Homework 2: Continuous Integration to Automate Processes

cis-3500.github.io/docs/example/homeworks/homework-2/

In this second homework, we are going to introduce you to the continuous integration and deployment platform called GitHub Actions, that is available for free on public repositories, and with a student pack, on private repositories as well.

GitHub Actions allows you to a lot of things, and we are only going to touch the surface. We are going to show you:

- the general way GitHub Actions workflows are run (Part I);
- how to use GitHub Actions to automate the deployment of a Hugo website (Part II);
- how to purchase and use a domain name (Part III);
- how to use GitHub Actions to create a web scraper that runs periodically, also called a **git scraper** (Part IV).

With this lessons, you will learn two invaluable skills: How to publish information automatically, and how to collect information automatically.

> **Important Note:** You have the opportunity to earn extra credit by keeping a time log of your work. This log should include the time you spend on each part of the assignment, as well as any additional time you spend exploring and experimenting with Hugo. You can submit this log as a separate file in your repository, and it will be used to award extra credit based on the effort you put into the assignment.
>
> **To get started, create a copy of this Google Spreadsheet template, that you will submit a link to at the end.**

Learning Objectives

1. Learn how to use GitHub Actions for continuous integration and automation. This includes understanding YAML workflow configuration and using both predefined and custom actions.

2. Practice automating builds and deployment of a Hugo static site using GitHub Actions. Learn how CI/CD can simplify publishing updates.

3. Gain experience with configuring custom domains and DNS settings by purchasing and connecting a domain to GitHub Pages.

4. Understand principles of web crawling, web scraping, and “git scraping” using GitHub Actions. Explore ethical considerations in collecting web data.

5. Practice reading technical papers and documentation and summarizing key points. Develop skills in querying models like Claude for assistance.

6. Learn how to import repositories to safely experiment with changes to real-world projects. Practice configuring repository settings.

7. Gain experience providing documentation and software project metadata via high-quality READMEs, commit messages, etc.

8. Learn how to contribute feedback to improve software documentation using built-in GitHub features.

9. Develop familiarity with a variety of common tools like Hugo, NameCheap, GitHub Importer, etc. through hands-on use.

10. Practice communicating with AI assistants to explain technical concepts and summarize instructions. Improve query formulation skills.

General Note on Repositories

Throughout this course, for every homework:

- You should create a **public** repository in your **personal** GitHub account.
- When a specific name is provided (such as `github-actions-quickstart`), you should use that name for the repository.
- You should ensure that a `README.md` is present and contains minimal information about your project (title, description, author, etc.).
- You should ensure that the repository details are properly configured: The description, and if there is one, the homepage.

You should ensure that you have claimed the GitHub Student Developer Pack, which contains a number of benefits, including a free GitHub Pro account (which allows for private repositories) and GitHub Copilot.

Time Estimate, Deadlines and Milestones (6-14 hours)

This assignment has never yet been done by students, so the time estimates are based on the author’s experience with the tools and technologies involved. The time estimates are based on the assumption that you are completely new on every topic, but if you have some familiarity you may be much faster.

- **Part I:** GitHub Actions Quickstart (1 hour)

- **Part II:** Automating the Deployment of a Hugo Website (1-3 hours)
- **Part III:** Purchasing and Using a Domain Name (1-2 hours)
- **Part IV:** Git Scraping (3-8 hours)

The suggested deadline for this homework is **Friday Mar 15, 11:59 PM EST**. If you cannot meet this deadline, you can request an extension.

Part I: GitHub Actions Quickstart (`github-actions-quickstart`)

The objective in this first part is to familiarize yourself with the concept of GitHub Actions, by reading the documentation,

Step 1: Create a Public Repository

Create a public repository `github-actions-quickstart` in your GitHub account, and ask for a `README.md` file to be created as usual (to ensure that you can clone your repository).

> ⚠️ **Note**: Private repositories are not supported by GitHub Actions for free accounts. For this homework, this will not make a difference, because the repositories are public. However if you decide to use GitHub Actions in private repositories in the future, you will need to either upgrade to a student account or a paid account.

Step 2: Follow the GitHub Actions Quickstart

In this step, you will create a `.github/workflows/github-actions-demo.yml` file in your repository `github-actions-quickstart`.

Read and follow step-by-step the guide GitHub Actions Quickstart in your repository `github-actions-quickstart`.

Step 3: Ask Claude for Help with the GitHub Actions YAML File

In this step, you will create a `CLAUDE-GITHUB-ACTIONS-CONVERSATION.pdf` file in the root directory of your `github-actions-quickstart` repository.

Once you have completed the quickstart once, you will have a `.github/workflows/github-actions-demo.yml` file in your repository. This file is a YAML file that describes a GitHub Actions workflow. It is a configuration file that tells GitHub Actions how to run your code.

You can learn about the GitHub Actions syntax many ways, but in this step, we will explore how to get assistance with a foundational model. Anthropic's Claude is a high-quality, ethical and privacy-compliant conversation AI model that can help you understand the GitHub Actions YAML file.

- Go to Anthropic's Claude. Select the Google account option to login, and use your Penn Google login to authenticate. The Free tier should be enough to complete this assignment in one session.
- Copy-paste the GitHub Actions YAML file from the GitHub Actions Quickstart (**pro-tip:** rather than selecting and copying, you can use the copy-paste button ⧉which uses a glyph from the Octicon library) into Claude, and ask it to explain it to you line-by-line. {

  > **Pro-Tip**: Whenever you are writing a prompt that contains external material, it is a good idea to clearly separate your instructions from the external material, for instance:
  >
  > ```
  > Please explain the following GitHub Actions YAML file line-by-line:
  > """
  > name: GitHub Actions Demo
  > run-name: ${{ github.actor }} is testing out GitHub Actions 🚀
  > on: [push]
  > jobs:
  >   Explore-GitHub-Actions:
  >   ...
  > """
  > ```

- Ask Claude follow-up questions in case you don't understand something. As much as possible, attempt to **ask questions such that you would be able to answer all questions about the quickstart given only this conversation as a ressource**.
- Use **PrintFriendly** to print the conversation with Claude to a PDF file, and include it in the root directory of your `github-actions-quickstart` repository as `CLAUDE-GITHUB-ACTIONS-CONVERSATION.pdf`.

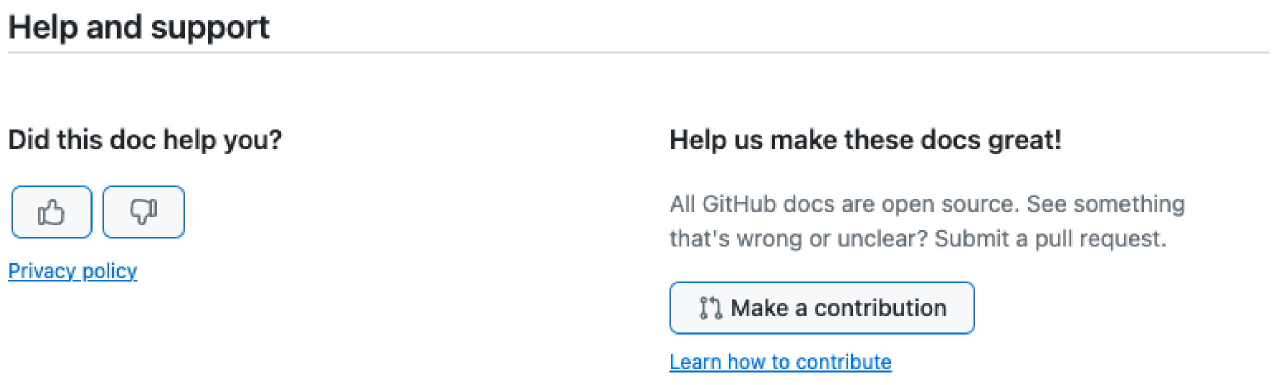
Step 4: Submit Feedback on the Documentation

In this step, you will create `FEEDBACK-1.png`, `FEEDBACK-2.png` files in the root directory of your `github-actions-quickstart` repository, as well as update your `README.md`.

The GitHub Actions Quickstart is a good example of the kind of documentation you will be reading extensively as a software engineer.

We have seen both the importance of having metrics for Quality Assurance (QA), but also how difficult it is to pick the right metrics. In the case of documentation, some metrics to measure quality, like the number of pages or the frequency of changes can be misleading or lead to adverse incentives. Instead, focusing on user ratings and feedback can provide more valuable insights.

In this step, you will experience the process of giving feedback. You can do so either by providing a positive/negative rating, along with feedback, or by making a direct contribution to the documentation. You can read more about this process in the corresponding blog article.



Help and support

Did this doc help you?

Privacy policy

Help us make these docs great!

All GitHub docs are open source. See something that's wrong or unclear? Submit a pull request.

Make a contribution

Learn how to contribute

As a newcomer, which is the target audience of this quickstart guide, did you find the guide clear? informative? Did it provide sufficient context, or references, to help you understand what you are doing? Were you able to follow the steps without any issues?

If the documentation was clear, don’t hesitate to click thumbs up. If not, don’t hesitate to click thumbs down and provide feedback.

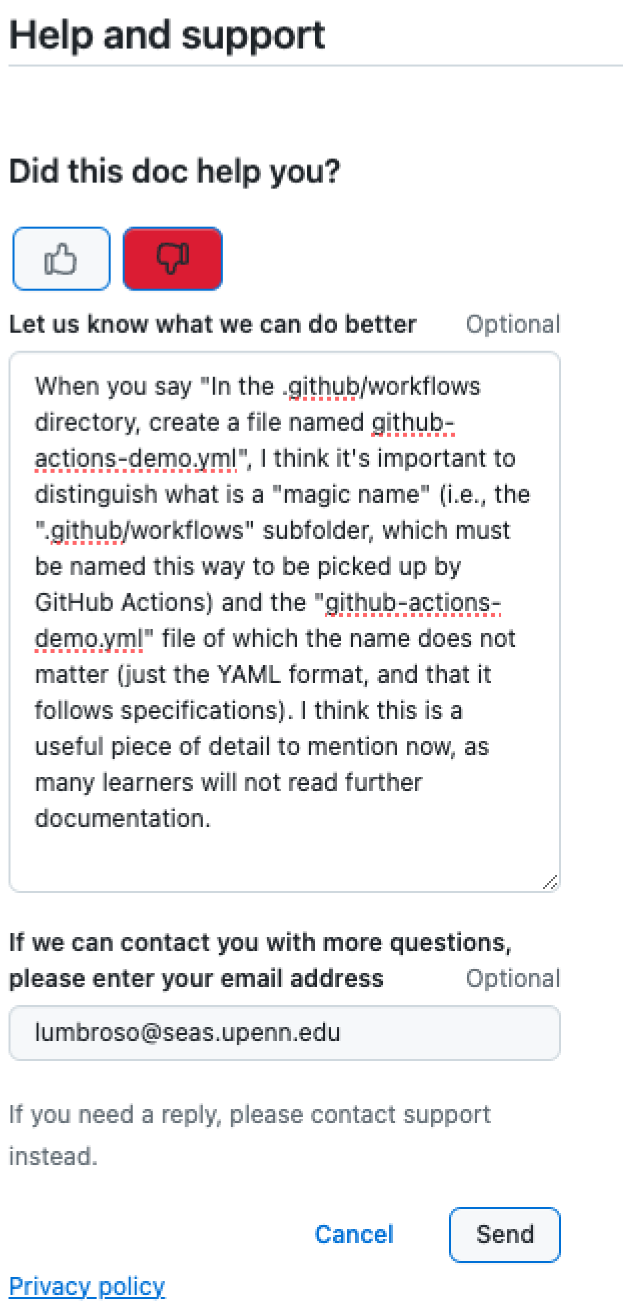
> Here are some examples:
>
> 1. Add more details or an example explaining when `${{ github.actor }}` and `${{ github.event_name }}` would be useful. As a new user, it’s unclear what these values represent.
> 2. Include screenshots demonstrating where the workflow results can be viewed after being triggered. The text describes clicking on various links, but visuals would make this clearer.
> 3. Provide troubleshooting tips in case the example workflow fails or runs into errors. New users may run into issues setting up workflows.
> 4. Consider simplifying the example by removing 1-2 echo steps and focusing on the core checkout and list files steps. There is a lot of output for a new user to parse.
> 5. Add a section linking to other introductory workflows for common tasks like building, testing, deploying etc. so users have next steps.
> 6. Provide more details on the different GitHub Actions concepts like jobs, steps, and runners that are mentioned briefly. Beginners will likely need more background.
> 7. Explain how to view previous workflow run history and access logs/output of those past runs.

Concretely:

- Enter feedback, either thumbs up or down, and a text note, then take a screenshot called `FEEDBACK-1.png` and include it in the root directory of your `github-actions-quickstart` repository.
  Also include the text note in the body of your `README.md` file.
- Click to submit the feedback, then take a screenshot called `FEEDBACK-2.png` and include it like the previous one in your repository.

For example:

`FEEDBACK-1.png`



Help and support

Did this doc help you?

Let us know what we can do better Optional

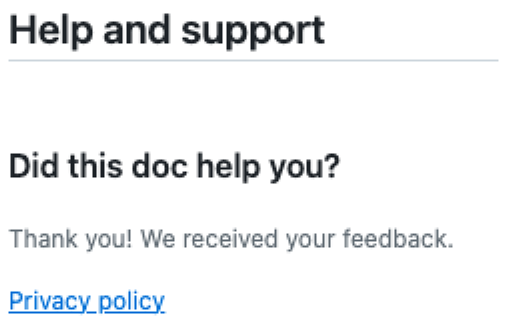
When you say "In the .github/workflows directory, create a file named github-actions-demo.yml", I think it's important to distinguish what is a "magic name" (i.e., the ".github/workflows" subfolder, which must be named this way to be picked up by GitHub Actions) and the "github-actions-demo.yml" file of which the name does not matter (just the YAML format, and that it follows specifications). I think this is a useful piece of detail to mention now, as many learners will not read further documentation.

If we can contact you with more questions, please enter your email address Optional

lumbroso@seas.upenn.edu

If you need a reply, please contact support instead.

`FEEDBACK-2.png`



Help and support

Did this doc help you?

Thank you! We received your feedback.

Part II: Automating the Deployment of a Hugo Website (`hugo-mock-landing-page-autodeployed`)

GitHub Actions allows us both to run arbitrary scripts, as illustrated in the quickstart, but also to use pre-built actions to automate common tasks. In this part, you will use GitHub Actions to automate the process of building and deploying the Hugo website you built in HW1.

These pre-built GitHub Actions cover a lot of scenarios. For example, Shohei Ueda is an open source developer who uses GitHub Actions to support static websites. He has created a GitHub Action called `peaceiris/actions-gh-pages` that automates the process of deploying the output of a static website generator to GitHub Pages.

Step 1: Import Your `hugo-mock-landing-page` Repository As `hugo-mock-landing-page-autodeployed`

Importing a repository creates a complete separate copy, with the identical version control history, that you can modify and experiment with, without affecting the original.

When modifying an existing repository, the best approach depends on your relationship to that project:

- If it is your own repository or one you contribute to, typically you would **create a new branch** to isolate your changes from the main codebase. Branches let you easily merge your work after review or testing.
- If it is an external project you don't contribute to, you would commonly **first fork the repository**, then create branches within your fork copy to manage distinct features. Forking links your repository as a downstream copy of the original for easily submitting changes.

However, if you are early in the learning process or otherwise less confident working directly in shared repositories, **importing a personal copy** can be very useful. Importing creates a **completely independent repository** that decouples you from any upstream coordination. This frees you up to safely experiment, revise, break, and retry approaches as you ramp up your Git skills. Importing removes the stress of accidentally impacting other users' code.

➡️ Read and follow the guide " Importing a repository with GitHub Importer" to import your `hugo-mock-landing-page` repository as `hugo-mock-landing-page-autodeployed`.

Step 2: Adjust the `baseURL` in the `config.toml` File

In the `hugo-mock-landing-page-autodeployed` repository, you will need to adjust the `baseURL` in the `config.toml` file to reflect the new repository name.

```
baseURL = 'https://<GitHub username>.github.io/hugo-mock-landing-page-autodeployed/'
```

If the configuration file is in `config.yaml` format, the `baseURL` will be in the following format:

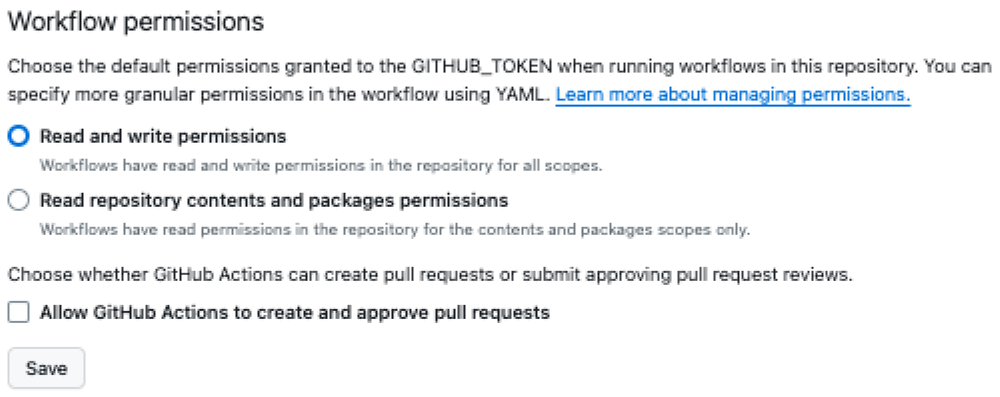
```
baseURL: 'https://<GitHub username>.github.io/hugo-mock-landing-page-autodeployed/'
```

Commit and push this change.

Step 3: Configure the Repository Settings

For complex security reasons, when a repository is created, the permissions are set to the most restrictive settings. This is a good thing, but it means that you will need to configure the repository settings to allow GitHub Actions to run.

➡️ You can follow the article " Configuring the default `GITHUB_TOKEN` permissions" to configure the default `GITHUB_TOKEN` to have **Read and write permissions**.


Workflow permissions

Choose the default permissions granted to the GITHUB_TOKEN when running workflows in this repository. You can specify more granular permissions in the workflow using YAML. Learn more about managing permissions.

[✓ Read and write permissions]
Workflows have read and write permissions in the repository for all scopes.

Read repository contents and packages permissions
Workflows have read permissions in the repository for the contents and packages scopes only.

Choose whether GitHub Actions can create pull requests or submit approving pull request reviews.

☐ Allow GitHub Actions to create and approve pull requests

➡️ Next, because we just created this repository, even if the source repository was published on GitHub Pages, we need to turn that setting back on. So set the publishing source to `gh-pages`.

➡️ Finally walk through the " Managing GitHub Actions permissions for your repository", to set the permissions for GitHub Actions to: **Allow all actions and reusable workflows**.

Step 4: Add a GitHub Actions Workflow to Automate the Deployment

➡️ Create a `.github/workflows/gh-pages-deployment.yaml` file in your `hugo-mock-landing-page-autodeployed` repository with the following content:

```
#######################################################
## Build and Deploy Hugo Website to GitHub Pages
## Author: Jérémie Lumbroso <lumbroso@seas.upenn.edu>
## Date: 2024-02-24
#######################################################

name: 🏗️ Build and Deploy GitHub Pages

on:
  push:
    branches:
      - main # Set a branch to deploy

jobs:
  deploy:
    runs-on: ubuntu-22.04
    steps:
      - name: 🔄 Check Out Source Repository
        uses: actions/checkout@v3.5.1
        with:
          submodules: true # Fetch Hugo themes (true OR recursive)
          fetch-depth: 0 # Fetch all history for .GitInfo and .Lastmod

      - name: 🛠️ Initialize Hugo Environment
        uses: peaceiris/actions-hugo@v2.6.0
        with:
          hugo-version: "0.123.4"
          extended: true

      - name: 🏗️ Compile Hugo Static Files
        run: hugo -D --gc --minify

      - name: 🚀 Publish to GitHub Pages
        uses: peaceiris/actions-gh-pages@v3.9.3
        with:
          github_token: ${{ secrets.GITHUB_TOKEN }}
          publish_branch: gh-pages
          user_name: "github-actions[bot]"
          user_email: "github-actions[bot]@users.noreply.github.com"
          ## NOTE: uncomment below if using a custom domain
          ## cname: mydomain.com
```

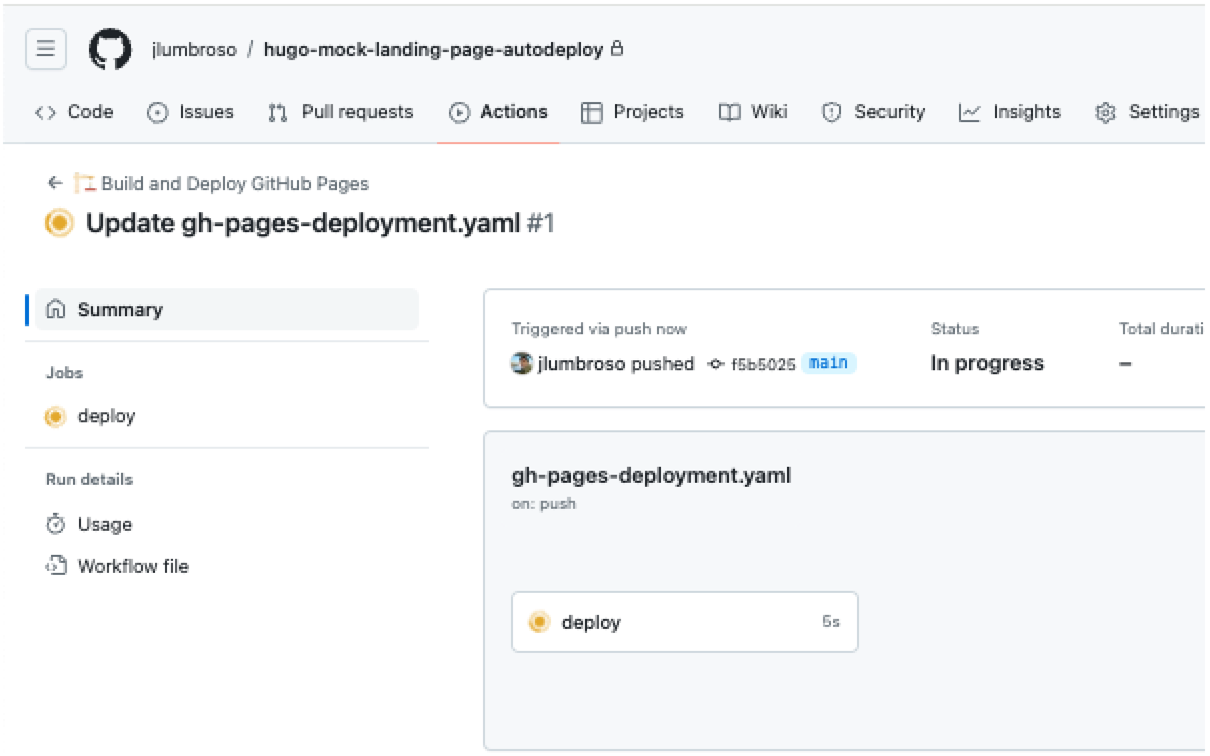
➡️ Commit and push the changes to your `hugo-mock-landing-page-autodeployed` repository.

Step 5: Ask Claude for Help with the GitHub Actions YAML File

As in Step 3 of Part I, you will use Claude to understand the GitHub Actions YAML file you just created. Using PrintFriendly, add the transcript as `github-actions-workflow-explanation.pdf` in the root directory of your `hugo-mock-landing-page-autodeployed` repository. Please commit and push this file.

Step 6: Check the Deployment of the Website

Having ensured that GitHub Actions is turned on in Step 3, you should now see the “Actions” tab in your repository. Having pushed the `.github/workflows/gh-pages-deployment.yaml` file in Step 4, you should see a new workflow running. (Sometimes the workflow is not launched on the first push, which is why we had you commit and push a file in the previous step, that would have also triggered a workflow of its own.)



Once the workflow is complete, you should be able to see the deployed website at `https://<GitHub username>.github.io/hugo-mock-landing-page-autodeployed/`.

> - It can take a few minutes for the website to be deployed. If you see a 404 error, wait a few minutes and try again.
> - If the workflow fails, one of the most likely answers is that **Read and write permissions** was not selected. Please review Step 2 carefully.
> - You can always rerun jobs.

Step 7: Make a Change to the Website and Check the Deployment

Make a change to the website and commit and push the change. This should trigger the GitHub Actions workflow again, and you should see the change reflected on the website.

For example, you could update the file `content/contact.md`. Since the website is no longer that of the original theme, users might want a convenient way to open an issue on the Github repository. Try changing the link to the theme repository to the following (be sure to replace jlumbroso with your Github username):

```
[Open an issue](https://github.com/jlumbroso/hugo-mock-landing-page-
autodeployed/issues/new) on GitHub.
```

Once you have made this change, commit and push, and double-check that the website is updated. You may need to force refresh the browser.

Step 8: Document What You Think Is Useful

Update the `README.md` file in your `hugo-mock-landing-page-autodeployed` repository to include a description of the workflow you just created. You can include parts of the transcript of the conversation with Claude (and include ask Claude or ChatGPT for help), and any other information you think is useful.

Part III: Purchasing and Using a Domain Name (`hugo-mock-landing-page-domain-name`)

In this part, you are going to spend a few dollars to buy a domain name, and then configure it to point to your GitHub Pages website. We are going to use NameCheap, which is a popular domain registrar, ranked #1 in 2024 by USNews.

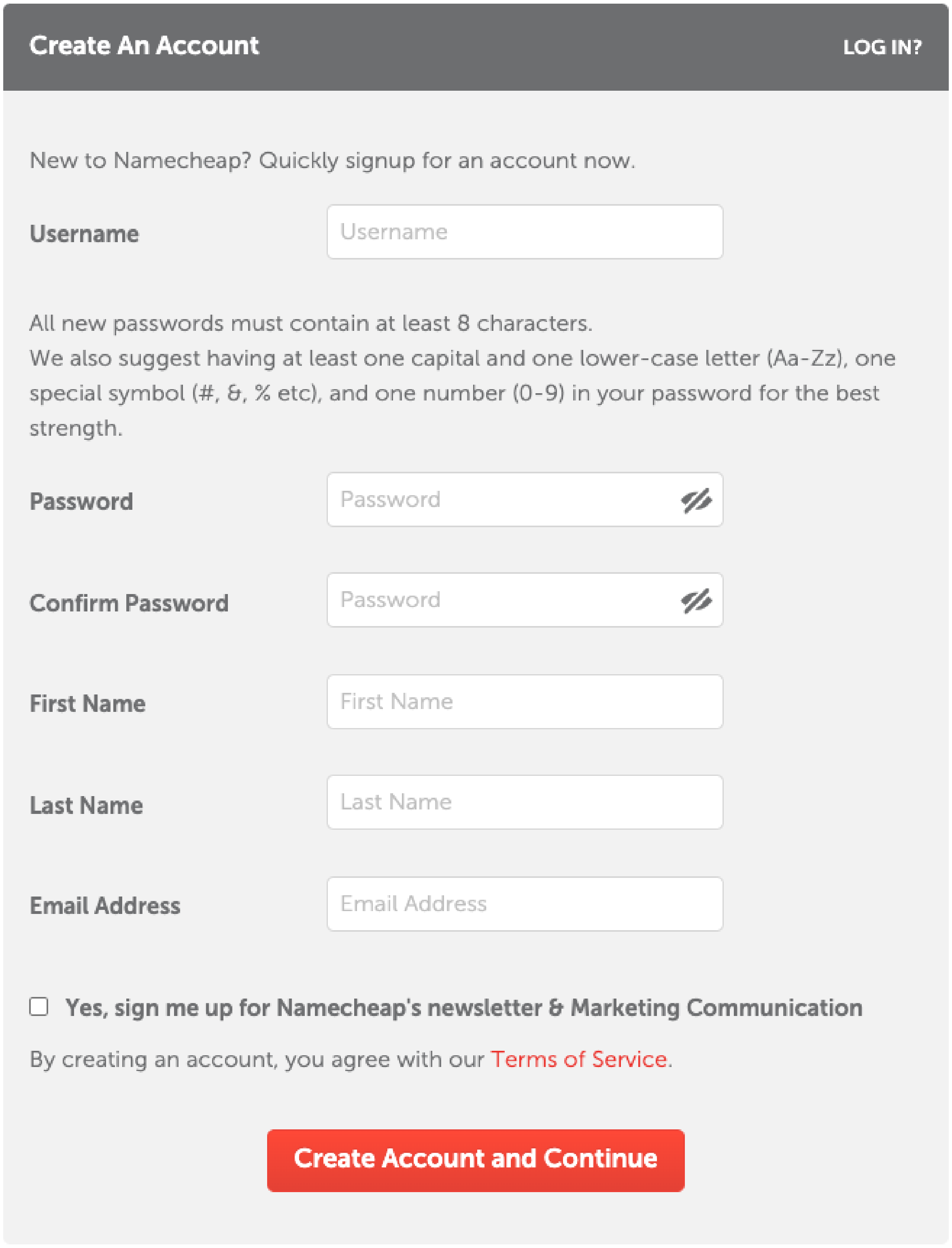
As previously, so that you keep the different versions of the website, we are going to import the repository and create a separate website. (Typically, you would just continue making updates to the same codebase.)

Step 1: Import Your `hugo-mock-landing-page-autodeployed` Repository As `hugo-mock-landing-page-domain-name` And Configure It

Walkthrough Step 1 through Step 3 of Part II, but this time, import your `hugo-mock-landing-page-autodeployed` repository as `hugo-mock-landing-page-domain-name`. Make sure to adjust the `baseURL` in the `config.toml` file to reflect the new repository name, and configure the repository settings to allow GitHub Actions to run.

Step 2: Buy a Domain Name on NameCheap

- Register an account on NameCheap



Create An Account

LOG IN?

New to Namecheap? Quickly signup for an account now.

Username	Username

All new passwords must contain at least 8 characters.
We also suggest having at least one capital and one lower-case letter (Aa-Zz), one special symbol (#, &, % etc), and one number (0-9) in your password for the best strength.

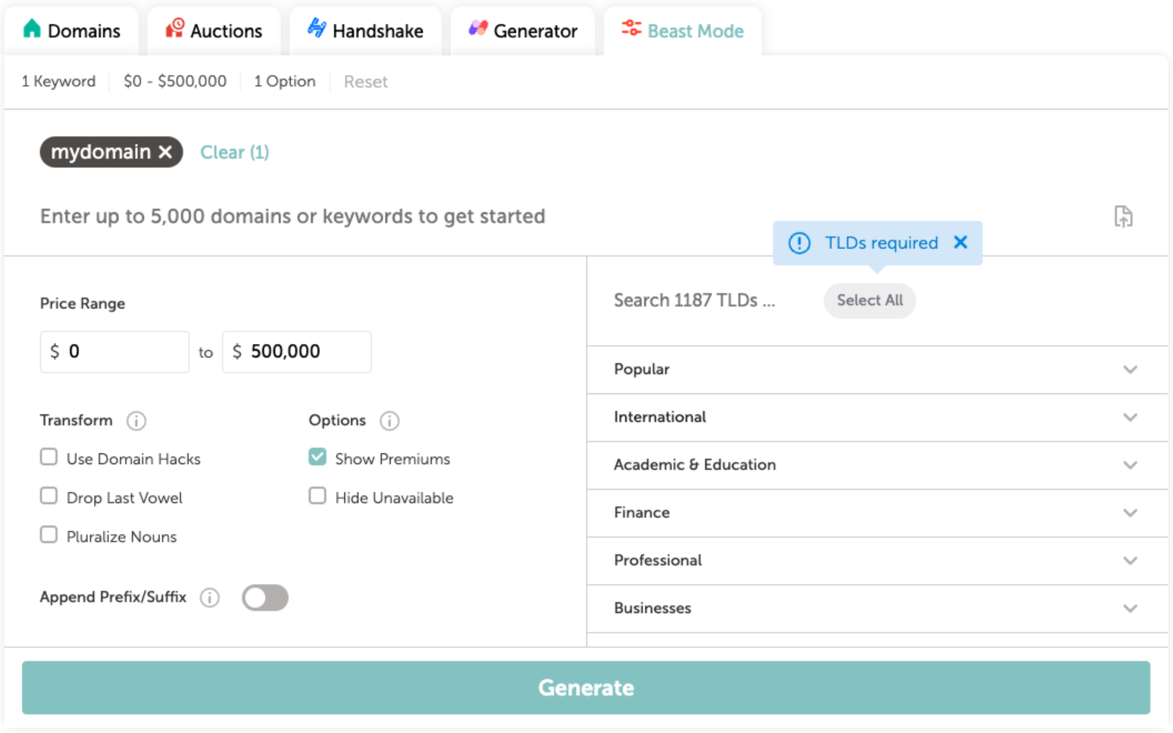
Password	Password
Confirm Password	Password
First Name	First Name
Last Name	Last Name
Email Address	Email Address

☐ Yes, sign me up for Namecheap's newsletter & Marketing Communication

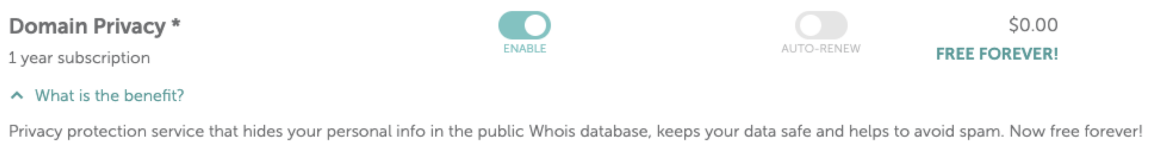
By creating an account, you agree with our Terms of Service.

Create Account and Continue

- Go to the Beast Mode domain search page. It is called this way because it searches across a large number of possible domain names. Enter a domain name you would like to purchase, click “Select All”, and click “Search”.



- Select the domain name you would like to purchase, and click “Add to Cart”. You can read more about how to buy a domain on NameCheap. At the time of purchase, `mydomain.boats` was $1.80, and there are many similarly priced domains.

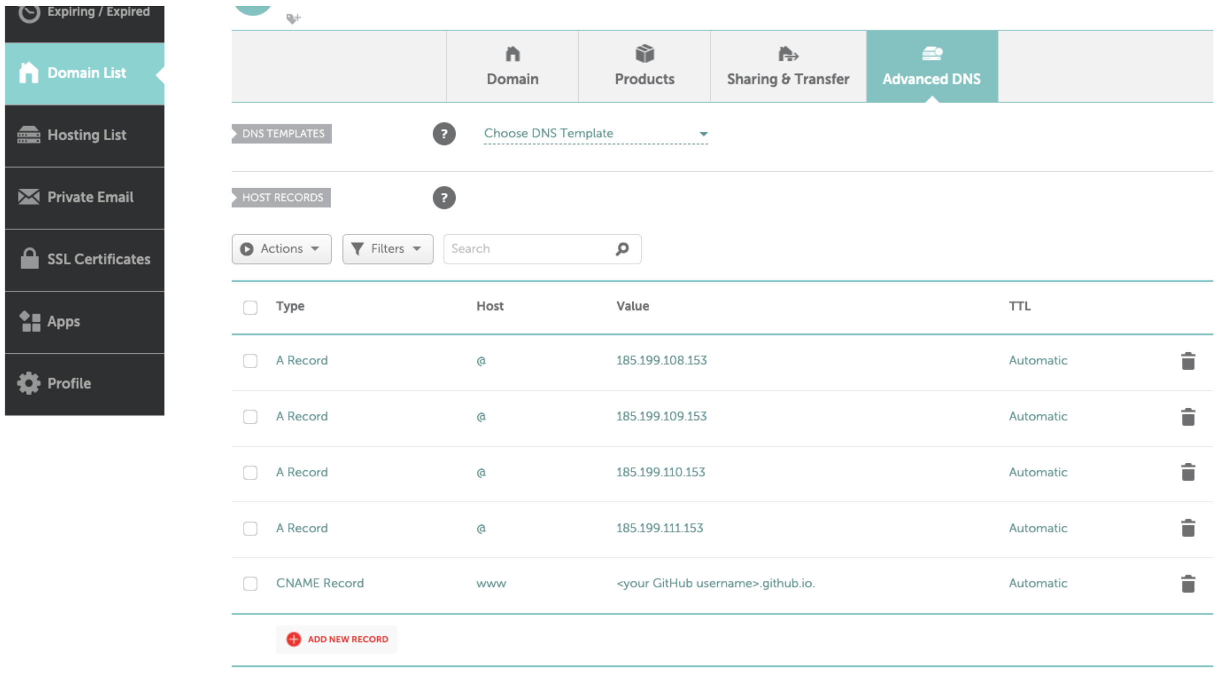
> Make sure to select **Domain Privacy Protection**. This is a service that hides your personal information from the public WHOIS database, which is a requirement of ICANN. It is a good idea to keep your personal information private. It is also a good idea to keep the **Auto-Renew** option on, so that you don’t lose your domain name.
>
> 
> Domain Privacy *
> 1 year subscription
> ENABLE
> AUTO-RENEW
> $0.00
> FREE FOREVER!
> What is the benefit?
> Privacy protection service that hides your personal info in the public Whois database, keeps your data safe and helps to avoid spam. Now free forever!

Step 3: Configure the Domain Name to Point to Your GitHub Pages Website

GitHub has an entire guide called “ Configuring a custom domain for your GitHub Pages site” that you can read to get better understanding.

We will try to summarize the instructions.

- Configure the DNS settings of your domain on NameCheap as in the screenshot (pay attention both to the type of record, such as A or CNAME, and the value of the record, such as the IP address or the domain name; also be careful **not to forget the period `.` at the end of the domain, it is important**):



Type	Host	Value	TTL
A Record	@	185.199.108.153	Automatic
A Record	@	185.199.109.153	Automatic
A Record	@	185.199.110.153	Automatic
A Record	@	185.199.111.153	Automatic
CNAME Record	www	<your GitHub username>.github.io.	Automatic

> These details are available in the section “ DNS records for your custom domain”.

- Next, edit the file `.github/workflows/gh-pages-deployment.yaml` in your `hugo-mock-landing-page-domain-name` repository to include the `cname` field, as in the following example:

```
## NOTE: uncomment below if using a custom domain
## cname: mydomain.com
```

to:

```
## NOTE: uncomment below if using a custom domain
cname: mydomain.boats
```

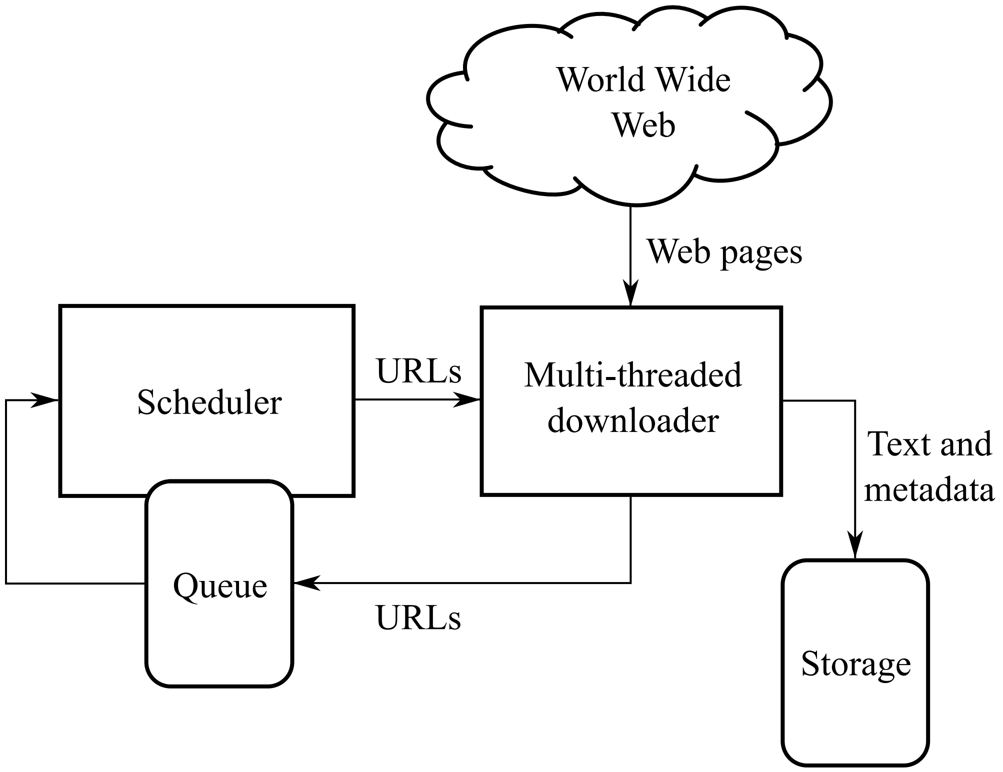
- Next configure your GitHub Pages deployment settings to have the domain, if this isn’t already done by the continuous integration, by following “ Configuring a subdomain”.

Part IV: Git Scraping (`daily-pennsylvanian-headline-scraper`)

In this part, we are going to use GitHub Actions to create a **web scraper** to keep track of the front page headline of the Daily Pennsylvanian every day. Typically this would be a preparatory step before doing some sort of Natural Language Processing (NLP) analysis on the headlines, but for now we are just going to store the headlines in a file.

Some Background on Web Crawling and Web Scraping (`daily-pennsylvanian-headline-scraper`)

Web crawling is the process of creating a snapshot of a portion of the visitable web: It consists of systematically browsing the World Wide Web, and recording a copy of every page visited. This is a very important concept in the context of search engines, which use web crawlers to index the web; in addition, through the Common Crawl, a non-profit organization that crawls the web and freely provides its archives and datasets to the public, web crawling is also used in research, data analysis, and to power foundation models such as ChatGPT.



Web scraping is one of the most important concepts in our modern information ecosystem: Web scraping is the process of extracting structured data from websites. This can be done manually, but it is often done using a program that simulates human web browsing, and extracts the data. Web scraping is used in a variety of contexts, including data analysis, data journalism, and more.

Finally, Git scraping is a term coined by Simon Willison to describe a technique for writing scrapers that are run periodically through GitHub Actions, and commit the data to a Git repository. This has the advantage of providing a historical record of the data, and also of making the data available to others.

Step 1: Familiarize Yourself With The Ethicality and Legality of Scraping

Read this recent scientific article (you may use Claude to help you summarize the key points, but I recommend you then look to read parts of the text for yourself if you do that). Additionally, read this recent legal judgement on web scraping, in which the Ninth Circuit upheld the right to scrape publicly available data.

In our case, we are going to scrape the front page of the Daily Pennsylvanian, which is a student-run newspaper at the University of Pennsylvania. The front page of the Daily Pennsylvanian is publicly available, and we are going to scrape only the headlines, which are also publicly available.

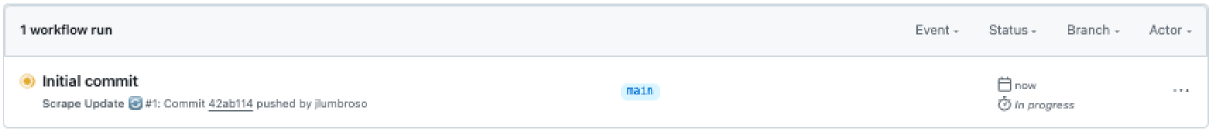
In addition, we our going to limit our scraping to once per day, and we are also going to respect the `robots.txt` file of the Daily Pennsylvanian website, which is a file that websites use to communicate to web crawlers which parts of the website they are allowed to scrape.

In doing so, we will be respecting the ethical and legal guidelines for web scraping.

Step 2: Create a New Repository `daily-pennsylvanian-headline-scraper`

Go to the `basic-git-scraper-template` template repository, and click "Use this template" to create a new repository `daily-pennsylvanian-headline-scraper` in your GitHub account.

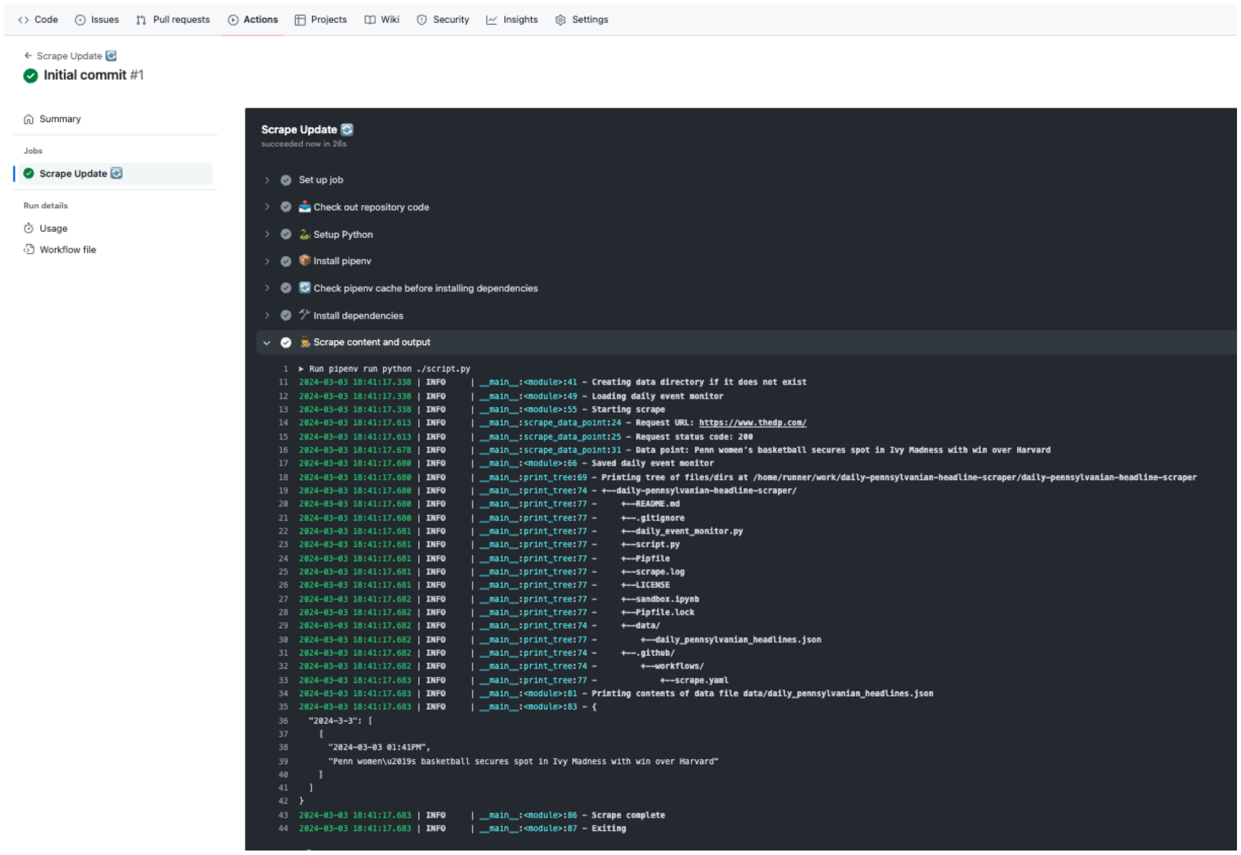
Once you have created your own repository, the “Actions” tab should be available, and when you click on it, you should be able to see an initial workflow in place:



1 workflow run — Event, Status, Branch, Actor

Initial commit
Scrape Update #1: Commit 42ab114 pushed by jlumbroso — main — now — In progress

If you click on the workflow, you should be able to see the logs of the workflow, and you expand any step such as the “Scrape content and output” (or similar) step:

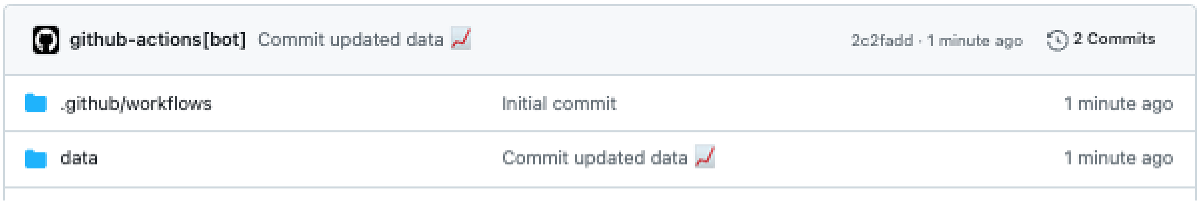


Scrape Update
succeeded now in 26s

- Set up job
- Check out repository code
- Setup Python
- Install pipenv
- Check pipenv cache before installing dependencies
- Install dependencies
- Scrape content and output

```
▶ Run pipenv run python ./script.py
2024-03-03 18:41:17.338 | INFO     | __main__:<module>:41 - Creating data directory if it does not exist
2024-03-03 18:41:17.338 | INFO     | __main__:<module>:49 - Loading daily event monitor
2024-03-03 18:41:17.338 | INFO     | __main__:<module>:55 - Starting scrape
2024-03-03 18:41:17.613 | INFO     | __main__:scrape_data_point:24 - Request URL: https://www.thedp.com/
2024-03-03 18:41:17.613 | INFO     | __main__:scrape_data_point:25 - Request status code: 200
2024-03-03 18:41:17.678 | INFO     | __main__:scrape_data_point:31 - Data point: Penn women’s basketball secures spot in Ivy Madness with win over Harvard
2024-03-03 18:41:17.680 | INFO     | __main__:<module>:66 - Saved daily event monitor
2024-03-03 18:41:17.680 | INFO     | __main__:print_tree:69 - Printing tree of files/dirs at /home/runner/work/daily-pennsylvanian-headline-scraper/daily-pennsylvanian-headline-scraper
2024-03-03 18:41:17.680 | INFO     | __main__:print_tree:74 - +--daily-pennsylvanian-headline-scraper/
2024-03-03 18:41:17.680 | INFO     | __main__:print_tree:77 -     +--README.md
2024-03-03 18:41:17.680 | INFO     | __main__:print_tree:77 -     +--.gitignore
2024-03-03 18:41:17.681 | INFO     | __main__:print_tree:77 -     +--daily_event_monitor.py
2024-03-03 18:41:17.681 | INFO     | __main__:print_tree:77 -     +--script.py
2024-03-03 18:41:17.681 | INFO     | __main__:print_tree:77 -     +--Pipfile
2024-03-03 18:41:17.681 | INFO     | __main__:print_tree:77 -     +--scrape.log
2024-03-03 18:41:17.681 | INFO     | __main__:print_tree:77 -     +--LICENSE
2024-03-03 18:41:17.682 | INFO     | __main__:print_tree:77 -     +--sandbox.ipynb
2024-03-03 18:41:17.682 | INFO     | __main__:print_tree:77 -     +--Pipfile.lock
2024-03-03 18:41:17.682 | INFO     | __main__:print_tree:74 -     +--data/
2024-03-03 18:41:17.682 | INFO     | __main__:print_tree:77 -         +--daily_pennsylvanian_headlines.json
2024-03-03 18:41:17.682 | INFO     | __main__:print_tree:74 -     +--.github/
2024-03-03 18:41:17.682 | INFO     | __main__:print_tree:74 -         +--workflows/
2024-03-03 18:41:17.683 | INFO     | __main__:print_tree:77 -             +--scrape.yaml
2024-03-03 18:41:17.683 | INFO     | __main__:<module>:81 - Printing contents of data file data/daily_pennsylvanian_headlines.json
2024-03-03 18:41:17.683 | INFO     | __main__:<module>:83 - {
  "2024-3-3": [
    [
      "2024-03-03 01:41PM",
      "Penn women\u2019s basketball secures spot in Ivy Madness with win over Harvard"
    ]
  ]
}
2024-03-03 18:41:17.683 | INFO     | __main__:<module>:86 - Scrape complete
2024-03-03 18:41:17.683 | INFO     | __main__:<module>:87 - Exiting
```

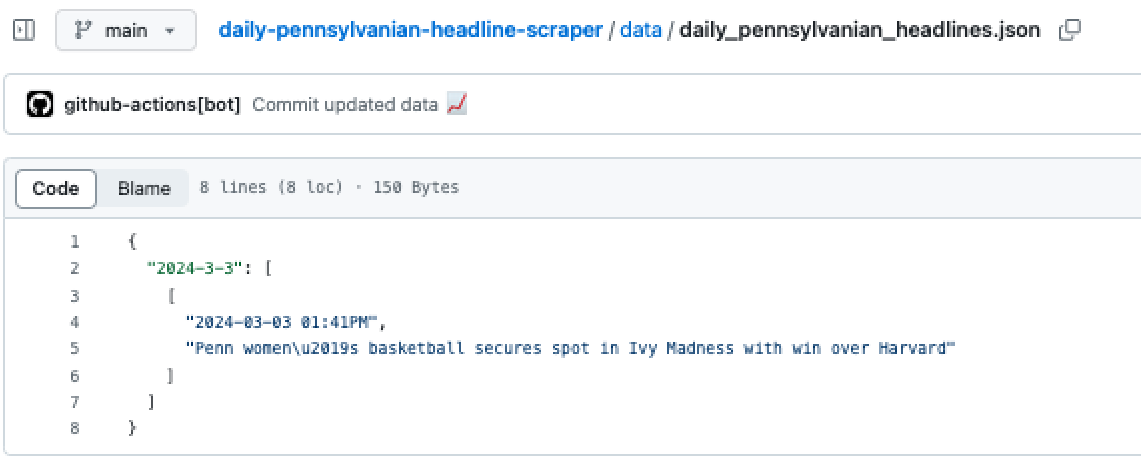
Once the initial workflow has run, if everything has worked correctly, you should be able to see the data file in the repository:



github-actions[bot] Commit updated data 📈 — 2c2fadd · 1 minute ago — 2 Commits

.github/workflows	Initial commit	1 minute ago
data	Commit updated data 📈	1 minute ago

And if you click on the data file, you should be able to see the data:


main
daily-pennsylvanian-headline-scraper / data / daily_pennsylvanian_headlines.json
github-actions[bot] Commit updated data
Code
Blame
8 lines (8 loc) · 150 Bytes

```
{
  "2024-3-3": [
    [
      "2024-03-03 01:41PM",
      "Penn women\u2019s basketball secures spot in Ivy Madness with win over Harvard"
    ]
  ]
}
```

Step 3: Understand How the Current Scraper Works

The current scraping happens in the file `script.py`, in the function `scrape_data_point`:

```
def scrape_data_point():
    """
    Scrapes the main headline from The Daily Pennsylvanian home page.

    Returns:
        str: The headline text if found, otherwise an empty string.
    """
    req = requests.get("https://www.thedp.com")
    loguru.logger.info(f"Request URL: {req.url}")
    loguru.logger.info(f"Request status code: {req.status_code}")

    if req.ok:
        soup = bs4.BeautifulSoup(req.text, "html.parser")
        target_element = soup.find("a", class_="frontpage-link")
        data_point = "" if target_element is None else target_element.text
        loguru.logger.info(f"Data point: {data_point}")
        return data_point
```

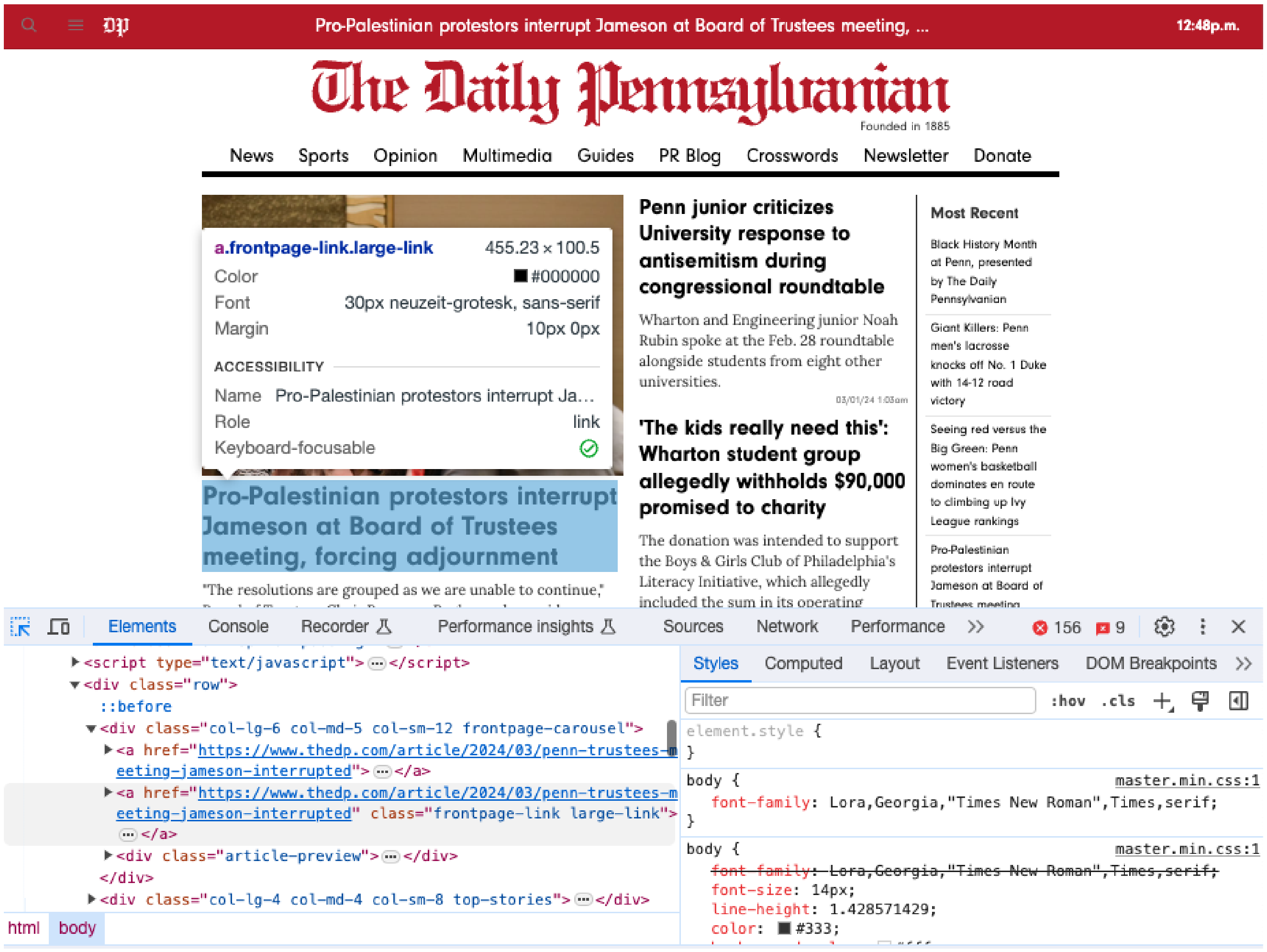
This function uses:

- the `requests` library to make the request;
- the `loguru` library to log the status of the request and the data point;
- the `beautifulsoup4` library to parse the HTML and extract the data point.

In the two lines here, it is looking for a link tag with `"frontpage-link"` as a class name, so `<a href="..." class="frontpage-link">...</a>`, and in the second step, if such an element has been found, it tries to extract the text inside the tag:

```
target_element = soup.find("a", class_="frontpage-link")
data_point = "" if target_element is None else target_element.text
```

The reason we are doing this is that when we went to the Daily Pennsylvanian website, by using the “Inspect” feature of the browser, which can be accessed in Chrome by right-clicking on the page and selecting “Inspect”, we saw that the main headline was in a link tag with the class name `"frontpage-link"`. This is a common way to structure a website, and it is a good way to structure a website, because it makes it easy to extract the data you want:



a.frontpage-link.large-link	455.23 × 100.5
Color	■ #000000
Font	30px neuzeit-grotesk, sans-serif
Margin	10px 0px
ACCESSIBILITY	
Name	Pro-Palestinian protestors interrupt Ja…
Role	link
Keyboard-focusable	✓

Pro-Palestinian protestors interrupt Jameson at Board of Trustees meeting, forcing adjournment

"The resolutions are grouped as we are unable to continue,"

Penn junior criticizes University response to antisemitism during congressional roundtable

Wharton and Engineering junior Noah Rubin spoke at the Feb. 28 roundtable alongside students from eight other universities.

03/01/24 1:03am

'The kids really need this': Wharton student group allegedly withholds $90,000 promised to charity

The donation was intended to support the Boys & Girls Club of Philadelphia's Literacy Initiative, which allegedly included the sum in its operating

Most Recent

Black History Month at Penn, presented by The Daily Pennsylvanian

Giant Killers: Penn men's lacrosse knocks off No. 1 Duke with 14-12 road victory

Seeing red versus the Big Green: Penn women's basketball dominates en route to climbing up Ivy League rankings

Pro-Palestinian protestors interrupt Jameson at Board of Trustees meeting

```
▶<script type="text/javascript">…</script>
▼<div class="row">
   ::before
  ▼<div class="col-lg-6 col-md-5 col-sm-12 frontpage-carousel">
    ▶<a href="https://www.thedp.com/article/2024/03/penn-trustees-m
     eeting-jameson-interrupted">…</a>
    ▶<a href="https://www.thedp.com/article/2024/03/penn-trustees-m
     eeting-jameson-interrupted" class="frontpage-link large-link">
     …</a>
    ▶<div class="article-preview">…</div>
   </div>
  ▶<div class="col-lg-4 col-md-4 col-sm-8 top-stories">…</div>
```

```
element.style {
}
body {                                                  master.min.css:1
  font-family: Lora,Georgia,"Times New Roman",Times,serif;
}
body {                                                  master.min.css:1
  ~~font-family: Lora,Georgia,"Times New Roman",Times,serif;~~
  font-size: 14px;
  line-height: 1.428571429;
  color: ■ #333;
```

When the process runs over several days, it can collect data and let us know when and how the headline changes:

```
{
  "2024-3-3": [
    [
      "2024-03-03 01:41PM",
      "Penn women\u2019s basketball secures spot in Ivy Madness with win over
Harvard"
    ]
  ],
  "2024-3-4": [
    [
      "2024-03-04 03:02PM",
      "Penn women\u2019s basketball secures spot in Ivy Madness with win over
Harvard"
    ]
  ],
  "2024-3-5": [
    [
      "2024-03-05 03:02PM",
      "Penn women\u2019s basketball secures spot in Ivy Madness with win over
Harvard"
    ]
  ],
  "2024-3-6": [
    [
      "2024-03-06 03:02PM",
      "Penn men's squash wins first national championship with victory at Potter Cup"
    ]
  ],
  "2024-3-7": [
    [
      "2024-03-07 03:02PM",
      "Penn extends test-optional policy for Class of 2029 while some Ivies reinstate
testing requirement"
    ]
  ]
}
```

So for instance, scraping headlines could be useful in the context of a project seeking to analyze: **What proportion of the Daily Pennsylvanian headlines are about sports versus academics?** or **How often does the headline change?**

➡️ Before continuing onto the next steps, make sure you understand how the current scraper works. If you would like, you can use Claude or ChatGPT to explain the code to you, and you can include the transcript in a file called `INITIAL-SCRAPER-EXPLANATION.pdf` in the root directory of your `daily-pennsylvanian-headline-scraper` repository.

Step 4: Modify the Scraper's Rule and Explain What You Did

The current scraper is scraping the main headline from the Daily Pennsylvanian home page. However, the main headline is not always the most interesting headline.

Here are some examples you might consider, but it's much better if the idea comes from you, this is just to get your inspiration going:

1. Scrape the top headline from the "Featured", "News", "Sports", "Opinion" section on the homepage. Look for a specific CSS class or HTML structure unique to that section.

2. Scrape the top headline from the "News", "Sports", "Opinion" pages, which provide a full list of articles. Look for a specific CSS class or HTML structure unique to that section.

3. Navigate to the "Multimedia" page (https://www.thedp.com/multimedia) and scrape the headline of the latest video or photo story.

4. Scrape the #1 most read article from the "Most Read" list at the bottom of the homepage. You'll need to find the CSS selector or HTML element that identifies the top most read story.

5. Navigate to the "Podcasts" page (https://www.thedp.com/section/podcasts) and scrape the title of the most recent podcast episode.

6. Scrape the featured headline from one of the other DP publications, such as "34th Street Magazine" or "Under the Button", which are linked on the homepage.

Remember to carefully inspect the HTML structure of the target elements on The Daily Pennsylvanian website and adjust the scraper's rule accordingly. You may need to update the CSS selectors or navigation logic in the `scrape_data_point()` function to accommodate the new scraping requirements.

After modifying the scraper, provide a clear explanation of the changes you made and the reasoning behind your chosen approach in your `README.md`. This will demonstrate your understanding of the scraping process and your ability to adapt the scraper to different use cases.

> Some of the possibilities may require making multiple requests. For instance, if you would like to scrape information about the Daily Crosswords, it is necessary to:
>
> - First, make a request to the Crosswords page to get the URL of the latest crossword.
> - Then, make a request to the URL of the latest crossword to get the title of the crossword.
>
> This would be a very interesting project, but it is one step more complex than the simple examples mentioned above.