Cairo University

Faculty of Engineering

Electronics and Electrical Communications Engineering

GitHub Actions

TIC TAC TOE

CI /CD PIPLINE DOCUMENTATION

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1_Introduction:

What is the CI/CD pipeline?

A CI/CD pipeline **(Continuous Integration and Continuous Deployment)** is an automated process that helps developers build, test, and deliver software more quickly and reliably.

- Continuous Integration (CI) means that every time a team member makes a change to the code, the new code is automatically checked, tested, and merged into the main codebase. This helps catch bugs early and keeps the project stable.
- Continuous Deployment (CD) means that after the code passes all tests and checks, it is automatically packaged and deployed (released) without manual steps. This makes it easy to deliver updates to users faster and reduces human errors.

A well-designed CI/CD pipeline ensures that software is always in a deployable state, saves developers time, and improves the overall quality of the project

2_CI/CD pipeline:

Our CI/CD Pipeline for Tic Tac Toe:

For our Tic Tac Toe game, we created a CI/CD pipeline using GitHub Actions, which automatically handles building, formatting, packaging, and releasing the project whenever we push new code or create a release tag.

Our pipeline consists of two main jobs: Build and Deploy.

1_Build job:

The Build Job runs every time we push changes to the repository or open a pull request. Its purpose is to make sure the code is correct, properly formatted, and successfully builds on Windows.

Main steps of the Build Job:

1. Checkout Code: Downloads the latest version of our project from GitHub.
2. Install Dependencies: Installs the Qt library (for the GUI) and clang-format (for code formatting).
3. Auto-format Code: Automatically formats all .cpp and .h files using clang-format, to follow Google C++ Style Guidelines that mentioned in our file. clang-format .
4. Commit Changes: If there are formatting changes, the job commits them back to the main branch automatically.
5. Build Project: Uses qmake and mingw32-make to compile the Tic Tac Toe game.
6. Package Qt Runtime: Uses windeployqt to include all necessary Qt files, so the game runs properly on any Windows machine.
7. Upload Build Artifact: Saves the built executable and related files as an artifact, which can be downloaded later.

2) Deploy Job

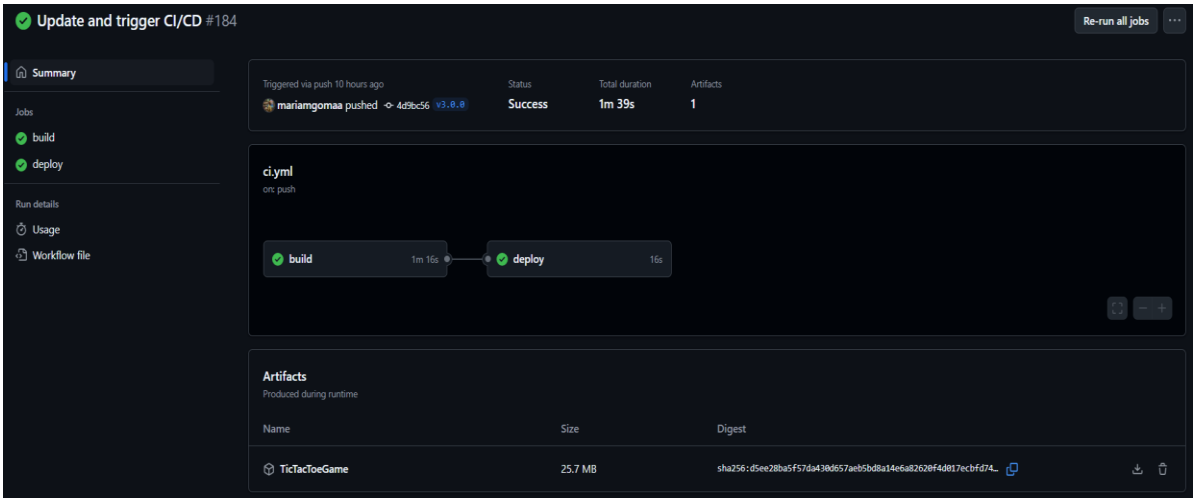
The Deploy Job runs when:

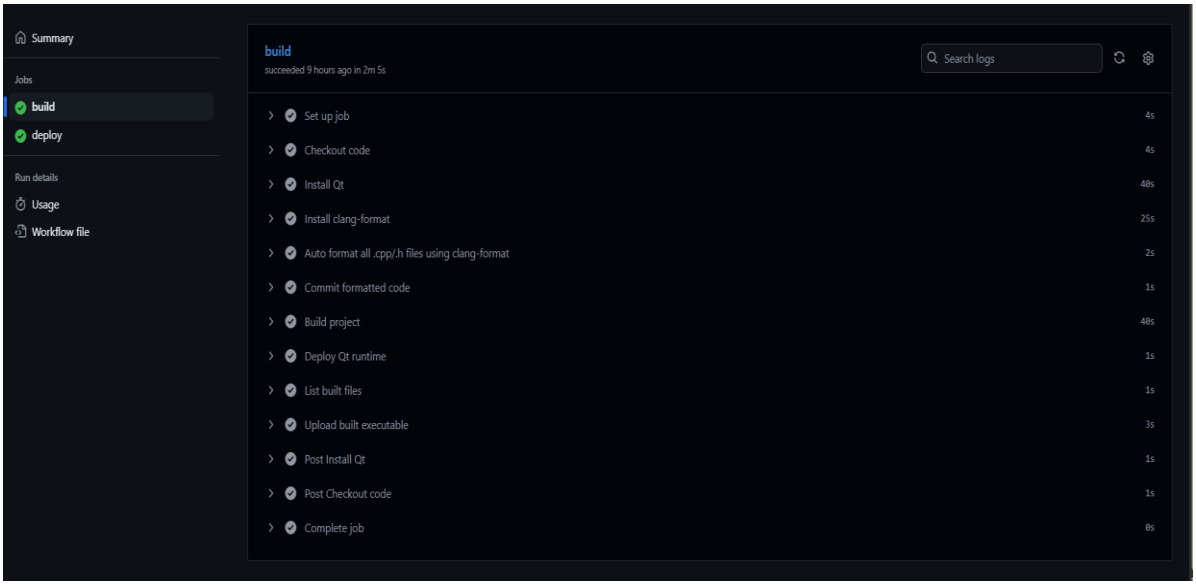
1. We push to a tag (to create a new version of release).

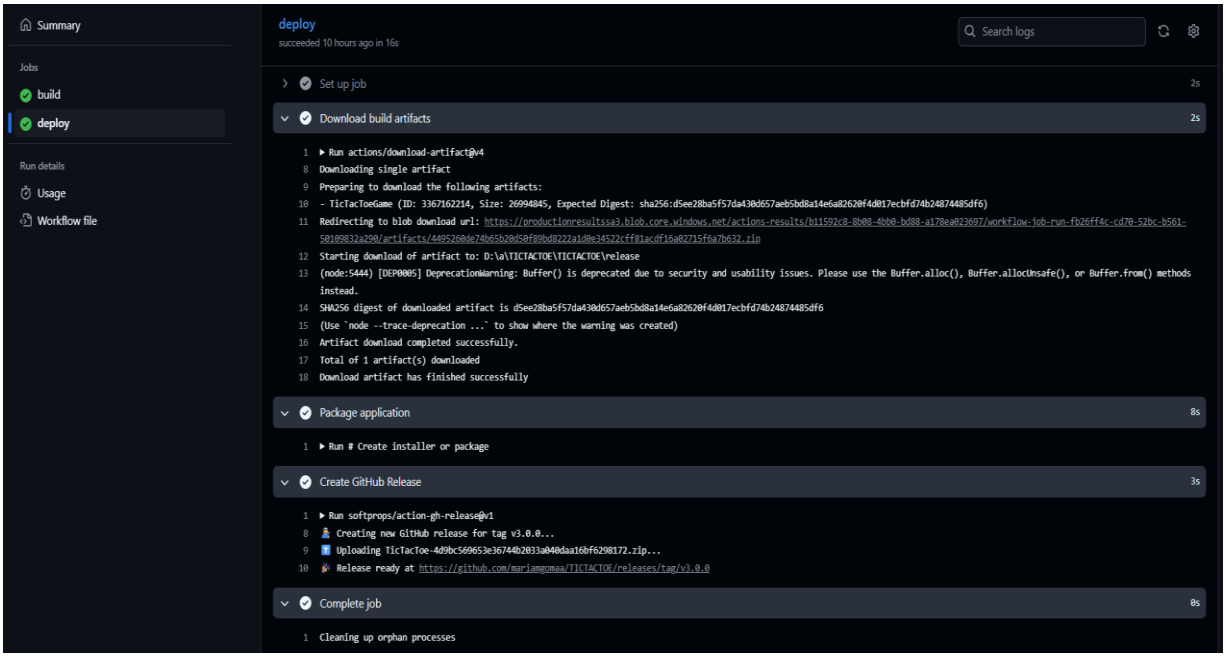
Main steps of the Deploy Job:

1. Download Build Artifact: Retrieves the executable built by the Build Job.
2. Create a Zip Package: Compresses the executable and its dependencies into a .zip file, named using the commit SHA to track the exact version.
3. Create a GitHub Release: If a tag is detected, the job automatically publishes a new GitHub Release and uploads the .zip file for users to download.

The following photos are screen shots from completed workflow build→deploy







Benefits of Our Pipeline

Our CI/CD pipeline helps us:

- Save time by automating repetitive tasks.
- Maintain consistent code style and high quality.
- Quickly deliver new updates to users.
- Minimize errors by testing builds automatically.