5 workflow runs". The table has columns for Event, Status, Branch, and Actor. The runs are:

Event	Status	Branch	Actor
1 minute ago	Success	master	GaganPal27
3 minutes ago	Success	master	GaganPal27
11 minutes ago	Success	master	GaganPal27
22 minutes ago	Success	master	GaganPal27
23 minutes ago	Success	master	GaganPal27

Screenshot of the details for the first workflow run, labeled "Update deploy.yml #5".

The left sidebar shows "Build & Deploy" selected. The main area shows the "Build & Deploy" step with the status "succeeded 1 hour ago in 36s".

The step details table:

Job	Step	Duration
Build & Deploy	Set up job	2s
Build & Deploy	Build appleboy/scp-action@v0.1.4	3s
Build & Deploy	Build appleboy/ssh-action@v1.0.0	2s
Build & Deploy	Checkout code	0s
Build & Deploy	Setup Node.js	1s
Build & Deploy	Install dependencies	4s
Build & Deploy	Deploy to Azure VM via SCP	17s
Build & Deploy	Restart Node.js app on Azure VM	3s
Build & Deploy	Post Setup Node.js	0s
Build & Deploy	Post Checkout code	1s
Build & Deploy	Complete job	0s