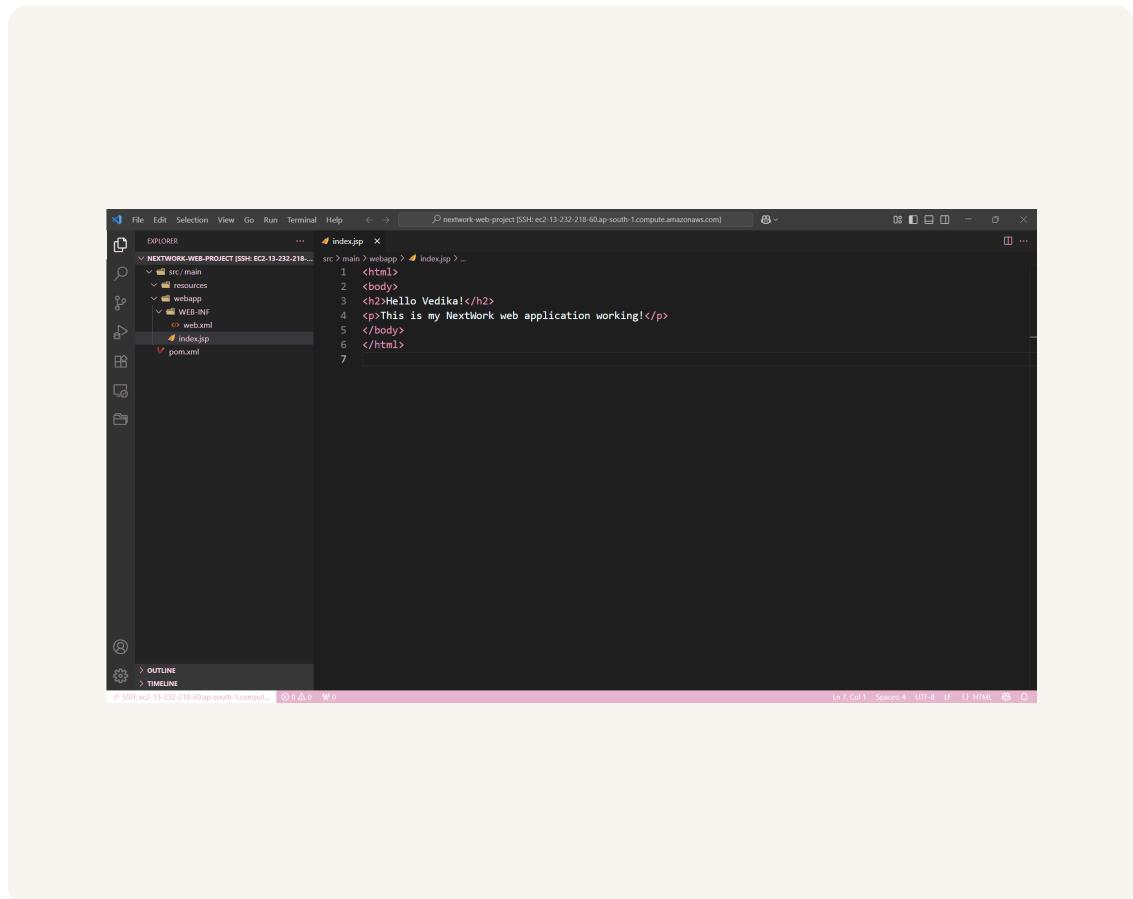




Set Up a Web App Using AWS and VS Code



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Introducing Today's Project!

In this project, I will launch an EC2 instance. Next I will use VS Code to set up a remote SSH connection to my EC2 instance. Then I will install Maven and Java and generate a basic web app. Later I will edit code without VS Code.

Key tools and concepts

The key services I used were security groups, creating an EC2 instance as well as creating a key pair for the instance. I then with the help of VS code, connected the instance together.

Project reflection

One thing I didn't expect was how there are so many ways to troubleshoot one small problem!

This project took me 3 hours.

This project is part one of a series of DevOps projects where I'm building a CI/CD pipeline! I'll be working on the next project tomorrow with the same amount of enthusiasm.

Launching an EC2 instance

I started this project by launching an EC2 instance because I need to create a server here to house my development and work. EC2 which stands for Elastic Cloud Computw will help me create this virtual server.

I also enabled SSH

SSH (Secure Shell) is a protocol used to make sure only authorized users can access a remote server. When I connect to my EC2 instance later in this project, SSH will verify if I have the correct private key that matches the public key on the server.

Key pairs

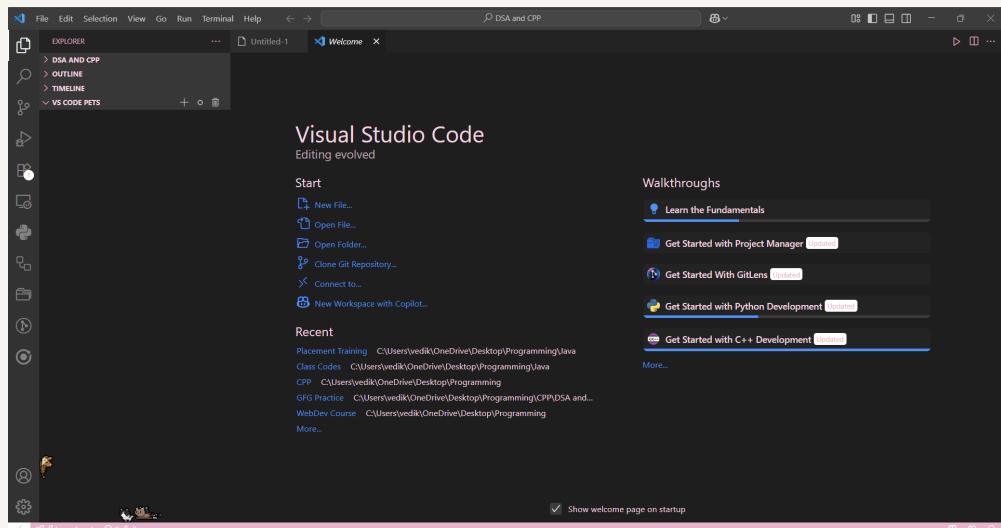
A key pair consists of a public key and a private key, used in encryption for secure authentication and data protection. The public key is shared openly to encrypt data or verify signatures, while the private key is kept secret to decrypt data.

Once I set up my key pair, AWS automatically downloaded a .pem file. It is a is a widely used format for storing cryptographic keys and certificates. It contains Base64-encoded text (ASCII) enclosed between -----BEGIN... and -----END... headers.

Set up VS Code

VS Code is a free, lightweight yet powerful code editor by Microsoft, popular for its speed, cross-platform support, and rich features like IntelliSense, built-in Git, debugging tools, and a vast extension marketplace for languages and tools.

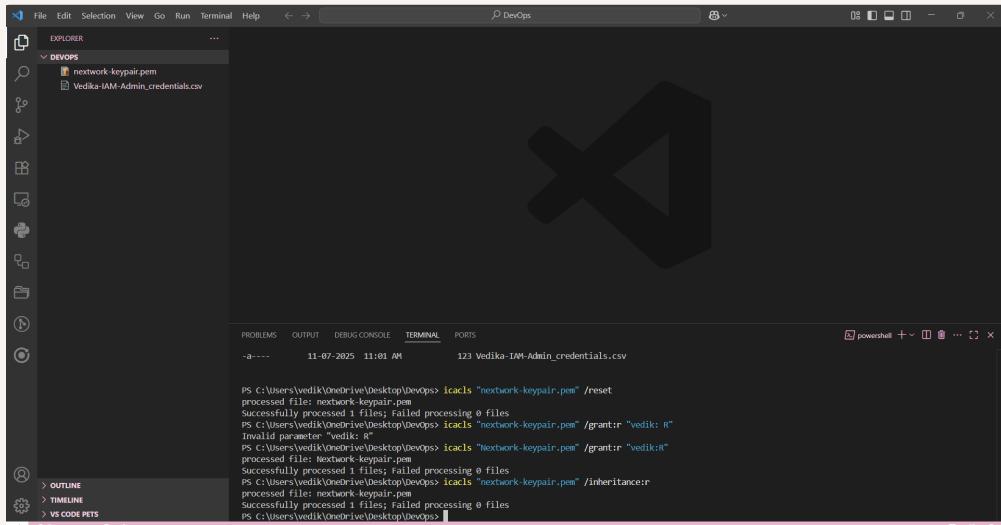
I installed VS Code use the extra tools that comes with it so that we'll be able to connect to virtual servers like EC2 instances.



My first terminal commands

A terminal is where you send instructions to your computer using text instead of clicks. The first command I ran for this project is cd C:\Users\Enter your username\Desktop\DevOps so as to navigate to my DevOps folders.

I also updated my private key's permissions by running some commands on the terminal of my VS code. I used Icacls (which stands for Integrity Control Access Control Lists) a tool for Windows that lets you decide who can open or change the files.



The screenshot shows a Microsoft Visual Studio Code interface. The left sidebar has sections for EXPLORER, DEVOPS, OUTLINE, TIMELINE, and VS CODE PETS. The main area features a large dark background with the VS logo. A terminal window is open at the bottom, showing the following command history:

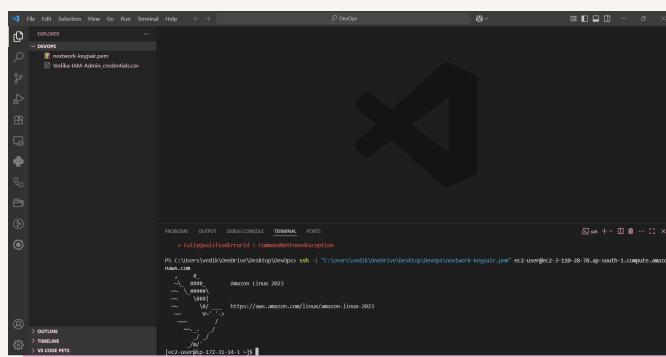
```
PS C:\Users\vedik\OneDrive\Desktop\DevOps> icacls "nextwork-keypair.pem" /reset
processed file: nextwork-keypair.pem
Successfully processed 1 files; failed processing 0 files
PS C:\Users\vedik\OneDrive\Desktop\DevOps> icacls "nextwork-keypair.pem" /grant:r "vedik:R"
Invalid parameter "vedik:R"
PS C:\Users\vedik\OneDrive\Desktop\DevOps> icacls "nextwork-keypair.pem" /grant:r "vedik:R"
processed file: nextwork-keypair.pem
Successfully processed 1 files; failed processing 0 files
PS C:\Users\vedik\OneDrive\Desktop\DevOps> icacls "nextwork-keypair.pem" /inheritance:r
processed file: nextwork-keypair.pem
Successfully processed 1 files; failed processing 0 files
PS C:\Users\vedik\OneDrive\Desktop\DevOps>
```

SSH connection to EC2 instance

To connect to my EC2 instance, I ensured that I used the correct SSH command with the right username. I made sure that I verify the .pem key permissions. I checked the AWS EC2 console to confirm the key pair is assigned to the instance.

This command required an IPv4 address

A Public IPv4 DNS (which stands for Domain Name System) is the public address for your EC2 server that the internet uses to find and connect to it. The local computer I am using to do this project will find and connect to my EC2 instance through this



Maven & Java

Apache Maven is a tool that helps developers build and organize Java software projects. It's also a package manager, which means it automatically download any external pieces of code your project depends on to work.

I am using Maven for my project because it's really useful for kick-starting web projects. I will use Maven later on to help set up all the necessary web files to create a web app structure, so I can jump straight into developing the web app.

Java is a popular programming language used to build different types of applications, from mobile apps to large enterprise systems. Maven is a tool that NEEDS Java to operate. If we don't install Java we won't be able to use Maven to generate web app

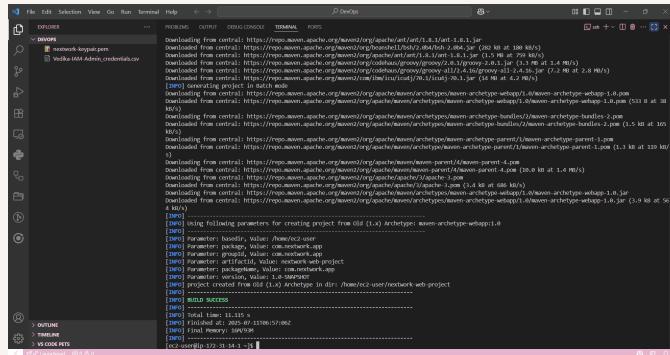
Java is required in this project because Maven, which we just downloaded, is a tool that NEEDS Java to operate. So if we don't install Java, we won't be able to use Maven to generate/build our web app today.

Create the Application

I generated a Java web app using the command: mvn archetype:generate \ -DgroupId=com.nextwork.app \ -DartifactId=nextwork-web-project \ -DarchetypeArtifactId=maven-archetype-webapp \ -DinteractiveMode=false

I installed Remote - SSH, edit files directly on the EC2 instance without manual SFTP/SCP transfers and to run terminal commands in VS Code as if working locally. It will also debug and manage remote environments seamlessly, improving productivity.

The Remote-SSH configuration file specifies the EC2 instance's hostname, the correct username (like ec2-user or ubuntu), and the path to your .pem key file, enabling secure VS Code access to the remote server for direct editing and debugging.



```

File Edit Selection View Go Run Terminal Help ⌘D DevOps

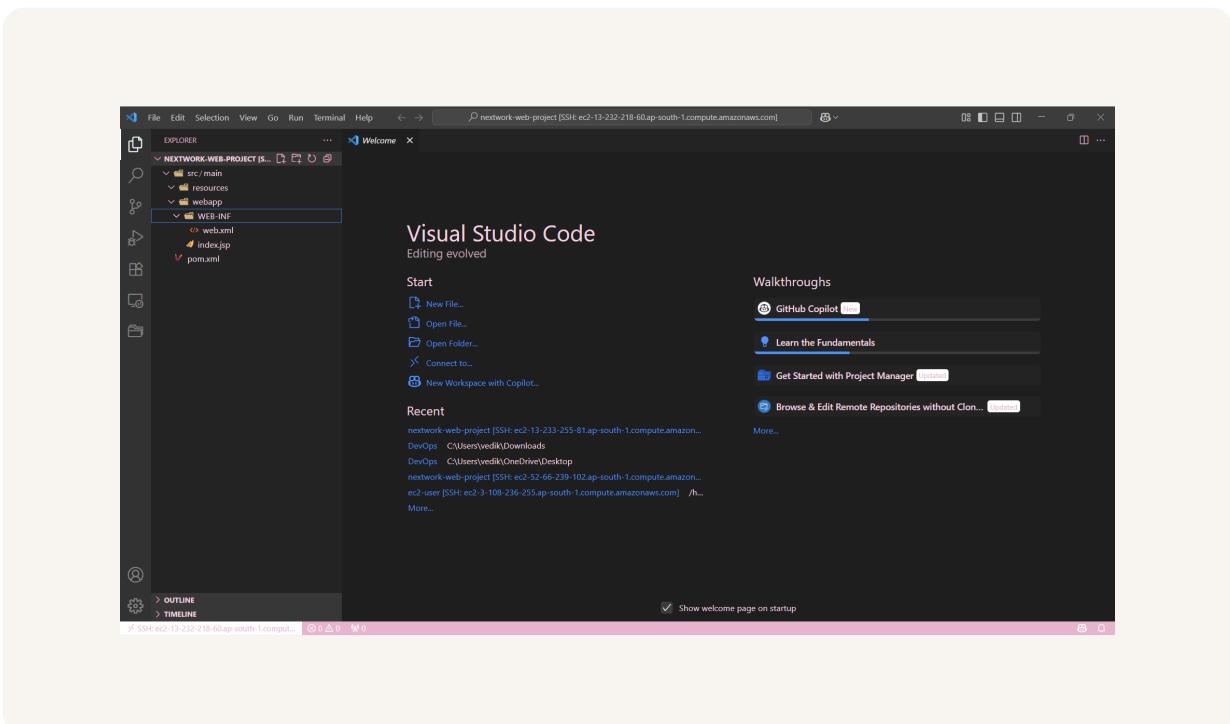
TERMINAL
[2023-07-31T08:57:08Z] [mvn] [INFO] Scanning for projects...
[2023-07-31T08:57:08Z] [mvn] [INFO] 
[2023-07-31T08:57:08Z] [mvn] [INFO]   Downloading from central: https://repo.maven.apache.org/maven/virtual-repository-for-artifact/javax.activation/javax.activation-api/1.2.1/jar
[2023-07-31T08:57:08Z] [mvn] [INFO]     Downloaded from central: https://repo.maven.apache.org/maven/virtual-repository-for-artifact/javax.activation/javax.activation-api/1.2.1/jar (120 kB at 100 kB/s)
[2023-07-31T08:57:08Z] [mvn] [INFO]   Downloading from central: https://repo.maven.apache.org/maven/virtual-repository-for-artifact/javax.activation/javax.activation-api/1.2.1/jar (120 kB at 100 kB/s)
[2023-07-31T08:57:08Z] [mvn] [INFO]     Downloaded from central: https://repo.maven.apache.org/maven/virtual-repository-for-artifact/javax.activation/javax.activation-api/1.2.1/jar (120 kB at 100 kB/s)
[2023-07-31T08:57:08Z] [mvn] [INFO]   Downloading from central: https://repo.maven.apache.org/maven/virtual-repository-for-artifact/org.codehaus.groovy/groovy-all/2.4.16/jar
[2023-07-31T08:57:08Z] [mvn] [INFO]     Downloaded from central: https://repo.maven.apache.org/maven/virtual-repository-for-artifact/org.codehaus.groovy/groovy-all/2.4.16/jar (7.2 MB at 2.0 MB/s)
[2023-07-31T08:57:08Z] [mvn] [INFO]   [INFO] Scanning for projects...
[2023-07-31T08:57:08Z] [mvn] [INFO]   [INFO] Generating project in batch mode
[2023-07-31T08:57:08Z] [mvn] [INFO]   [INFO] 
[2023-07-31T08:57:08Z] [mvn] [INFO]   [INFO]   Downloading from central: https://repo.maven.apache.org/maven/virtual-repository-for-artifact/org.apache.maven.archetype/maven-archetype-webapp/1.0.pom
[2023-07-31T08:57:08Z] [mvn] [INFO]     Downloaded from central: https://repo.maven.apache.org/maven/virtual-repository-for-artifact/org.apache.maven.archetype/maven-archetype-webapp/1.0.pom (533 B at 28 kB/s)
[2023-07-31T08:57:08Z] [mvn] [INFO]   [INFO]   Downloading from central: https://repo.maven.apache.org/maven/virtual-repository-for-artifact/org.apache.maven.archetype/maven-archetype-handle/2/maven-archetype-handle-2.pom
[2023-07-31T08:57:08Z] [mvn] [INFO]     Downloaded from central: https://repo.maven.apache.org/maven/virtual-repository-for-artifact/org.apache.maven.archetype/maven-archetype-handle/2/maven-archetype-handle-2.pom (1.5 kB at 10 kB/s)
[2023-07-31T08:57:08Z] [mvn] [INFO]   [INFO]   Downloading from central: https://repo.maven.apache.org/maven/virtual-repository-for-artifact/org.apache.maven.archetype/maven-archetype-parent/1/maven-archetype-parent-1.pom
[2023-07-31T08:57:08Z] [mvn] [INFO]     Downloaded from central: https://repo.maven.apache.org/maven/virtual-repository-for-artifact/org.apache.maven.archetype/maven-archetype-parent/1/maven-archetype-parent-1.pom (1.3 kB at 10 kB/s)
[2023-07-31T08:57:08Z] [mvn] [INFO]   [INFO]   Downloading from central: https://repo.maven.apache.org/maven/virtual-repository-for-artifact/org.apache.maven.archetype/maven-archetype-parent/4/maven-parent-4.pom
[2023-07-31T08:57:08Z] [mvn] [INFO]     Downloaded from central: https://repo.maven.apache.org/maven/virtual-repository-for-artifact/org.apache.maven.archetype/maven-archetype-parent/4/maven-parent-4.pom (38.0 kB at 1.0 MB/s)
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[2023-07-31T08:57:08Z] [mvn] [INFO]   [INFO]   Downloaded from central: https://repo.maven.apache.org/maven/virtual-repository-for-artifact/com.nextwork.nextwork/nextwork/1.0.0/jar
[2023-07-31T08:57:08Z] [mvn] [INFO]     Downloaded from central: https://repo.maven.apache.org/maven/virtual-repository-for-artifact/com.nextwork.nextwork/nextwork/1.0.0/jar (3.9 kB at 56 kB/s)
[2023-07-31T08:57:08Z] [mvn] [INFO]   [INFO]   [INFO] Using following parameters for creating project from old (1.x) Archetype: maven-archetype-webapp1
[2023-07-31T08:57:08Z] [mvn] [INFO]   [INFO]   Parameters:
[2023-07-31T08:57:08Z] [mvn] [INFO]     Parameter: basedir, Value: /home/ec2-user
[2023-07-31T08:57:08Z] [mvn] [INFO]     Parameter: groupId, Value: com.nextwork.app
[2023-07-31T08:57:08Z] [mvn] [INFO]     Parameter: artifactId, Value: nextwork-web-project
[2023-07-31T08:57:08Z] [mvn] [INFO]     Parameter: packageName, Value: com.nextwork.app
[2023-07-31T08:57:08Z] [mvn] [INFO]     Parameter: version, Value: 1.0.0
[2023-07-31T08:57:08Z] [mvn] [INFO]   [INFO]   project created from old (1.x) archetype in dir: /home/ec2-user/nextwork-web-project
[2023-07-31T08:57:08Z] [mvn] [INFO]   [INFO] BUILD SUCCESS
[2023-07-31T08:57:08Z] [mvn] [INFO] 
[2023-07-31T08:57:08Z] [mvn] [INFO] Total time: 15.137 s
[2023-07-31T08:57:08Z] [mvn] [INFO] Finished at: 2023-07-31T08:57:08Z
[2023-07-31T08:57:08Z] [mvn] [INFO] 
[2023-07-31T08:57:08Z] [mvn] [INFO] 
[2023-07-31T08:57:08Z] [mvn] [INFO] [ec2-user@ip-172-31-104-1 ~]

```

Create the Application

Using VS Code's file explorer, I could see the src (source) folder which holds all the source code files. src is further divided into webapp, which are the web app's files and pom.xml which is a Maven Project Object Model file.

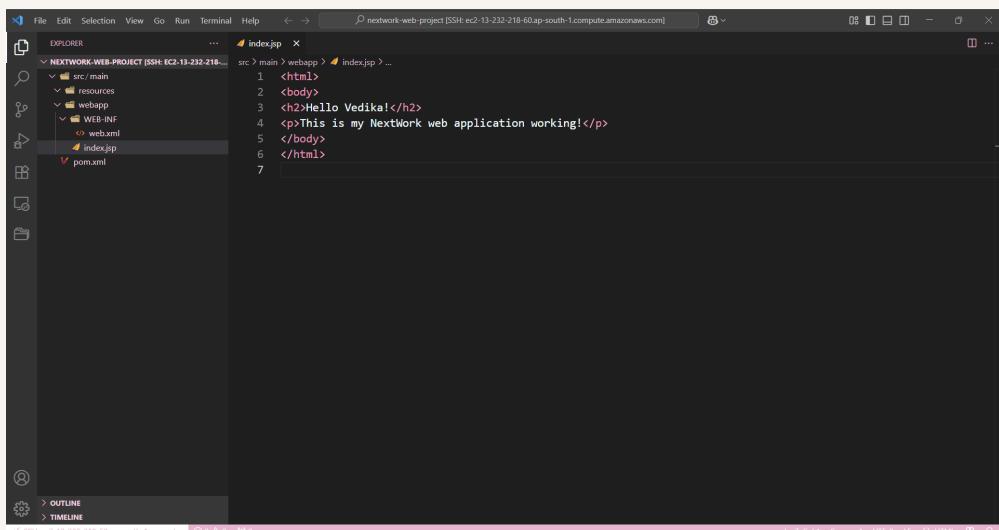
The src folder contains my project's core code (e.g., Java classes, Python scripts, React components). The webapp folder (common in Java web projects like Spring or Maven) holds web-specific files like HTML, CSS, JavaScript, etc.



Using Remote - SSH

index.jsp is a file used in Java web apps. It's similar to an HTML file because it contains markup to display web pages. However, index.jsp can also include Java code, which lets it generate dynamic content.

I edited index.jsp by changing "Hello World" to "Hello Vedika" and adding a paragraph that says: This is my NextWork web application working!



```
<html>
<body>
<h2>Hello Vedika!</h2>
<p>This is my NextWork web application working!</p>
</body>
</html>
```



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