

GitHub Actions Quick Reference

Workflows, triggers, jobs, secrets, caching, artifacts

Workflow Basics

Minimal Workflow

```
# .github/workflows/ci.yml
name: CI
on: push
jobs:
  build:
    runs-on: ubuntu-latest
    steps:
      - uses: actions/checkout@v4
      - run: echo "Hello from CI"
```

Key Concepts

Workflow	YAML file in <code>.github/workflows/</code> that defines automation
Event	Trigger that starts a workflow (push, PR, schedule, etc.)
Job	Set of steps that run on the same runner
Step	Individual task — runs a command or uses an action
Runner	VM that executes jobs (ubuntu-latest , macos-latest , windows-latest)
Action	Reusable unit of code referenced with uses :

Triggers

Common Events

```
on:
  push:
    branches: [main]
  pull_request:
    branches: [main]
  schedule:
    - cron: "0 6 * * 1" # every Monday 6 AM UTC
  workflow_dispatch: # manual trigger
```

Event Filters

branches:	Trigger only for specific branches
paths:	Trigger only when matching files change
tags:	Trigger on tag pushes (v*)
types: [opened, synchronize]	Filter PR activity types
branches-ignore:	Exclude specific branches
paths-ignore:	Exclude specific file paths

Jobs & Steps

Job Configuration

```
jobs:
  test:
    runs-on: ubuntu-latest
    needs: build # depends on build job
    if: github.ref == 'refs/heads/main'
    timeout-minutes: 10
    steps:
      - uses: actions/checkout@v4
      - run: npm test
```

Step Types

run:	Execute a shell command
uses:	Use a published action
with:	Pass inputs to an action
name:	Display name in the UI
id:	Reference step outputs via steps.<id>.outputs
if:	Conditional execution
continue-on-error: true	Don't fail the job if step fails

Actions

Using Actions

```
steps:
  - uses: actions/checkout@v4
  - uses: actions/setup-node@v4
    with:
      node-version: 20
  - uses: ./github/actions/my-action # local action
```

Popular Actions

actions/checkout@v4	Check out repository code
actions/setup-node@v4	Install Node.js
actions/setup-python@v5	Install Python
actions/upload-artifact@v4	Upload build artifacts
actions/download-artifact@v4	Download artifacts from another job
actions/cache@v4	Cache dependencies between runs
actions/github-script@v7	Run JS with the GitHub API client

Environment Variables

Setting Variables

```
env: # workflow-level
  NODE_ENV: production
jobs:
  build:
    env: # job-level
      CI: true
    steps:
      - run: echo "$MY_VAR" # step-level
        env:
          MY_VAR: hello
```

Default Variables

github.sha	Commit SHA that triggered the workflow
github.ref	Branch or tag ref (refs/heads/main)
github.repository	Owner/repo name
github.actor	User who triggered the workflow
github.event_name	Event that triggered the workflow
runner.os	Runner OS (Linux , macOS , Windows)

Secrets

Using Secrets

```
steps:
  - run: deploy --token "$TOKEN"
    env:
      TOKEN: ${ secrets.DEPLOY_TOKEN }
  - uses: some/action@v1
    with:
      api-key: ${ secrets.API_KEY }
```

Secret Rules

secrets.GITHUB_TOKEN	Auto-generated token scoped to the repo
Settings → Secrets	Add secrets in repo or org settings
Masking	Secret values are masked in logs automatically
Environment secrets	Scoped to a deployment environment
Org secrets	Shared across repos in an organization

Matrix Strategy

Matrix Builds

```
jobs:
  test:
    strategy:
      matrix:
        os: [ubuntu-latest, macos-latest]
        node: [18, 20]
    runs-on: ${ matrix.os }
    steps:
      - uses: actions/setup-node@v4
        with:
          node-version: ${ matrix.node }
```

Matrix Options

matrix:	Define variable combinations to expand
include:	Add extra combinations to the matrix
exclude:	Remove specific combinations
fail-fast: false	Continue other jobs if one fails
max-parallel: 2	Limit concurrent matrix jobs

Caching

Cache Dependencies

```
- uses: actions/cache@v4
  with:
    path: ~/.npm
    key: npm-${ hashFiles('package-lock.json') }
    restore-keys: npm-
```

Built-in Caching

```
- uses: actions/setup-node@v4
  with:
    node-version: 20
    cache: npm # auto-cache for npm/yarn/pnpm
- uses: actions/setup-python@v5
  with:
    python-version: "3.12"
    cache: pip # auto-cache for pip
```

Artifacts

Upload & Download

```
- uses: actions/upload-artifact@v4
  with:
    name: build-output
    path: dist/
    retention-days: 7
- uses: actions/download-artifact@v4
  with:
    name: build-output
```

Artifact Notes

retention-days	Auto-delete after N days (default 90)
path	File or directory to upload (supports globs)
Cross-job	Upload in one job, download in another with needs:
compression-level	0 (none) to 9 (max), default 6

Common Patterns

Conditional Deployment

```
- name: Deploy to production
  if: github.ref == 'refs/heads/main'
  run: ./deploy.sh
- name: Post PR comment
  if: github.event_name == 'pull_request'
  run: gh pr comment $PR --body "Build passed"
```

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Useful Expressions

<code>success()</code>	True if all previous steps passed
<code>failure()</code>	True if any previous step failed
<code>always()</code>	Run regardless of status (cleanup)
<code>cancelled()</code>	True if workflow was cancelled
<code>contains(github.ref, 'release')</code>	String contains check
<code>startsWith(github.ref, 'refs/tags')</code>	String prefix check
<code>hashFiles('**/lock*')</code>	SHA-256 of files (for cache keys)