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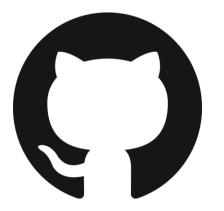
Github Actions CI

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Github Actions

- CI system developed by Github
- Fully hosted, including runner
- Uses yaml based configuration
- Well documented
- Community-driven plugins, so-called "actions"
  - ▶ integrated marketplace

Advantages

- Well documented
- Known by many developers
- Premade actions for almost everything
- No hosting required
- Free for non-commercial open source

Disadvantages

- Vendor lockin
  - ▶ Closed source runner
  - ▶ pre made options only available on github
- High pricing for large scale
- Requires code to be hosted on Github
- Runner runs on Github servers
  - ▶ Possible compliance problems (GDPR)
  - ▶ US Company $\Rightarrow$ CLOUD Act

High Level Workflow

1 Create yml file
  - ▶ `mkdir -p .github/workflows`
  - ▶ `touch .github/workflows/ci.yml`

2 Define when to run

3 define jobs with different steps. Including:
  - ▶ Checking out (getting) the code
  - ▶ Setting up the Environment
  - ▶ The actual work

Config Breakdown: When to Run

```
1    name: PCST Pipeline on Github
 1  on:
 2    push:
 3      branches: [ master ]
 4    pull_request:
 5      branches: [ master ]
```

- Defined by on:
- in our case:
  - ▶ On every master commit
  - ▶ On every pull request against master
- Is a list, can contain multiple branches

Config Breakdown: Build Job

```
jobs:
  build:
    name: Build Works
    runs-on: ubuntu-latest
    steps:
      - uses: actions/checkout@v3
      - name: Setup Maven Action
        uses: s4u/setup-maven-action@v1.13.0
      - name: Build with mvn
        run: mvn clean install
```
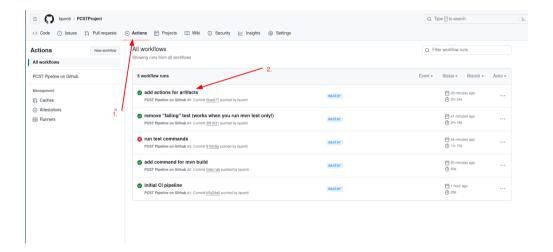
- Each bullet point is a step that runs one after another
- `actions/checkout` is a pre-made action by Github
  ▶ git checkouts the newest version of the repo
- `s4u/setup-maven-action` is a community action to install maven
- `run:` allows for arbitrary shell code execution
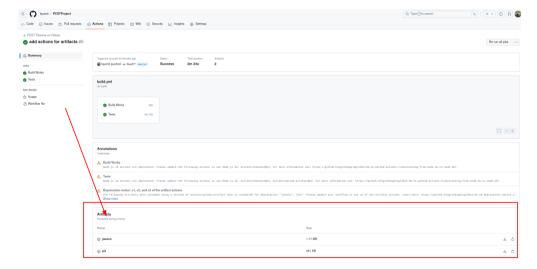
Config Breakdown: Test Job

```
test:
  name: Tests
  runs-on: ubuntu-latest
  steps:
    - uses: actions/checkout@v3
    - name: Setup Maven Action
      uses: s4u/setup-maven-action@v1.13.0
    - name: Run Junit tests (including integration tests and jacoco coverage)
      run: mvn test
    - name: Upload jacoco report
      uses: actions/upload-artifact@v3
      with:
        name: jacoco
        path: target/site/jacoco
    - name: Create Mutation coverage (pit)
      run: "mvn test compile org.pitest:pitest-maven:mutationCoverage"
    - name: Upload pit report
      uses: actions/upload-artifact@v3
      with:
        name: pit
        path: target/pit-reports
```

- Again: Checkout and Maven setup
- Run unit and integration test suite
  - Like in Terminal: `mvn test`
- Run Mutation test coverage with terminal command
- `actions/upload-artifact` is official action by GitHub
  - `with:` can be used to configure actions
  - `name:` defines name of the zip file
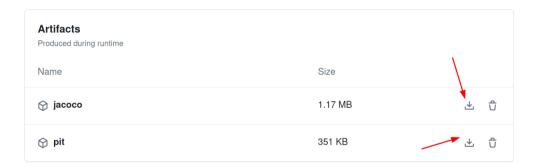 - `path:` defines where the to-be-zipped files are located

Artifacts

Artifacts

Artifacts

Artifacts
Produced during runtime

Name	Size		
⬡ **jacoco**	1.17 MB	⬇	🗑
⬡ **pit**	351 KB	⬇	🗑

Thanks for your attention!