Experiment 3

Maven Build using GitHub Actions

Objective: Set up a GitHub Actions workflow to automatically build a Maven project whenever changes are pushed to a GitHub repository.

Prerequisites:
- GitHub account
- A Maven-based Java project hosted on GitHub

Exercise Steps:

Step 1: Fork and Clone the Repository

- Fork a sample Maven-based Java project repository on GitHub.
- Clone the forked repository to your local machine.

Step 2: Create a GitHub Actions Workflow

- In your cloned repository, create a directory named .github/workflows if it doesn't exist.
- Inside the .github/workflows directory, create a YAML file (e.g., maven-build.yml) to define your GitHub Actions workflow. You can use any text editor to create the file.
- Edit maven-build.yml and add the following content:

```
name: Maven Build

on:

  push:

    branches:

      - main  # Change this to your main branch name

jobs:

  build:
```

```
    runs-on: ubuntu-latest

    steps:

    - name: Checkout code

      uses: actions/checkout@v2


    - name: Set up Java

      uses: actions/setup-java@v2

      with:

        java-version: '11'  # Change this to the desired Java version


    - name: Build with Maven

      run: mvn clean install
```

This workflow will trigger a Maven build whenever changes are pushed to the main branch.

Step 3: Commit and Push Changes

- Save the maven-build.yml file.
- Commit the changes to your local repository:

```
git add .

git commit -m "Add GitHub Actions workflow for Maven build"

git push origin main
```

Step 4: Check the Workflow Status
- Go to your GitHub repository on the GitHub website.
- Click on the "Actions" tab to see the workflow running. You should see a workflow named "Maven Build" or the name you specified in the YAML file.
- Monitor the workflow's progress, and once it completes successfully, you should see a green checkmark indicating a successful build.

Step 5: Verify the Build Artifacts

- If the build was successful, navigate to the "Actions" tab on your GitHub repository, and click on the latest workflow run.
- In the workflow details, you can find the "Artifacts" section. Click on the artifact(s) to download and verify the build artifacts.

Step 6: Optional - Trigger a Build

To test the workflow, make a change in your project, commit, and push it to the repository. This should trigger the GitHub Actions workflow automatically.

Conclusion:

In this lab exercise, you've set up a GitHub Actions workflow for a Maven-based Java project to automate the build process. Participants should now have a basic understanding of how to integrate CI/CD into their projects using GitHub Actions. You can extend this exercise by adding deployment steps, testing, or other actions to the workflow as needed.

```java
package devsecops.b3.cicd;

public class MyClass {
    public void greeting()
    {
        System.out.println("Hello GitHub Actions");
    }
    public static void main(String[] args) {
        MyClass ob = new MyClass();
        ob.greeting();

    }
}
```

Console ×
\<terminated> MyClass (2) [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (19-Sep-2023, 8:56:33 am – 8:56:34 am) [pid: 21828]
Hello GitHub Actions

```
         https://maven.apache.org/xsd/maven-4.0.0.xsd (xsi:schemaLocation)
 1 <project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://mave
 2   <modelVersion>4.0.0</modelVersion>
 3   <groupId>devops.b3.lab3.cicd</groupId>
 4   <artifactId>devops.b3.lab3.cicd</artifactId>
 5   <version>0.0.1-SNAPSHOT</version>
 6
 7
 8   <properties>
 9         <maven.compiler.source>1.8</maven.compiler.source>
10         <maven.compiler.target>1.8</maven.compiler.target>
11   </properties>
12 </project>
```

Overview | Dependencies | Dependency Hierarchy | Effective POM | pom.xml

```
Console
terminated> C:\Program Files\Java\jdk-17\bin\javaw.exe (23-Sep-2023, 2:59:34 pm) [pid: 5428]
[INFO]
[INFO] --- maven-jar-plugin:2.4:jar (default-jar) @ devops.b3.lab3.cicd ---
[INFO]
[INFO] --- maven-install-plugin:2.4:install (default-install) @ devops.b3.lab3.cicd ---
[INFO] Installing C:\Users\anu39\.eclipse\devops.b3.lab3.cicd\target\devops.b3.lab3.cicd-0.0.1-SNAPSHOT.jar to C:\Users\anu39\.m2\repository\
[INFO] Installing C:\Users\anu39\.eclipse\devops.b3.lab3.cicd\pom.xml to C:\Users\anu39\.m2\repository\devops\b3\lab3\cicd\devops.b3.lab3.cic
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  0.950 s
[INFO] Finished at: 2023-09-23T14:59:36+05:30
[INFO] ------------------------------------------------------------------------
```

Name	Last commit message	Last commit date
..		
src/main/java/devops/b3/lab3/cicd	Pushing files via Eclipse	4 days ago
target	Pushing files via Eclipse	4 days ago
pom.xml	Pushing files via Eclipse	4 days ago

CICd / .github / workflows / maven.yml in master

Edit | Preview   Code 55% faster with GitHub Copilot   Spaces ⇕ 2 ⇕ No wrap ⇕

```
10
11   on:
12     push:
13       branches: [ "master" ]
14     pull_request:
15       branches: [ "master" ]
16
17   jobs:
18     build:
19
20       runs-on: ubuntu-latest
21
22       steps:
23       - uses: actions/checkout@v3
24       - name: Set up JDK 17
25         uses: actions/setup-java@v3
26         with:
27           java-version: '17'
28           distribution: 'temurin'
29           cache: maven
30       - name: Build with Maven
31         run: mvn -B package --file pom.xml
32
```

← Java CI with Maven
✓ **Create maven.yml** #1   ...

🏠 Summary

Jobs
✓ build

Run details
⏱ Usage
📄 Workflow file

build
succeeded 4 days ago in 17s   🔍 Search logs   ⚙

› ✓ Set up job   2s
› ✓ Run actions/checkout@v3   0s
› ✓ Set up JDK 17   0s
› ✓ Build with Maven   9s
› ✓ Post Set up JDK 17   1s
› ✓ Post Run actions/checkout@v3   0s
› ✓ Complete job   0s

🏠 Summary

Jobs
✓ build

Run details
⏱ Usage
📄 Workflow file

build
succeeded 4 days ago in 17s   🔍 Search logs   ⚙

∨ ✓ Build with Maven   9s
517 [INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-interpolation/1.15/plexus-interpolation-1.15.jar
518 [INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-archiver/2.1/plexus-archiver-2.1.jar
519 [INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-io/2.0.2/plexus-io-2.0.2.jar
520 [INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/maven-archiver/2.5/maven-archiver-2.5.jar (22 kB at 909 kB/s)
521 [INFO] Downloading from central: https://repo.maven.apache.org/maven2/commons-lang/commons-lang/2.1/commons-lang-2.1.jar
522 [INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-io/2.0.2/plexus-io-2.0.2.jar (58 kB at 2.6 MB/s)
523 [INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-utils/3.0/plexus-utils-3.0.jar
524 [INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-interpolation/1.15/plexus-interpolation-1.15.jar (60 kB at
     2.3 MB/s)
525 [INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-archiver/2.1/plexus-archiver-2.1.jar (104 kB at 6.6 MB/s)
526 [INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/classworlds/classworlds/1.1-alpha-2/classworlds-1.1-alpha-2.jar (38 kB at 1.1 MB/s)
527 [INFO] Downloaded from central: https://repo.maven.apache.org/maven2/commons-lang/commons-lang/2.1/commons-lang-2.1.jar (208 kB at 4.8 MB/s)
528 [INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-utils/3.0/plexus-utils-3.0.jar (226 kB at 5.1 MB/s)
529 [INFO] Building jar: /home/runner/work/exp3-jenkins/exp3-jenkins/target/CICD-EXP3-1.0-SNAPSHOT.jar
530 [INFO] --
531 [INFO] BUILD SUCCESS
532 [INFO] --
533 [INFO] Total time: 7.446 s
534 [INFO] Finished at: 2023-09-19T04:16:51Z
535 [INFO] --
› ✓ Post Set up JDK 17   1s
› ✓ Post Run actions/checkout@v3   0s
› ✓ Complete job   0s