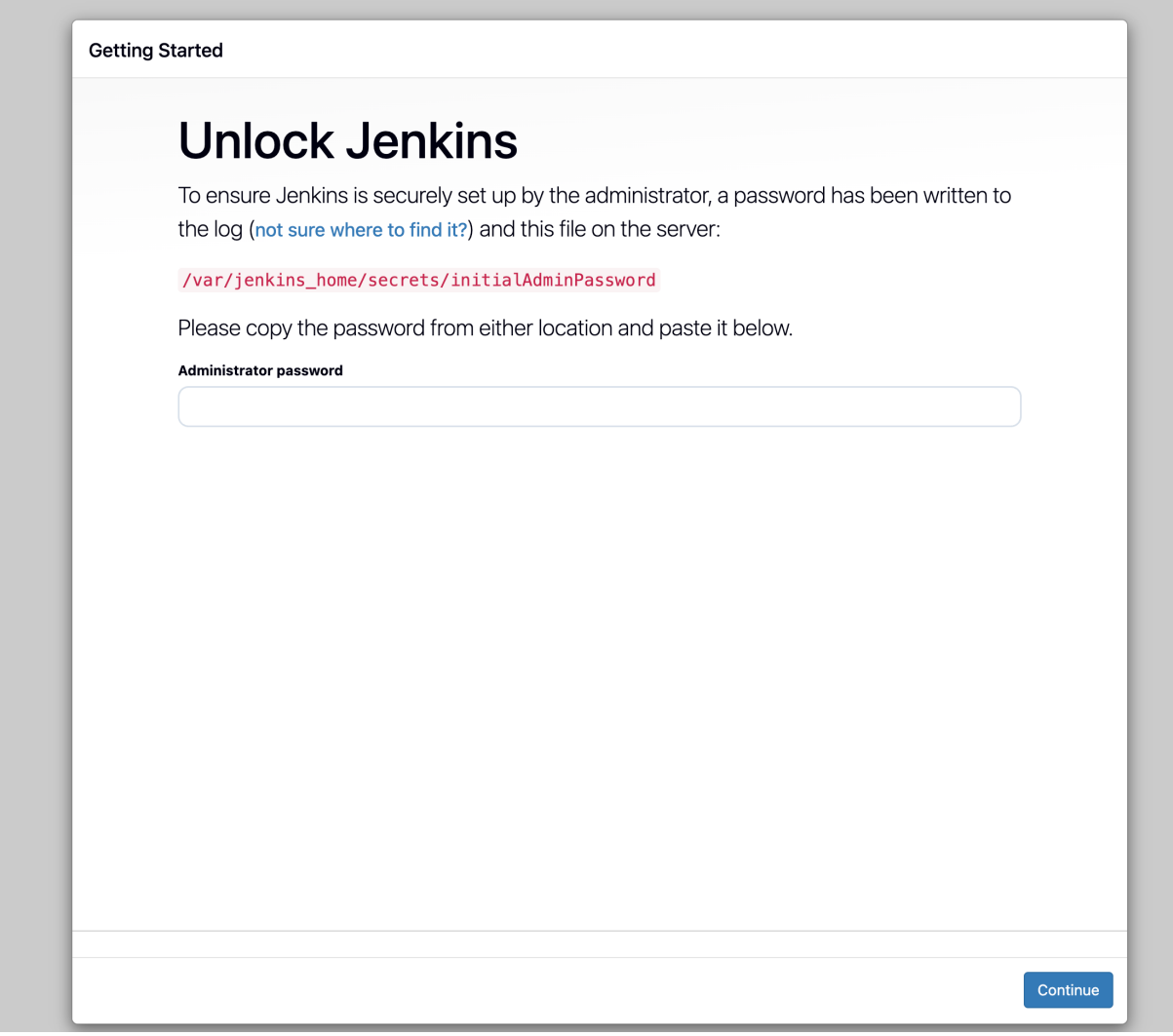
Software Quality Management & Assurance Homework

This document is the required document with every step and the result of both tasks (Task 1 and Task 2).

To complete either tasks I had to get Jenkins running locally. On the official jenkins app, it didn't have an official distribution for MacOS (only third-party) so instead of installing another executable/brew service I went with the docker installation.

In the codebase, there is the ***docker-compose.yml*** file that contains the configuration to run Jenkins in a Docker container.

To ensure reproduction, after running ***docker-compose up -d***, you will be prompted to **Unlock Jenkins**:



The administrator password can be found inside the docker container at path: `/var/jenkins_home/secrets/initialAdminPassword`:

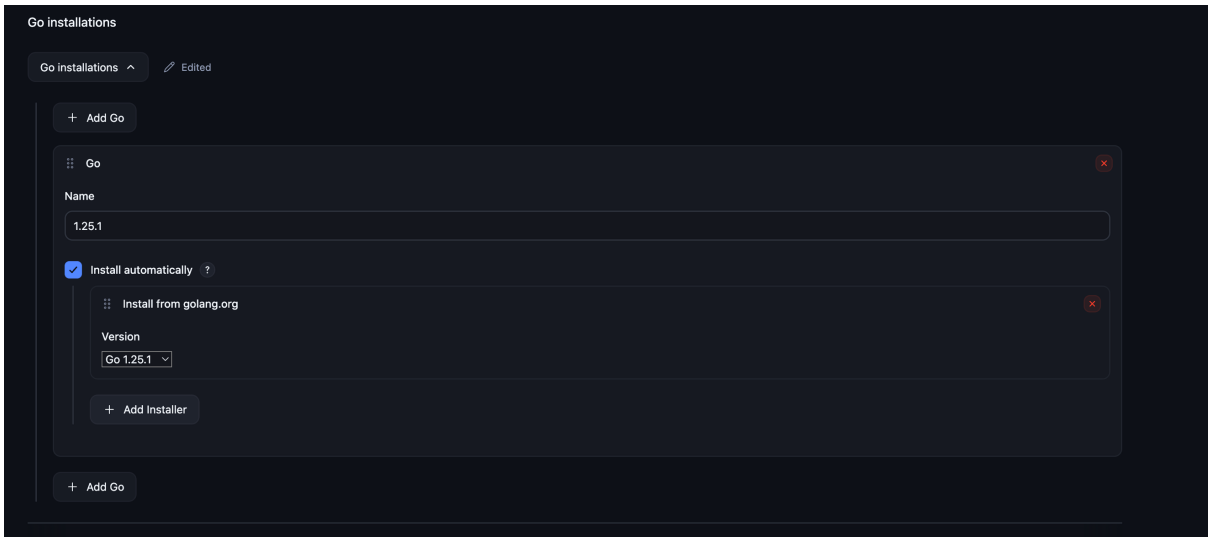
docker exec -it <container_id> cat /var/jenkins_home/secrets/initialAdminPassword

```
(base) ➜  sqma docker ps -a
CONTAINER ID   IMAGE                          COMMAND
f082582c53b6   jenkins/jenkins:jdk17          "/usr/bin/tini -- /u…"
677a4948992c   minio/minio:latest             "/usr/bin/docker-ent…"
72081051563c   postgres:17-alpine             "docker-entrypoint.s…"
04725fe29f14   getmeili/meilisearch:latest    "tini -- /bin/sh -c …"
10251e2ca245   redis:latest                   "docker-entrypoint.s…"
(base) ➜  sqma docker exec -it f082582c53b6 /bin/sh
# cat /var/jenkins_home/secrets/initialAdminPassword
305fb5b1e09c438982147feb385159f7
#
```

Task 1

I'm going to be using Golang for the tests and Jenkins pipeline runner. First step would be to install the Golang plugin from the Jenkins plugin marketplace.

I'm going to be using Golang for the tests and Jenkins pipeline runner. First step would be to install the Golang plugin from the Jenkins plugin marketplace.

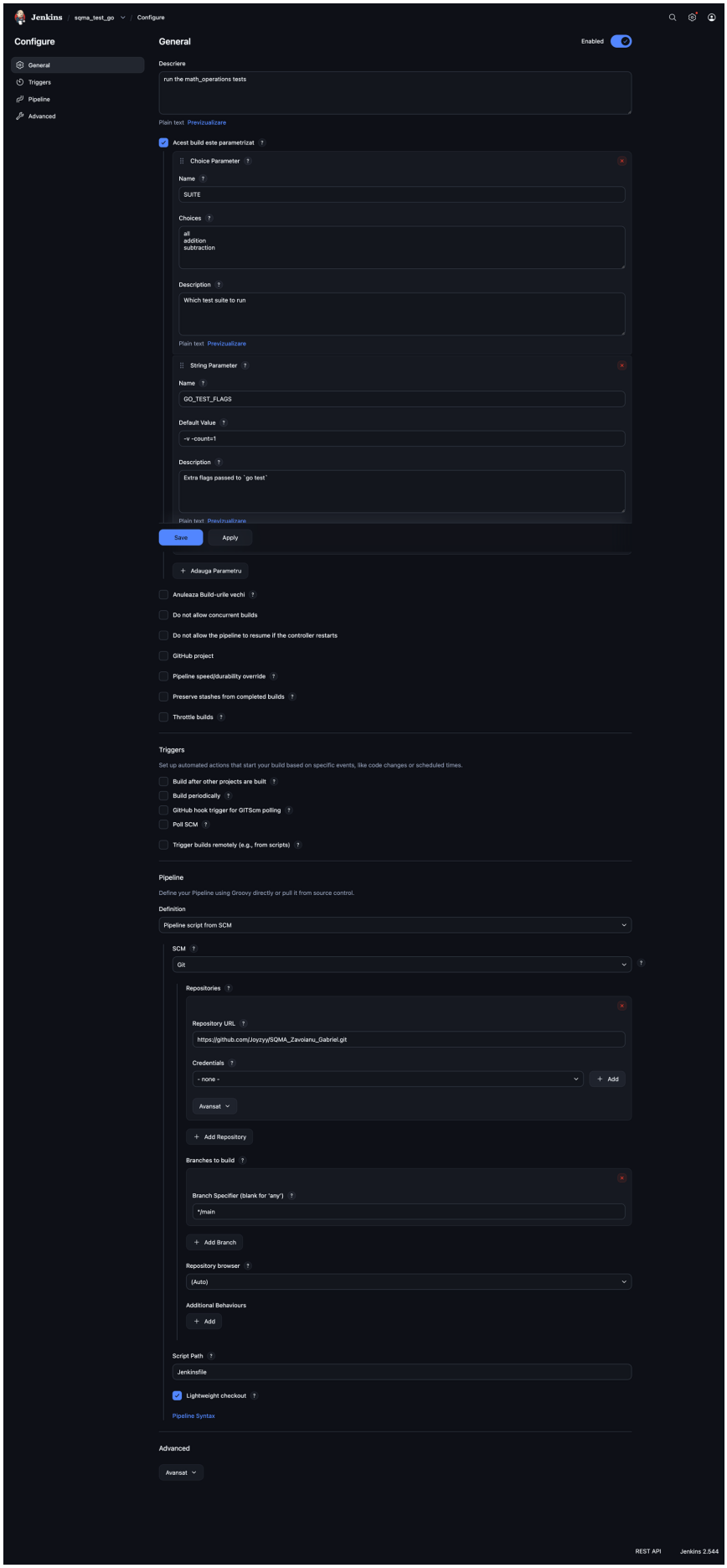


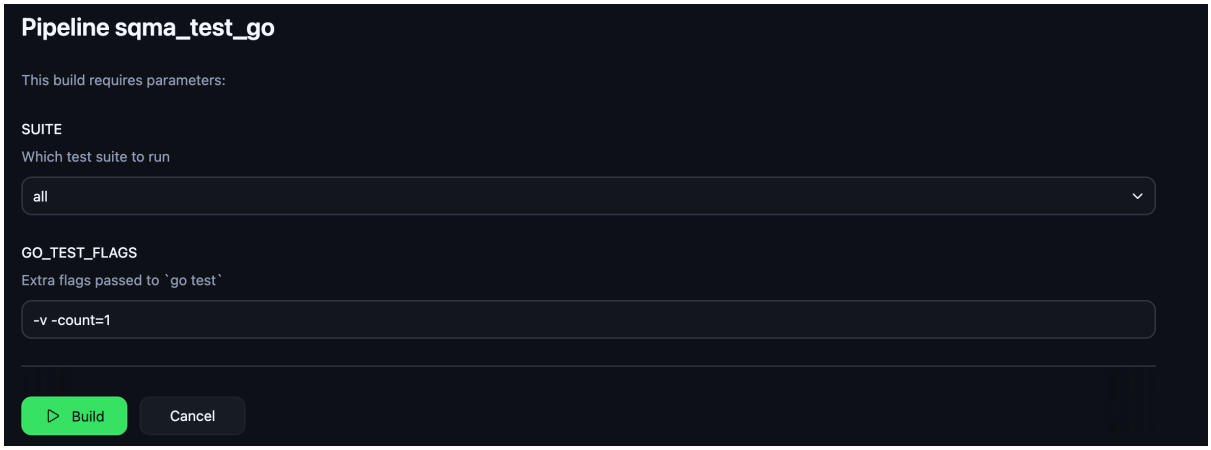
After that, I created the test cases based off *math_operations.go* implementation. The test cases are the following: *addition_test.go*, *subtraction_test.go*. With the implementation of the test cases, I created a Jenkins pipeline *Jenkinsfile* (in the current repo) that will run the tests using the Golang installation configured before and also fulfilling the "parameterized" requirement:

```yaml
parameters {
  choice(
    name: 'SUITE',
    choices: ['all', 'addition', 'subtraction'],
    description: 'Which test suite to run'
```

```
    )
    string(
      name: 'GO_TEST_FLAGS',
      defaultValue: '-v -count=1',
      description: 'Extra flags passed to `go test`'
    )
  }
```

Here is the Jenkins UI configuration of the created pipeline (some fields are completed automatically when using a Jenkinsfile in the repo):


Jenkins | sqma_test_go | Configure
Configure
General
Triggers
Pipeline
Advanced
General
Enabled
Descriere
run the math_operations tests
Plain text Previzualizare
Acest build este parametrizat
Choice Parameter
Name
SUITE
Choices
all
addition
subtraction
Description
Which test suite to run
Plain text Previzualizare
String Parameter
Name
GO_TEST_FLAGS
Default Value
-v -count=1
Description
Extra flags passed to `go test`
Plain text Previzualizare
Save
Apply
Adauga Parametru
Anuleaza Build-urile vechi
Do not allow concurrent builds
Do not allow the pipeline to resume if the controller restarts
GitHub project
Pipeline speed/durability override
Preserve stashes from completed builds
Throttle builds
Triggers
Set up automated actions that start your build based on specific events, like code changes or scheduled times.
Build after other projects are built
Build periodically
GitHub hook trigger for GITScm polling
Poll SCM
Trigger builds remotely (e.g., from scripts)
Pipeline
Define your Pipeline using Groovy directly or pull it from source control.
Definition
Pipeline script from SCM
SCM
Git
Repositories
Repository URL
https://github.com/Joyzyy/SQMA_Zavoianu_Gabriel.git
Credentials
- none -
Add
Avansat
Add Repository
Branches to build
Branch Specifier (blank for 'any')
*/main
Add Branch
Repository browser
(Auto)
Additional Behaviours
Add
Script Path
Jenkinsfile
Lightweight checkout
Pipeline Syntax
Advanced
Avansat
REST API
Jenkins 2.544



After running the pipeline with different parameters, here are some results (you can see them better in the ./logs folder):

```sh
Started by user admin

Obtained Jenkinsfile from git
https://github.com/Joyzyy/SQMA_Zavoianu_Gabriel.git
[Pipeline] Start of Pipeline
[Pipeline] node
Running on Jenkins
 in /var/jenkins_home/workspace/sqma_test_go
[Pipeline] {
[Pipeline] stage
[Pipeline] { (Declarative: Checkout SCM)
[Pipeline] checkout
Selected Git installation does not exist. Using Default
The recommended git tool is: NONE
No credentials specified
 > git rev-parse --resolve-git-dir
/var/jenkins_home/workspace/sqma_test_go/.git # timeout=10
Fetching changes from the remote Git repository
 > git config remote.origin.url
https://github.com/Joyzyy/SQMA_Zavoianu_Gabriel.git # timeout=10
Fetching upstream changes from
https://github.com/Joyzyy/SQMA_Zavoianu_Gabriel.git
 > git --version # timeout=10
 > git --version # 'git version 2.47.3'
 > git fetch --tags --force --progress --
https://github.com/Joyzyy/SQMA_Zavoianu_Gabriel.git
+refs/heads/*:refs/remotes/origin/* # timeout=10
 > git rev-parse refs/remotes/origin/main^{commit} # timeout=10
Checking out Revision 87bb4a7fc6bb3967cedcb7d892ffb114fb979387
(refs/remotes/origin/main)
 > git config core.sparsecheckout # timeout=10
```

```
 > git checkout -f 87bb4a7fc6bb3967cedcb7d892ffb114fb979387 # timeout=10
Commit message: "add Jenkinsfile"
 > git rev-list --no-walk 87bb4a7fc6bb3967cedcb7d892ffb114fb979387 #
timeout=10
[Pipeline] }
[Pipeline] // stage
[Pipeline] withEnv
[Pipeline] {
[Pipeline] stage
[Pipeline] { (Declarative: Tool Install)
[Pipeline] tool
[Pipeline] envVarsForTool
[Pipeline] }
[Pipeline] // stage
[Pipeline] withEnv
[Pipeline] {
[Pipeline] stage
[Pipeline] { (Checkout)
[Pipeline] tool
[Pipeline] envVarsForTool
[Pipeline] withEnv
[Pipeline] {
[Pipeline] checkout
Selected Git installation does not exist. Using Default
The recommended git tool is: NONE
No credentials specified
 > git rev-parse --resolve-git-dir
/var/jenkins_home/workspace/sqma_test_go/.git # timeout=10
Fetching changes from the remote Git repository
 > git config remote.origin.url
https://github.com/Joyzyy/SQMA_Zavoianu_Gabriel.git # timeout=10
Fetching upstream changes from
https://github.com/Joyzyy/SQMA_Zavoianu_Gabriel.git
 > git --version # timeout=10
 > git --version # 'git version 2.47.3'
 > git fetch --tags --force --progress --
https://github.com/Joyzyy/SQMA_Zavoianu_Gabriel.git
+refs/heads/*:refs/remotes/origin/* # timeout=10
 > git rev-parse refs/remotes/origin/main^{commit} # timeout=10
Checking out Revision 87bb4a7fc6bb3967cedcb7d892ffb114fb979387
(refs/remotes/origin/main)
 > git config core.sparsecheckout # timeout=10
 > git checkout -f 87bb4a7fc6bb3967cedcb7d892ffb114fb979387 # timeout=10
Commit message: "add Jenkinsfile"
[Pipeline] }
[Pipeline] // withEnv
```

```
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Test)
[Pipeline] tool
[Pipeline] envVarsForTool
[Pipeline] withEnv
[Pipeline] {
[Pipeline] dir
Running in /var/jenkins_home/workspace/sqma_test_go/go_tests
[Pipeline] {
[Pipeline] sh
+ go version
go version go1.25.1 linux/arm64
[Pipeline] script
[Pipeline] {
[Pipeline] sh
+ go test -v -count=1 -run ^TestAddition$
=== RUN   TestAddition
=== RUN   TestAddition/positive_numbers
=== RUN   TestAddition/negative_numbers
=== RUN   TestAddition/mixed_numbers
=== RUN   TestAddition/zero_values
=== RUN   TestAddition/with_zero
--- PASS: TestAddition (0.00s)
    --- PASS: TestAddition/positive_numbers (0.00s)
    --- PASS: TestAddition/negative_numbers (0.00s)
    --- PASS: TestAddition/mixed_numbers (0.00s)
    --- PASS: TestAddition/zero_values (0.00s)
    --- PASS: TestAddition/with_zero (0.00s)
PASS
ok      ism/sqma    0.001s
[Pipeline] }
[Pipeline] // script
[Pipeline] }
[Pipeline] // dir
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // node
```

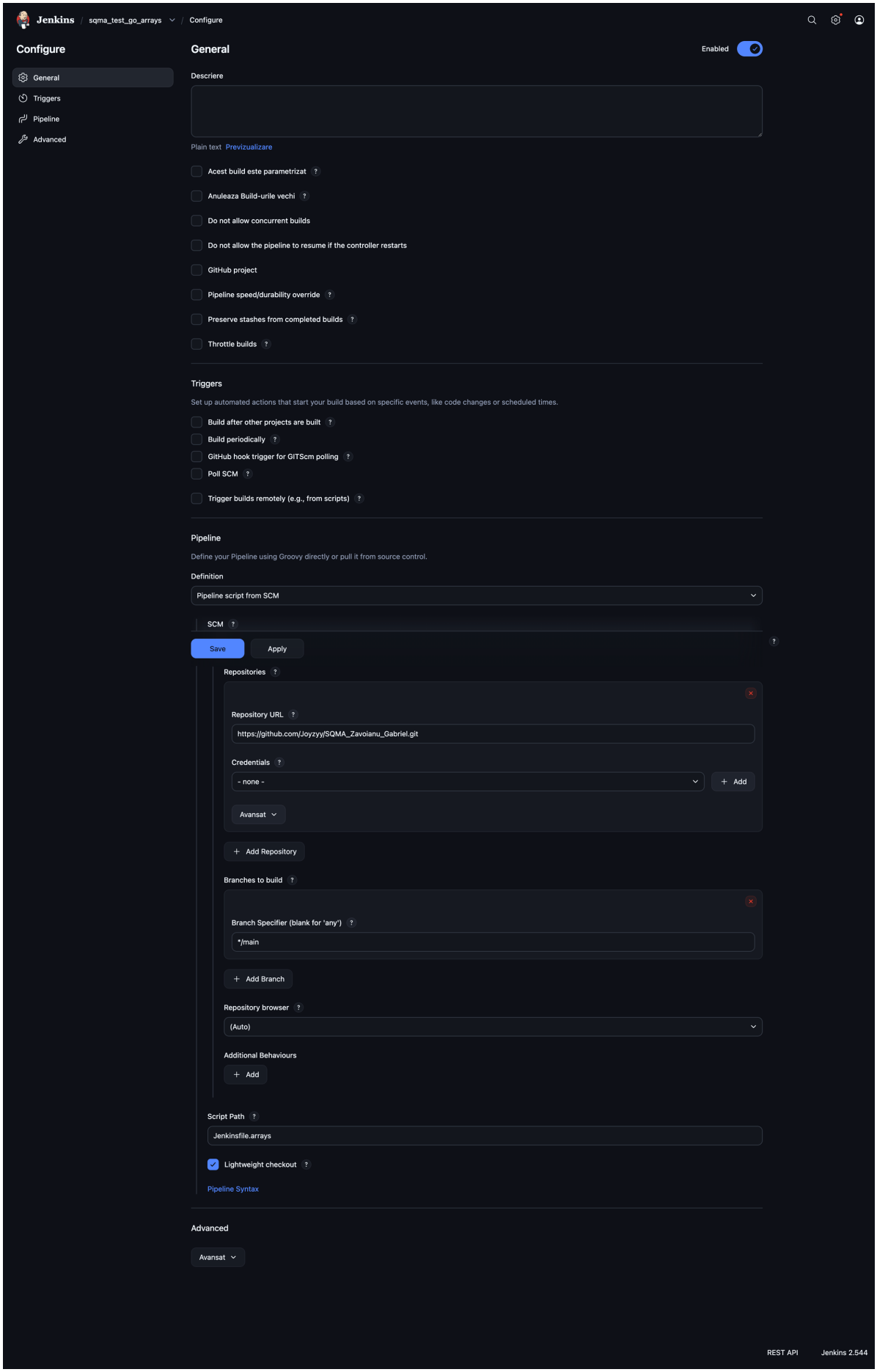
```
[Pipeline] End of Pipeline
Finished: SUCCESS
```

Same for subtraction test (truncated):

```sh
[Pipeline] sh
+ go test -v -count=1 -run ^TestSubtraction$
=== RUN   TestSubtraction
=== RUN   TestSubtraction/positive_numbers
=== RUN   TestSubtraction/negative_numbers
=== RUN   TestSubtraction/mixed_numbers
=== RUN   TestSubtraction/zero_values
=== RUN   TestSubtraction/with_zero
--- PASS: TestSubtraction (0.00s)
    --- PASS: TestSubtraction/positive_numbers (0.00s)
    --- PASS: TestSubtraction/negative_numbers (0.00s)
    --- PASS: TestSubtraction/mixed_numbers (0.00s)
    --- PASS: TestSubtraction/zero_values (0.00s)
    --- PASS: TestSubtraction/with_zero (0.00s)
PASS
ok      ism/sqma    0.001s
```

Task 2

For Task 2, I created a new test suite based off the *arrays.go* implementation. The test cases are: *arrays_test.go*. The Jenkinsfile associated with the build pipeline for the arrays test suite is *Jenkinsfile.arrays*. Here is the pipeline configuration in the Jenkins UI:

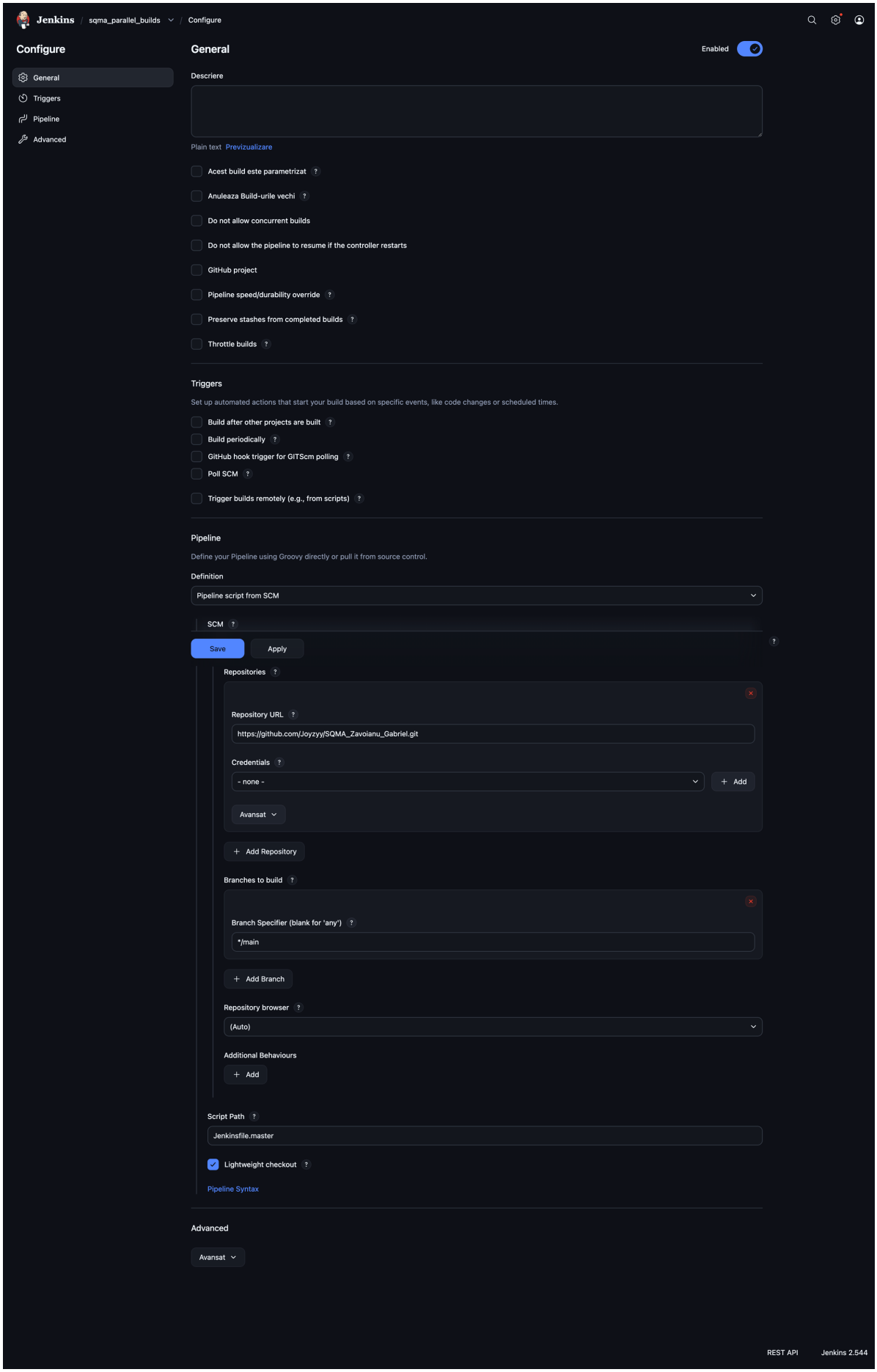

Jenkins / sqma_test_go_arrays / Configure
Configure
General
Triggers
Pipeline
Advanced
General
Enabled
Descriere
Plain text Previzualizare
Acest build este parametrizat
Anuleaza Build-urile vechi
Do not allow concurrent builds
Do not allow the pipeline to resume if the controller restarts
GitHub project
Pipeline speed/durability override
Preserve stashes from completed builds
Throttle builds
Triggers
Set up automated actions that start your build based on specific events, like code changes or scheduled times.
Build after other projects are built
Build periodically
GitHub hook trigger for GITScm polling
Poll SCM
Trigger builds remotely (e.g., from scripts)
Pipeline
Define your Pipeline using Groovy directly or pull it from source control.
Definition
Pipeline script from SCM
SCM
Save
Apply
Repositories
Repository URL
https://github.com/Joyzyy/SQMA_Zavoianu_Gabriel.git
Credentials
- none -
Add
Avansat
Add Repository
Branches to build
Branch Specifier (blank for 'any')
*/main
Add Branch
Repository browser
(Auto)
Additional Behaviours
Add
Script Path
Jenkinsfile.arrays
Lightweight checkout
Pipeline Syntax
Advanced
Avansat
REST API
Jenkins 2.544

And for fulfilling the parallel pipeline builds for this task I added the *Jenkinsfile.master* file that contains both pipelines running in parallel:

```yaml
pipeline {
    agent any

    stages {
        stage('Run all tests jobs') {
            parallel {
                stage('Math Operations Tests') {
                    steps {
                        build job: 'sqma_test_go'
                    }
                }
                stage('Arrays Tests') {
                    steps {
                        build job: 'sqma_test_go_arrays'
                    }
                }
            }
        }
    }
}
```

Here is the parallelized pipeline configuration in the Jenkins UI:


Jenkins / sqma_parallel_builds / Configure
Configure
General
Triggers
Pipeline
Advanced
General
Enabled
Descriere
Plain text Previzualizare
Acest build este parametrizat
Anuleaza Build-urile vechi
Do not allow concurrent builds
Do not allow the pipeline to resume if the controller restarts
GitHub project
Pipeline speed/durability override
Preserve stashes from completed builds
Throttle builds
Triggers
Set up automated actions that start your build based on specific events, like code changes or scheduled times.
Build after other projects are built
Build periodically
GitHub hook trigger for GITScm polling
Poll SCM
Trigger builds remotely (e.g., from scripts)
Pipeline
Define your Pipeline using Groovy directly or pull it from source control.
Definition
Pipeline script from SCM
SCM
Save
Apply
Repositories
Repository URL
https://github.com/Joyzyy/SQMA_Zavoianu_Gabriel.git
Credentials
- none -
Add
Avansat
Add Repository
Branches to build
Branch Specifier (blank for 'any')
*/main
Add Branch
Repository browser
(Auto)
Additional Behaviours
Add
Script Path
Jenkinsfile.master
Lightweight checkout
Pipeline Syntax
Advanced
Avansat
REST API
Jenkins 2.544

After running the parallelized pipeline, here is the result:

```sh
Started by user admin

Obtained Jenkinsfile.master from git
https://github.com/Joyzyy/SQMA_Zavoianu_Gabriel.git
[Pipeline] Start of Pipeline
[Pipeline] node
Running on Jenkins
 in /var/jenkins_home/workspace/sqma_parallel_builds
[Pipeline] {
[Pipeline] stage
[Pipeline] { (Declarative: Checkout SCM)
[Pipeline] checkout
Selected Git installation does not exist. Using Default
The recommended git tool is: NONE
No credentials specified
Cloning the remote Git repository
Cloning repository https://github.com/Joyzyy/SQMA_Zavoianu_Gabriel.git
 > git init /var/jenkins_home/workspace/sqma_parallel_builds #
timeout=10
Fetching upstream changes from
https://github.com/Joyzyy/SQMA_Zavoianu_Gabriel.git
 > git --version # timeout=10
 > git --version # 'git version 2.47.3'
 > git fetch --tags --force --progress --
https://github.com/Joyzyy/SQMA_Zavoianu_Gabriel.git
+refs/heads/*:refs/remotes/origin/* # timeout=10
 > git config remote.origin.url
https://github.com/Joyzyy/SQMA_Zavoianu_Gabriel.git # timeout=10
 > git config --add remote.origin.fetch
+refs/heads/*:refs/remotes/origin/* # timeout=10
Avoid second fetch
 > git rev-parse refs/remotes/origin/main^{commit} # timeout=10
Checking out Revision d8acb6a285ee071b81ae3e5caa2a83b19e822653
(refs/remotes/origin/main)
 > git config core.sparsecheckout # timeout=10
 > git checkout -f d8acb6a285ee071b81ae3e5caa2a83b19e822653 # timeout=10
Commit message: "arrays tests and parallel pipeline"
First time build. Skipping changelog.
[Pipeline] }
[Pipeline] // stage
[Pipeline] withEnv
[Pipeline] {
```

```
[Pipeline] stage
[Pipeline] { (Run all tests jobs)
[Pipeline] parallel
[Pipeline] { (Branch: Math Operations Tests)
[Pipeline] { (Branch: Arrays Tests)
[Pipeline] stage
[Pipeline] { (Math Operations Tests)
[Pipeline] stage
[Pipeline] { (Arrays Tests)
[Pipeline] build (Building sqma_test_go)
Scheduling project: sqma_test_go

[Pipeline] build (Building sqma_test_go_arrays)
Scheduling project: sqma_test_go_arrays

Starting building: sqma_test_go #4

Starting building: sqma_test_go_arrays #2

Build sqma_test_go_arrays #2
 completed: SUCCESS
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
Build sqma_test_go #4
 completed: SUCCESS
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // parallel
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```