**09 – Project Work**

COMP290 – Large-scale and Open Source Software Development

Dickinson College

Spring 2023

**Introduction:**

At this point you have developed the fundamental skills and knowledge required to make technical contributions to the FarmData2 project. You have learned:

* how sub-tabs are added to the FarmData2 inside the farmOS user interface.
* some HTML, JavaScript and Vue.js.
* about web APIs, how to use the farmOS API and the FarmData2 convenience methods.
* how to create end-to-end tests using Cypress.
* how to add custom Vue Components to a page and how to access them in tests.

During the remainder of the semester, you will work on issues that are of value to the FarmData2 project. You will be working as part of a team but will also be responsible for demonstrating your individual efforts in several ways. The sections below provide additional details about these team and individual components.

**Project Activities and Deliverables:**

Your team and individual effort during this project work will be assessed based on the following activities and deliverables:

* **FarmData2 Contributions:** Teams will collaboratively produce, test, revise and contribute code that addresses FarmData2 issues.
* **Team Meetings:** Class time will be allocated (weekly or bi-weekly announced in the prior class) for meetings between the team and the instructor.
* **WiD Assignment:** Each individual will complete a Writing in the Discipline (WiD) assignment for this course.
* **Final Team Presentation:** Each team will give a final presentation of their project work.

More details on each of these activities and deliverables is given in the sections below.

The details of how these activities and deliverables factor into individual grades for the course is detailed in the course syllabus for your section.

**FarmData2 Contributions:**

Teams will collaboratively produce, test, revise and contribute code that addresses FarmData2 issues.

In doing so Teams will gain additional experience with software project *workflows*. Teams will use the *Forking Workflow* introduced in COMP190 when learning about git and GitHub to make contributions to FarmData2. This workflow used by most open source projects and is also the process described in FarmData2’s CONTRIBUTING.md document. Internally, teams will use a modified *Feature Branch Workflow* to support small group collaboration and provide team members with experience resolving merge conflicts and making pull requests.

These workflows are outlined in the sub-sections below and will have been discussed in class. The following links are provided for reference if you would like to read more:

* Forking Workflow:
  + <https://www.atlassian.com/git/tutorials/comparing-workflows/forking-workflow>
  + FarmData2 CONTRIBUTING.md:
    - <https://github.com/DickinsonCollege/FarmData2/blob/main/CONTRIBUTING.md>
* Feature Branch Workflow:
  + <https://www.atlassian.com/git/tutorials/comparing-workflows/feature-branch-workflow>)

*1. Setting up the Forking Workflow:*

The team should setup the Forking Workflow by doing the following:

1. Have one team member create a free GitHub organization for the team.

* <https://docs.github.com/en/organizations/collaborating-with-groups-in-organizations/creating-a-new-organization-from-scratch>

1. Invite all team members to be **owners** of the organization.

* <https://docs.github.com/en/organizations/managing-membership-in-your-organization/inviting-users-to-join-your-organization>

1. Fork the FD2School-FarmData2 repository into the organization.

* <https://docs.github.com/en/get-started/quickstart/fork-a-repo#forking-a-repository>

1. Have all team members clone the FD2School-FarmData2 repository onto their host machine (MacOS or WSL in Windows).
   1. Copy the URL of the repo in your team’s organization using the green “Code” button.
   2. In a terminal in the host OS (MacOS or WSL in Windows) use the commands.

cd ~  
git clone <repo url> COMP290-FarmData2  
cd COMP290-FarmData2  
git remote add upstream https://github.com/DickinsonCollege/FD2School-FarmData2.git

* 1. Now when starting FarmData2, be sure to be in the directory for your new COMP290-FarmData2 repo when you use the ./fd2-up.bash command.

*2. Find and Understand Your Team’s Issue:*

In class your team will have been assigned a “Good First Issue” to begin working on. The team should:

1. Visit the Issue tracker in the FD2School-FarmData2 upstream repository.
2. Find the “Good First Issue” ticket that has been assigned to your team.
3. All team members should comment on the issue ticket indicating that they will be working on it. This will allow the instructor to assign the issue to your team members.
4. Read your issue ticket and understand what it is asking your team to do.
5. Discuss the issue among your team and develop a strategy for addressing it.
6. If you have questions or want clarification, post a comment on the issue ticket and your instructor or another FarmData2 community member will respond with additional information.

*3. Work Using the Modified Feature Branch Workflow:*

When your team understands its issue and is ready to begin working, you will be using the modified feature branch workflow. The following steps describe what your team should be doing to follow this workflow:

1. Synchronize your main branch with the upstream.
2. Create a new feature branch based on main with a short but descriptive name for your team’s work on the issue in the FD2School-FarmData2 repository in your team’s organization.
3. Have all team members *fetch* a copy of the new feature branch into their local repositories.

git fetch origin <branchname>

git switch <branchname>

1. All team members should work on the issue using the modified feature branch workflow described in class.
   * Be sure to follow the suggestions from class for minimizing merge conflicts.
   * Be sure that commits include a descriptive commit message. You can use multiple lines in your commit messages if a longer description is needed:
     + <https://levelup.gitconnected.com/how-to-commit-multiline-messages-in-git-commit-bcd76f81919c>
   * Be sure to use a co-authored commit if you have collaborated with a teammate on the code in that commit.
     + <https://docs.github.com/en/pull-requests/committing-changes-to-your-project/creating-and-editing-commits/creating-a-commit-with-multiple-authors#creating-co-authored-commits-on-the-command-line>
2. When one team member has pushed a commit to the feature branch on the origin the team should make a Draft Pull Request for the feature branch to the upstream. The pull request body should describe the work that is being done and contain, on its own line, the statement:  
     
    Closes #xx   
     
   where xx is the number of the issue ticket on which the team is working.
3. The team members should continue working on the issue, being sure to pull, merge changes from their teammates, resolve conflicts and push their own commits to the origin on a regular basis.
4. If clarifications are needed or questions arise members of the team should comment on:
   * the issue ticket, if the question is about the issue to be addressed.
   * the pull request, if the question is about the specific code that is in the draft pull request.

*4. Pull Request to Upstream:*

When a team believes that it has fully addressed its assigned issue it should:

1. Conduct at code review as a team to ensure that:

* All code is neat and consistently indented and aligned.
* Variable and function names are concise, consistent, and meaningful.
* Any code or output added for debugging or incremental development steps has been removed.
* Any unused variables, code or functions have been removed.
* All commented out code has been removed.

1. Convert the pull request from a draft pull request to a full pull request. One team member should add a comment to the PR saying that it is ready for review and tag the instructor.
2. Move to step 5 (below), but also be responsive to any comments received on the PR. For example, if the instructor requests changes to the code the team should stop work on other issues and return to make the requested changes and push them to update the PR.

Note that if the team’s PR is of high quality, it will then also be considered for merging into the upstream FarmData2 project - which looks good on a resume!

*5. Repeat:*

While you are waiting for feedback on your PR or if it has been merged, the team should begin work on another issue. The team should:

1. Review the Issue Tracker looking at tickets that are labeled as “Good Second Issue.” Or if your team has already completed a “Good Second Issue” then look for another ticket that is not labeled as “Good First Issue” or “Good Second Issue.”
2. Go Back to step 2.3.

**Team Meetings:**

When a class period includes Team Meetings, the instructor will meet with each team for 10-15 minutes during the designated class time. During this time the team is expected to discuss:

* what each team member has accomplished since the prior meeting.
* demonstrate the progress that has been made since the prior meeting.
* describe any challenges that are currently being faced by the team.

**Writing in the Discipline (WiD):**

The ability to pose well-formed technical questions using on-line tools (e.g. Issue Trackers and forums) is a valuable skill for software developers and computer scientists. You have certainly come across questions on sites like Stack Overflow that receive lots of answers and other that receive none. What makes the difference between a question that gets an answer and one that does not is often how the question is written. Writing concise questions that contain the information others need in order to quickly understand the question and give an accurate answer highly increases the likelihood of getting an answer and of getting the answer you are looking for. Experience also suggests that asking that first question is the hardest!

Thus, to give you some practice and to break that first question anxiety, the Writing in the Discipline (WiD) assignment for this course is to:

1. Post at least one technical question on:

* an issue that your team is working on to the issue tracker in the FD2School\_FarmData2 issue tracker.
* a Pull Request that your team has submitted as part of its work.

1. Follow up on any comments, questions, or requests for additional information that are posted in response to your question.
2. Post a PDF of the Issue or PR showing your question, the responses and your follow up to your WiD repository.

Before posting your question, review the following short articles that give good advice on how to pose technical questions and what information to include to maximize the chances of getting a helpful response:

* [https://www.freecodecamp.org/news/how-to-ask-good-technical-questions](https://www.freecodecamp.org/news/how-to-ask-good-technical-questions/)
* <https://opensource.com/life/16/10/how-ask-technical-questions>
* <https://www.10stripe.com/articles/kb/how-to-ask-a-question.php>

**Final Presentation:**

Each team will give a 15-20 minute presentation on their project work. The presentation need not be comprehensive of everything that the team did. However, it must:

* Present at least one issue on which the team worked.
  + The issue should be explained so that the audience can understand the issue.
  + Demonstrate and explain the code in the team’s the pull request for the issue.
* Discuss some of the challenges faced.
* Reflect on what was learned during the project work.
* Involve approximately equal participation by all team members.

**Documentation:**

If you did not complete the final issue on which you were working you should fully document the status of your work. Add a comment on the issue that explains the current state of the implementation. Explain what has been completed, what is in progress and what is yet to be done. Identify any significant challenges you have encountered and explain what you have tried that did not work. For example, when describing what has been completed or things that are in progress link to your draft PR.

When doing this documentation, it might be helpful to think about writing to your former self. Imagine you at the half-way point of this semester being assigned to pick up your issue in its current state. Ask yourself: What would be helpful for you to know? Have you written it in a way that you, at that point in time, would understand? That last one can be difficult. You are now very very familiar with the work. In fact, you know more about your part of FarmData2 than anyone in the world. So, be on the lookout for any assumptions you make in your writing that would not be clear to your former self.

While this documentation must be done by the time of the final, FarmData2 is open source and of course you can continue working on your issue as much or as little as you like. If its ever ready for review, just flip the PR to a full PR and tag your instructor.