

## DEVOPS CI/CD PIPELINE

As steps given in the question the screenshots are placed accordingly

1.Implement a CI/CD pipeline using Jenkins multi-branch pipelines

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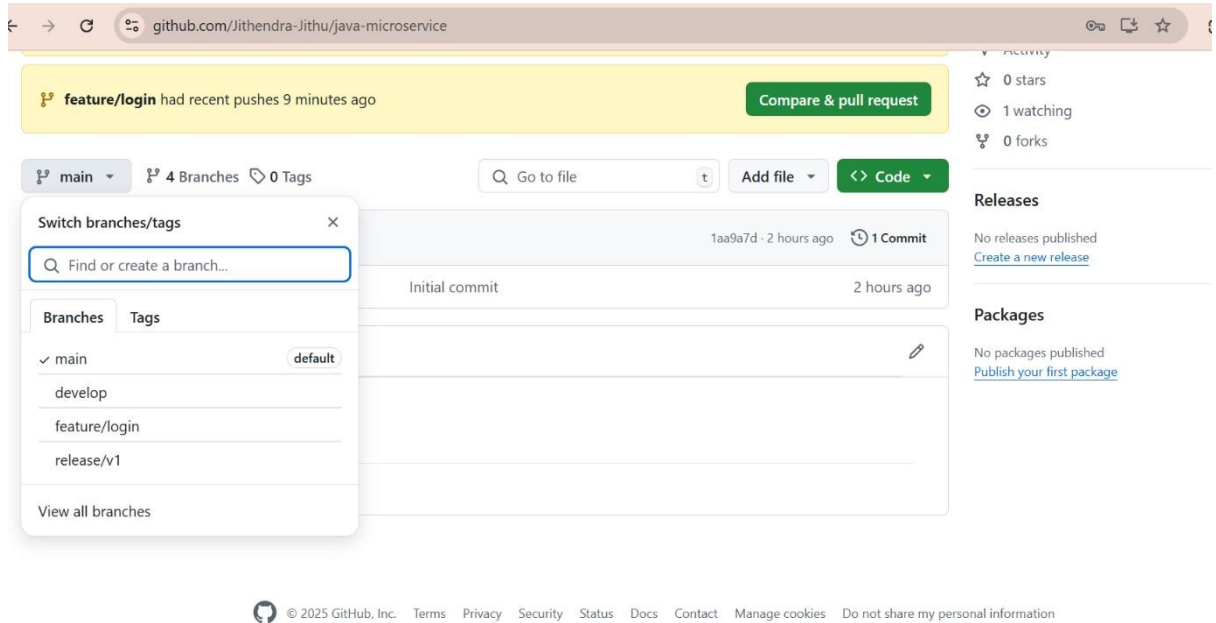
This github contains three branches:

289238

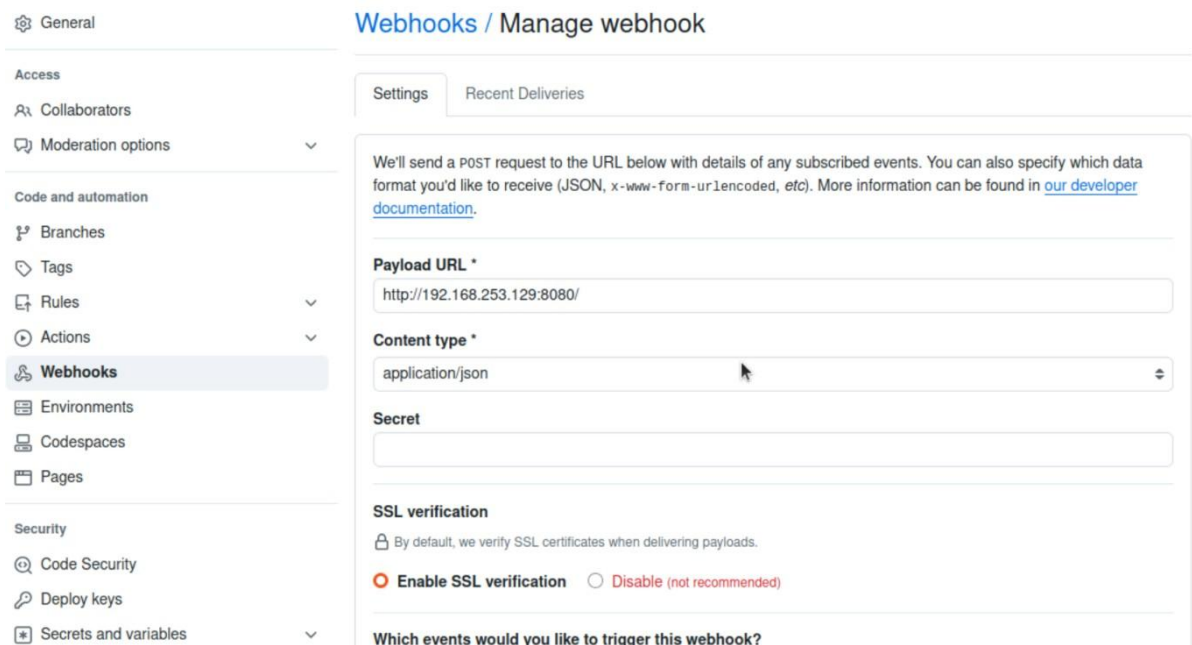
1.Develop

2.Feature/login

3.Release/v1



2.Triggers automatically using a GitHub webhook.



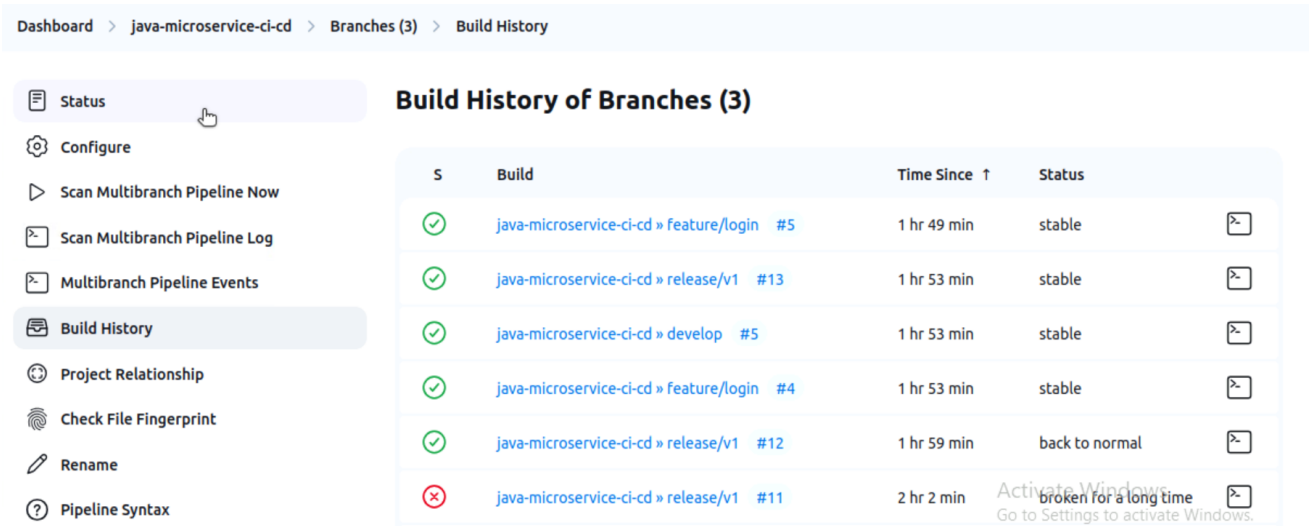
### 3. Builds and tests the Java application using maven.



The screenshot shows the Jenkinsfile for the 'java-microservice' project. The file is located at 'release/v1' and contains the following stages:

```
stages {  
  stage('Checkout') {  
    steps {  
      checkout scm  
    }  
  }  
  stage('Build') {  
    steps {  
      sh 'mvn clean package'  
    }  
  }  
  stage('Test') {  
    steps {  
      sh 'mvn test'  
    }  
  }  
  stage('Docker Build & Push') {  
    steps {  
      sh 'docker build -t java-microservice .'  
      sh 'docker push java-microservice'  
    }  
  }  
}
```

### Build history:



The screenshot shows the Jenkins Build History page for the 'java-microservice-ci-cd' pipeline. The page displays a table of build history for the 'release/v1' branch.

S	Build	Time Since ↑	Status
✓	java-microservice-ci-cd » feature/login #5	1 hr 49 min	stable
✓	java-microservice-ci-cd » release/v1 #13	1 hr 53 min	stable
✓	java-microservice-ci-cd » develop #5	1 hr 53 min	stable
✓	java-microservice-ci-cd » feature/login #4	1 hr 53 min	stable
✓	java-microservice-ci-cd » release/v1 #12	1 hr 59 min	back to normal
✗	java-microservice-ci-cd » release/v1 #11	2 hr 2 min	broken for a long time

Activate Windows. Go to Settings to activate Windows.

## Output of maven:

```
Dashboard > java-microservice-ci-cd > Branches (3) > develop > #5
[[1;34mINFO[m] [1m--- [0;32mmaven-compiler-plugin:3.1:testCompile[m [1m(default-testCompile)
[m @ [36mjava-microservice[0;1m ---[m
[[1;34mINFO[m] No sources to compile
[[1;34mINFO[m]
[[1;34mINFO[m] [1m--- [0;32mmaven-surefire-plugin:2.12.4:test[m [1m(default-test)[m @
[36mjava-microservice[0;1m ---[m
[[1;34mINFO[m] No tests to run.
[[1;34mINFO[m]
[[1;34mINFO[m] [1m--- [0;32mmaven-jar-plugin:2.4:jar[m [1m(default-jar)[m @ [36mjava-
microservice[0;1m ---[m
[[1;34mINFO[m] Building jar: /var/lib/jenkins/workspace/java-microservice-ci-cd_develop/
target/java-microservice-1.0-SNAPSHOT.jar
[[1;34mINFO[m] [1m-----[m
[[1;34mINFO[m] [1;32mBUILD SUCCESS[m
[[1;34mINFO[m] [1m-----[m
[[1;34mINFO[m] Total time: 4.987 s
[[1;34mINFO[m] Finished at: 2025-04-10T15:41:52+05:30
[[1;34mINFO[m] [1m-----[m
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Test)
[Pipeline] sh
+ mvn test
```

4. Packages the application into a Docker container and pushes it to an image registry.


```
master@master-vm:~$ docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
jithu145/java-microservice  develop            cfc25ecfba55       11 minutes ago     326MB
jithu145/java-microservice  release-v1         de30310dbe7e       11 minutes ago     326MB
jithu145/java-microservice  <none>             a811920edab4       18 minutes ago     326MB
jithu145/java-microservice  <none>             761f1de2637f       24 minutes ago     326MB
jithu145/java-microservice  <none>             e626c4202288       46 minutes ago     326MB
jithu145/java-microservice  <none>             50bc25066993       52 minutes ago     326MB
jithu145/java-microservice  <none>             27c6884f350a       About an hour ago   326MB
```

## 5. Docker Containerization and Image Push

The screenshot shows the Docker Hub interface for the user 'jithu145'. The left sidebar contains navigation links: Repositories (selected), Settings, Default privacy, Notifications, Billing, and Usage. The main area is titled 'Repositories' and shows 'All repositories within the jithu145 namespace.' Below this is a search bar and a dropdown menu set to 'All content'. A 'Create a repository' button is in the top right. A table lists the repositories:

Name	Last Pushed	Contains	Visibility	Scout
jithu145/java-microservice	11 minutes ago	IMAGE	Public	Inactive

Docker file:

 **Jithendra-Jithu** Initial commit for multi-branch Java microservice

**Code** **Blame** 3 lines (3 loc) • 93 Bytes

```
1 FROM openjdk:17-jdk-alpine
2 COPY target/*.jar app.jar
3 ENTRYPOINT ["java", "-jar", "/app.jar"]
```

And exposed to 8080

## Kubernetes Deployment

- i. deployment.yaml (Defines the app deployment and replicas).
  - ii. service.yaml (Exposes the application internally).
- b. Add Kubernetes apply command to Jenkinsfile to enable deployment.

t

▼ k8s

deployment.yaml

service.yaml

> src

Dockerfile

Jenkinsfile

pom.xml

sonar-project.properties

**Code** **Blame** 19 lines (19 loc) • 360 Bytes

```
1 apiVersion: apps/v1
2 kind: Deployment
3 metadata:
4   name: java-microservice
5 spec:
6   replicas: 1
7   selector:
8     matchLabels:
9       app: java-microservice
10  template:
11    metadata:
12      labels:
13        app: java-microservice
14  spec:
15    containers:
16      - name: java-microservice
17        image: IMAGE_PLACEHOLDER
18        ports:
19          - containerPort: 8080
```

[java-microservice](#) / [k8s](#) / [service.yaml](#) 



**Jithendra-Jithu** Initial commit for multi-branch Java microservice

Code

Blame

12 lines (12 loc) • 194 Bytes

```
1  apiVersion: v1
2  kind: Service
3  metadata:
4    name: java-microservice
5  spec:
6    selector:
7      app: java-microservice
8    ports:
9      - protocol: TCP
10      port: 80
11      targetPort: 8080
12  type: NodePort
```

Jenkins file that is written in the code:

```
1  pipeline {
2      agent any
3      environment {
4          IMAGE = "docker.io/jithu145/java-microservice:${env.BRANCH_NAME.replaceAll('/', '-')}"
5          KUBECONFIG_PATH = "/var/lib/jenkins/.kube/config"
6      }
7
8
9      stages {
10         stage('Checkout') {
11             steps {
12                 checkout scm
13             }
14         }
15
16         stage('Build') {
17             steps {
18                 sh 'mvn clean package'
19             }
20         }
21
22         stage('Test') {
23             steps {
24                 sh 'mvn test'
25             }
26         }
27     }
28
29     stage('Docker Build & Push') {
30         when {
31             anyOf {
32                 branch "develop"
33                 branch pattern: "release/.*", comparator: "REGEXP"
34                 branch "main"
35             }
36         }
37         steps {
38             withCredentials([usernamePassword(credentialsId: 'fb16b1ba-d2e9-41bb-8654-d00d3b5b61e6', usernameVariable:
39                 sh '''
40                     docker build -t ${IMAGE} .
41                     echo "${PASS}" | docker login -u "${USER}" --password-stdin
42                     docker push ${IMAGE}
43                 ''')
44             ]
45         }
46     }
47 }
```

```

stage('Deploy to Staging') {
    when {
        branch pattern: "release/.*", comparator: "REGEXP"
    }
    steps {
        sh '''
            sed -i 's|IMAGE_PLACEHOLDER|${IMAGE}|' k8s/deployment.yaml
            kubectl --kubeconfig=${KUBECONFIG_PATH} apply -f k8s/deployment.yaml
            kubectl --kubeconfig=${KUBECONFIG_PATH} apply -f k8s/service.yaml
            ...
        '''
    }
}

```

```

stage('Approval & Deploy to Prod') {
    when {
        branch 'main'
    }
    steps {
        input message: "Deploy to Production?"
        sh '''
            sed -i 's|IMAGE_PLACEHOLDER|${IMAGE}|' k8s/deployment.yaml
            kubectl --kubeconfig=${KUBECONFIG_PATH} apply -f k8s/deployment.yaml
            kubectl --kubeconfig=${KUBECONFIG_PATH} apply -f k8s/service.yaml
            ...
        '''
    }
}

```

After executing the Jenkins multibranch pipeline:

Output:

Total pipeline output:

The screenshot displays the Jenkins web interface for a multibranch pipeline named 'java-microservice-ci-cd'. The top navigation bar includes the Jenkins logo, a search icon, a notification bell with 3 alerts, a shield icon with 2 warnings, the user 'admin', and a 'log out' button. The breadcrumb trail shows 'Dashboard > java-microservice-ci-cd > Scan Multibranch Pipeline Now'.

The left sidebar contains the following menu items: Status, Configure, Scan Multibranch Pipeline Now (highlighted), Scan Multibranch Pipeline Log, Multibranch Pipeline Events, Delete Multibranch Pipeline, Build History, Project Relationship, Check File Fingerprint, Rename, and Pipeline Syntax.

The main content area shows the 'Status' view for 'java-microservice-ci-cd'. It features a 'Branches (3)' button and a table with the following data:

S	W	Name ↓	Last Success	Last Failure	Last Duration
✓	☁	develop	56 min #4	57 min #3	1 min 33 sec
✓	☁	feature/login	1 hr 6 min #3	1 hr 22 min #1	1 min 2 sec
✓	☁	release/v1	6 min 2 sec #12	8 min 50 sec #11	1 min 4 sec

Below the table, there is a link to 'localhost:8080/job/java-microservice-ci-cd/build?delay=0' and a row of icons: S, M, L.

The second part of the screenshot shows the 'Scan Multibranch Pipeline Log' view. It includes a 'View as plain text' link and a large text area containing the following log output:

```
Started by user admin
[Thu Apr 10 15:41:01 IST 2025] Starting branch indexing...
> git --version # timeout=10
> git --version # 'git version 2.25.1'
> git ls-remote --symref -- https://github.com/Jithendra-Jithu/java-microservice.git #
timeout=10
> git rev-parse --resolve-git-dir /var/lib/jenkins/caches/
git-3a14c6c2a63d382eee485c46a4508359/.git # timeout=10
Setting origin to https://github.com/Jithendra-Jithu/java-microservice.git
> git config remote.origin.url https://github.com/Jithendra-Jithu/java-microservice.git #
timeout=10
Fetching & pruning origin...
Listing remote references...
> git config --get remote.origin.url # timeout=10
> git --version # timeout=10
> git --version # 'git version 2.25.1'
> git ls-remote -h -- https://github.com/Jithendra-Jithu/java-microservice.git # timeout=10
Fetching upstream changes from origin
```

At the bottom, a summary bar shows a green checkmark icon, a sun icon, the pipeline name 'java-microservice-ci-cd', the duration '6 min 12 sec', the status 'log', 'N/A', '2 sec', and a green play button icon.



## Develop branch:

develop 4 Branches 0 Tags

Go to file

Add file

Code

This branch is 8 commits ahead of, 1 commit behind main.

Jithendra-Jithu Update Jenkinsfile 35fc792 · 10 minutes ago 8 Commits

k8s	Initial commit for multi-branch Java microservice	2 hours ago
src/main/java/com/example	Initial commit for multi-branch Java microservice	2 hours ago
Dockerfile	Initial commit for multi-branch Java microservice	2 hours ago
Jenkinsfile	Update Jenkinsfile	10 minutes ago
pom.xml	Initial commit for multi-branch Java microservice	2 hours ago

Releases

No releases published  
[Create a new release](#)

Packages

No packages published  
[Publish your first package](#)

## Output:

Status

</> Changes

Build Now

View Configuration

Full Stage View

Stages

GitHub

Pipeline Syntax

Builds

Filter

Today

#2 4:44 PM

#1 4:39 PM

Develop

Full project name: java-maven/Develop

Stage View

Average stage times: (full run time: ~55s)

	Declarative: Checkout SCM	Checkout	Build with Maven	Docker Build and Push	Deploy to Kubernetes
16:44 No Changes	1s	1s	13s	23s	1s
16:39 No Changes	3s	2s	7s	22s	1s

Permalinks

- Last build (#2), 1 min 13 sec ago
- Last stable build (#2), 1 min 13 sec ago
- Last successful build (#2), 1 min 13 sec ago
- Last completed build (#2), 1 min 13 sec ago

Activate Windows  
Go to Settings to activate Windows.

</> Changes

Console Output

Edit Build Information

Delete build '#5'

Timings

Git Build Data

Git Build Data

Pipeline Overview

Pipeline Console

Restart from Stage

Replay

Pipeline Steps

Workspaces

```

Branch indexing
> git rev-parse --resolve-git-dir /var/lib/jenkins/caches/
git-3a14c6c2a63d382eee485c46a4508359/.git # timeout=10
Setting origin to https://github.com/Jithendra-Jithu/java-microservice.git
> git config remote.origin.url https://github.com/Jithendra-Jithu/java-microservice.git #
timeout=10
Fetching origin...
Fetching upstream changes from origin
> git --version # timeout=10
> git --version # 'git version 2.25.1'
> git config --get remote.origin.url # timeout=10
> git fetch --tags --force --progress -- origin +refs/heads/*:refs/remotes/origin/* #
timeout=10
Seen branch in repository origin/develop
Seen branch in repository origin/feature/login
Seen branch in repository origin/main
Seen branch in repository origin/release/v1
Seen 4 remote branches
Obtained Jenkinsfile from 35fc792ff94490122c8e2bec4800b005abb85361
Loading library jenkins-shared-library@main
Attempting to resolve main from remote references...
> git --version # timeout=10

```

## Release branch:

release/v1

4 Branches

0 Tags

Go to file

Add file

<> Code

This branch is 12 commits ahead of, 1 commit behind main.

Contribute

Jithendra-Jithu

Update Jenkinsfile

de4f8ff · 16 minutes ago

12 Commits

k8s	Initial commit for multi-branch Java microservice	2 hours ago
src/main/java/com/example	Initial commit for multi-branch Java microservice	2 hours ago
Dockerfile	Initial commit for multi-branch Java microservice	2 hours ago
Jenkinsfile	Update Jenkinsfile	16 minutes ago
pom.xml	Initial commit for multi-branch Java microservice	2 hours ago

Releases

No releases published

Create a new release

Packages

No packages published

Publish your first package

## Output:

Dashboard > java-microservice-ci-cd > release/v1 > #13

Status

Changes

Console Output

Edit Build Information

Delete build '#13'

Timings

Git Build Data

Git Build Data

Pipeline Overview

Pipeline Console

Restart from Stage

Build

✓ Console Output

Download Copy View as plain text

```
Branch indexing
> git rev-parse --resolve-git-dir /var/lib/jenkins/caches/
git-3a14c6c2a63d382eee485c46a4508359/.git # timeout=10
Setting origin to https://github.com/Jithendra-Jithu/java-microservice.git
> git config remote.origin.url https://github.com/Jithendra-Jithu/java-microservice.git #
timeout=10
Fetching origin...
Fetching upstream changes from origin
> git --version # timeout=10
> git --version # 'git version 2.25.1'
> git config --get remote.origin.url # timeout=10
> git fetch --tags --force --progress -- origin +refs/heads/*:refs/remotes/origin/* #
timeout=10
Seen branch in repository origin/develop
Seen branch in repository origin/feature/login
Seen branch in repository origin/main
Seen branch in repository origin/release/v1
... 4 commits behind
```

Activate Windows  
Go to Settings to activate Windows.

## Feature/login:

feature/login 4 Branches 0 Tags Go to file Add file <> Code

This branch is 6 commits ahead of, 1 commit behind main. Contribute

Jithendra-Jithu Update Jenkinsfile c5e4f5c · 40 minutes ago 6 Commits

k8s	Initial commit for multi-branch Java microservice	2 hours ago
src/main/java/com/example	Initial commit for multi-branch Java microservice	2 hours ago
Dockerfile	Initial commit for multi-branch Java microservice	2 hours ago
Jenkinsfile	Update Jenkinsfile	40 minutes ago
pom.xml	Initial commit for multi-branch Java microservice	2 hours ago
sonar-project.properties	Initial commit for multi-branch Java microservice	2 hours ago

README

Releases

No releases published  
[Create a new release](#)

Packages

No packages published  
[Publish your first package](#)

## Output:

Dashboard > java-microservice-ci-cd > feature/login > #5

Status

Changes

Console Output

Edit Build Information

Delete build '#5'

Timings

Git Build Data

Git Build Data

Pipeline Overview

Pipeline Console

Restart from Stage

Console Output

Download

Copy

View as plain text

Started by user [admin](#)

> git rev-parse --resolve-git-dir /var/lib/jenkins/caches/  
git-3a14c6c2a63d382eee485c46a4508359/.git # timeout=10

Setting origin to <https://github.com/Jithendra-Jithu/java-microservice.git>

> git config remote.origin.url <https://github.com/Jithendra-Jithu/java-microservice.git> #  
timeout=10

Fetching origin...

Fetching upstream changes from origin

> git --version # timeout=10

> git --version # 'git version 2.25.1'

> git config --get remote.origin.url # timeout=10

> git fetch --tags --force --progress -- origin +refs/heads/\*:refs/remotes/origin/\* #  
timeout=10

Seen branch in repository origin/develop

Seen branch in repository origin/feature/login

Seen branch in repository origin/main

Seen branch in repository origin/release/v1

localhost:8080/job/java-microservice-ci-cd/job/feature%2Flogin/5/pipeline-console

Activate Windows  
Go to Settings to activate Windows.