CSci 5801: Software Engineering I, Spring 2021
Project 2 – Agile Scrum

Special Instructions: You will be working in your small teams to complete this project assignment. You will Zoom, Google Hangout, Discord, or talk on the phone (if unable to meet in person) about the requirements for the assignment. You will only turn in one assignment per group per deadline except for the Daily Scrum Meetings. You must include all names on your assignments with X500 names and your Team #. Please use the name that is listed on the class roster so we know who you are. Your team will upload the work to your team repository on GitHub except for the Daily Scum Meeting logs that will go on your team's Discussion Board on Canvas.

The Problem

Now that you have a voting software system developed that allows an election official to run two different types of elections (i.e. IRV and Open Party Listing), the election officials have decided that they would like some changes made to the system and new functionality added. Instead of using the traditional Waterfall methodology to complete the new changes and functionality, management has decided that Agile Scrum will be used to do one 2-week sprint.

Jody, the product owner for the system has put together an initial description of what the election officials and others would like to see in the improved software.

- Jody wants the IRV and Open Party Listing algorithms to work fully as described in project #1.
- Election officials need another type of voting algorithm. They want to be able to determine a single winner based on the candidate receiving the most ballots with a fair coin toss if there is a tie or ties between candidates. This will be called Popularity Only (PO).
- Election officials need for the PO election ballots to be brought in via a .csv file so that the election can be run.

```
PO
6
[Pike,D], [Foster,D],[Deutsch,R], [Borg,R], [Jones,R],[Smith,I]
9
1,,,,,
1,,,,,
,1,,,,
,,,,1,
,,,,,1
,,,1,,
,,,1,,
1,,,,,
,1,,,,
```

1st Line: PO for Popularity Only
2nd Line: Number of Candidates
3rd Line: The candidates and their party in [ ]. Notice the name and party are separated by commas.
4th Line: Number of Ballots

- The election officials would like the PO stats displayed to the screen at the end of the election so that they know who won and who lost. They want to know the percentage of votes each candidate received so that constituents who voted know how well their candidate did in the election.
- Election officials have indicated that they would like to be able to bring in multiple files instead of a single file. The election officials want this functionality so that they can bring in different files from different balloting locations.
- When prompting for a filename, the user would like a GUI instead of a text prompt. A window should appear and the user should be able to type in a file name or look for file(s) on disk using their mouse or arrow keys.
- The election officials have been told by the state election officials that the IRV ballots need to have at least half of the candidates ranked, rounded up from .5 or above to the next higher integer value, for the ballot to be valid. The ballots

will not be invalidated at the point of collection but will need to be done when the election is run with the software system. This is very important since invalidated ballots must be removed from the election. A file needs to be created that stores the invalidated ballots for audit purposes. The name of the file should be invalidated_dateofelection.xxx

- The officials would like to see a table at the end of the election showing each round of the IRV and the number of votes that the candidate added/subtracted for that round. The table should be displayed to the screen.
  Example from Wikipedia, en.wikipedia.org/wiki/Instant-runoff_voting,
  (note: we do not have write in candidates in our IRV system so disregard that line):

Candidates		1st Round		2nd Round		3rd Round	
Candidate	**Party**	**Votes**	**±**	**Votes**	**±**	**Votes**	**±**
Bob Kiss	Progressive	2585	+2585	2981	+396	**4313**	+1332
Kurt Wright	Republican	**2951**	+2951	**3294**	+343	4061	+767
Andy Montroll	Democrat	2063	+2063	2554	+491	0	-2554
Dan Smith	Independent	1306	+1306	0	-1306		
James Simpson	Green	35	+35	0	-35		
Write-in		36	+36	0	-36		
EXHAUSTED PILE		4	+4	151	+147	606	+455
TOTALS[28]		8980	+8980				

- The audit file is stored in case of election contesting and was part of project 1. Now the election officials want, in addition to the audit report, a short report that can be printed and given to the election certification officials. The report should have the date, type of election, IR or OPL, the candidates, the number of seats, and the winner(s) of the election. Only the pertinent information is on this report.

Asking Questions

If you have questions about this portion of the project, please see a Shana or a TA during office hours. If you are not able to come to office hours, bring your questions to class.

Deliverables

1) GitHub Team Directory Structure:

```
umn-csci-5801-S21-001/repo-TeamXXX   : XXX is your team number, all teams have a repository set up
        /Project2                    : Create directory in your team repository to store all work
                /src                 : Create directory under Project2 to store all your program files
                                     : Be sure to include your makefile if using C++
                                     : If you have a special directory structure to support your coding, you can
                                     : copy it in the the Project2 directory but you must provide clear instructions
                                     : in the Readme.md
                /testing             : Put all test logs along with all test files that were used for testing here (e.g.
                                     : CSV files used for testing)
                /documentation       : Place your javadocs or doxygen documentation here. Use your
                                     : documentation from project1 as a starting point. We need every new :
                                     : method to be documented or changed methods to be updated. You may
                                     : also delete methods due to the new requirements.
                /product_backlogs    : Your original backlog created on Wednesday, November 14th and the backlog
                                     : created during the Sprint Review Meeting will be placed in this directory
                                     : along with all files used in their creation. For example, you may want to
                                     : put user stories and their acceptance criteria in this directory so everyone
```

: has access to all of the original PBIs.

/sprint_backlogs : You will use this directory to document your Sprint Backlogs as you : progress through the project. For example if you complete a task, you will : want to document what was completed and what you are then doing (e.g. : taking another task off of the log.)

Readme.md : This is stored in the Project2 directory and should provide instructions for : us if there is any special handling or issues we should know about. Be clear on : how to run the program.

2) Initial Product Backlog: On Thursday, April 1st during class, we will develop the Product Backlog Items (PBIs) by writing the user stories (with acceptance criteria) and effort estimation. The user stories will be used to develop the PBIs. The Product Backlog will be used on Thursday, April 15 in class to create your Sprint BackLog during the Sprint Planning Meeting.

ACTION REQUIRED: You will put a clean copy of your Product Backlog on GitHub **by Friday, April 2nd at 11:55 p.m.** Name this file: ***InitialProductBacklog.xxx*** where xxx is the file extension of your choice (e.g. .docx, .pdf) You should only have to clean up what we do during class and put your document(s) on GitHub. You will want to type up your work and put on GitHub under the /*product_backlogs* directory. This is the first graded artifact for your Agile Project.

Template for a PBI:

As <user role/persona> I want <what?> So that <why?> Note: We are interested in functionality and not the individual tasks for the PBI. Do not create tasks at this time.
Acceptance Criteria (conditions that have to be fulfilled to ensure the story is complete)
Definition of Done (what is required by the team before sending out for review)
Effort: Small, Medium, Large, Extra Large (estimate of effort and time) OR number of hours needed
PBI Author(s)

3) Initial Sprint Backlog: On Thursday, April 15th during class, we will create your team's Sprint Backlog using our Product Backlog we developed on before spring break. We will use the same type of process as was shown in our video, the Sprint Planning Meeting. We will break down the PBIs into tasks and determine how much work can be done in the allotted time for the Sprint.

ACTION REQUIRED: You will put a clean copy of your Initial Sprint Backlog, named ***Initial_Sprint_Backlog.xxx*** on GitHub **by Friday, April 16th at 11:55 p.m.** You should only have to clean up what we do during class and put your document(s) on GitHub. Type up your work and put on GitHub under the /*sprint_backlogs* directory.

4) Daily Scrum Meetings: You will need to complete 3 daily standup scrum meetings each week of the sprint. Each person will post their own response at the scheduled day and time for the daily standup meeting on the Team's discussion board. Each team member will have up to 15 minutes after the daily scrum meeting is completed to post their own response. Meetings must be at least 12 hours apart from one another on different days.

ACTION REQUIRED: By Friday, April 16th at 11:55pm you will post to the discussion board the days and times you will meet as a team on Zoom during the Sprint for your daily Scrum meetings. This will be your committed meeting times. We will grade the standups and participation based on this schedule of events you post to the Discussion board. Please post your day and times of your meetings that everyone agrees to participate in to your team's Canvas Discussion location. It will be your first team's posting to the Team's discussion. Each team will have their own discussion board allocated to them.

- Each team member will answer these questions/prompts at each meeting:

  - Team Member's Name
  - Task that you are working on
  - What did I do yesterday (or since the last Scrum meeting?)
  - What will I do today (before the next Scrum meeting?)
  - What impedes me (blocks my progress, reduces estimates, etc.?) You can state here you need help.
  - Is there a side bar issue to bring up that will be discuss outside of the daily Scrum meeting?
  - Note: Be sure to mention if you updated the Sprint Backlog with new tasks, completed, etc. Are you starting another task or do you need help?

ACTION REQUIRED: For each forum posting for a given day, you will state the Scrum Meeting # (sequential numbering). We will expect a total of 6 meetings over the sprint (3 per week).

Week 1: Friday, April 16 – Thursday, April 22 (3 meetings needed on different days at least 12 hours apart)

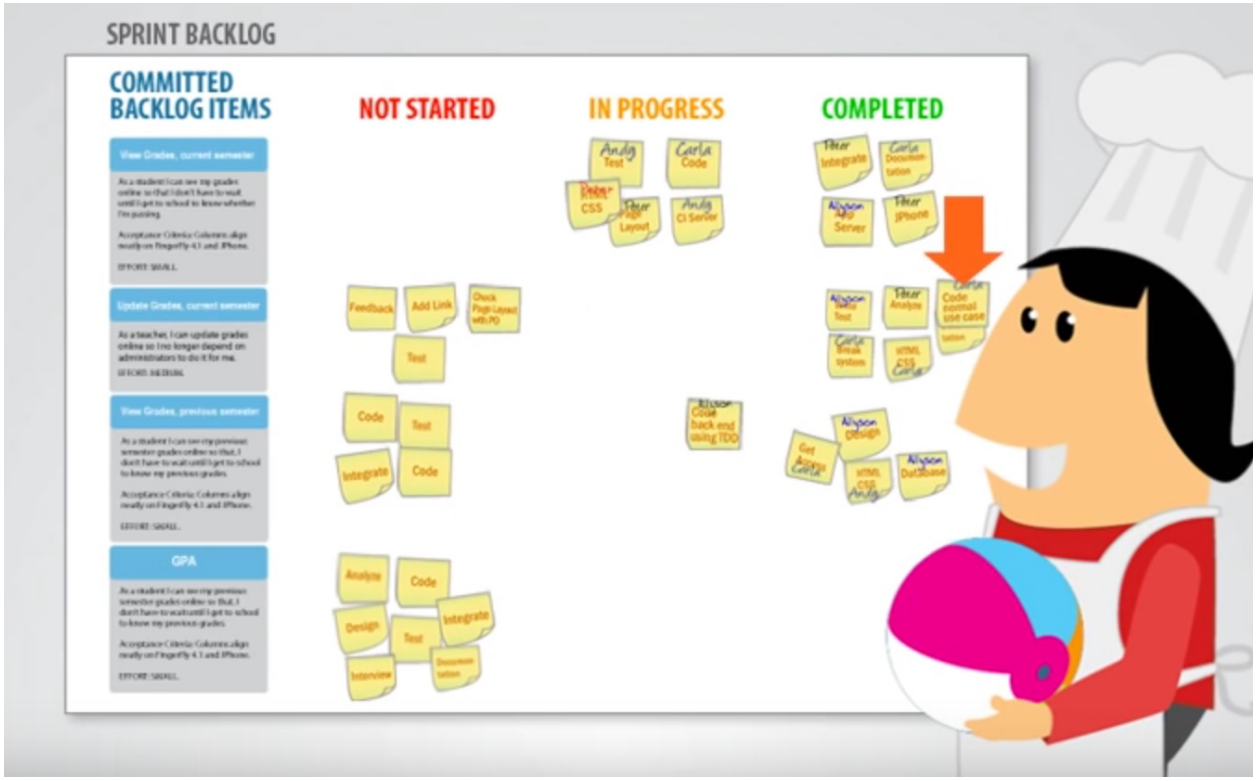
Week 2: Friday, April 23 – Thursday, April 29 (3 meetings needed on different days at least 12 hours apart)

5) Ongoing Sprint BackLog files will need to be kept current on GitHub. We should see updated Sprint Backlogs at **least 2 times a week**. Name the files, *SprintBacklog112618.xxx* where xxx is the extension of the file and the numbers are monthdayyear. If you have not completed anything for that week, make a copy of the older sprint backlog and still add a new file so we can progress through your work.

ACTION REQUIRED:

Week 1: Friday, April 16 – Thursday, April 22 (2 times - upload on 2 different days your Sprint Backlog)

Week 2: Friday, April 23 – Thursday, April 29 (2 times - upload on 2 different days your Sprint Backlog)



6) All source program files will be provided and stored in the proper directory.

- Correctness and Program Execution: Your code should execute with no syntax or runtime errors and produce correct output. Your program must meet the specifications and function properly for the PBIs that were completed during this Sprint. Remember, if something does not work or is not fully implemented by the end of the Sprint, the item is placed back on the Backlog. The code should only contain the PBIs that were fully coded, tested, and were accepted as done. This encourages using GitHub to maintain versions of the code. Get into the habit of committing work to GitHub throughout the Sprint. The TAs can help you with merging if you find it difficult.
- Readability: Your code needs to be easy to read and follow. It should be stylistically well design.
  - Use indentation consistently.
  - Variables, methods/functions, and files should have meaningful names. Please do not try to be funny or vague. We are expecting professional looking code in a 5000 level course.
  - Code is well organized. Methods and functions organized into blocks of code that can be reused. Do not, stress do not, create huge methods or functions. A good rule to follow is that methods and functions should do only one thing and do it well. Sometimes it makes sense to have a method or function do a couple of things but this grouping must be for a reason. You are expected to pass variables and use method/function calls.
- Documentation:
  - Every file should have a header comment. It should contain the name of the file, the description of what the code does, and the name of the author.
  - Commenting of the code itself is expected. You need to explain what is happening in the code itself.
  - Use either javadocs or doxygen to create the formal documentation of the code itself. All methods/functions must have comments that will generate documentation via javadocs or doxygen. You cannot have a method/function without its purpose being documented.

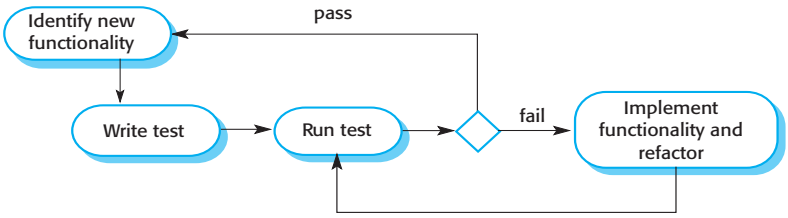
- Efficiency: Your code should be efficient in its processing. For example, your program may take too long to run or you have blocks of code that could be written more efficiently by reducing the number of lines of code. Example: use looping constructs when needed instead of copying and pasting code over and over.
- Assignment Specifications: Please ensure you provide the documentation files (i.e. javadocs or doxygen generated files) in their proper locations as defined in the GitHub section of the deliverables.

7) User Documentation (beyond the comments in the code itself as part of documenting flow):

- You will use either javadocs or doxygen to generate the formal documentation that would be provided to a user or programmer. You should ensure that you document each class, method/function, header file, etc with the name, description of purpose, input parameters (with purpose), return value (with purpose), and exception handling. We should be able to read the documentation and understand exactly what your class, headers, and methods/functions are doing.

ACTION REQUIRED:
Store all files generated for your documentation under the */Project2/*documentation directory on GitHub.

8) Testing: You will be testing your code as you work on your assigned coding tasks. Remember that testing as you go is an integral part of iterative methods. You should identify the new functionality (your task), write your test(s), run the test(s) (and it/they will fail), and then implement the functionality and rerun the tests. The task is only complete when you have passed all tests.



Remember, in Agile Scrum the goal is for the product owner to declare the PBI as finished. If any of your tasks that make up the PBI fail, the entire PBI is moved back to the Product Backlog during the Sprint Review meeting. You will create simple logs as you complete your coding tasks. You can use a testing framework such as JUnit (for Java), Google test framework (for C++), or write your own methods/functions to run your tests. Be sure to give directions in the Readme.md on how to run your tests.

The following is the template to use for your test logs:

The PBI, the Task Description (from Sprint Log) with Unique Testing Number:
Team Member(s) Responsible:
Inputs:
Tests:
Outputs:
Passed or Failed
Date

A partially completed log from our book is found below. Notice that I have asked you to add a few more details.

Test 4: Dose checking

Input:
1. A number in mg representing a single dose of the drug.
2. A number representing the number of single doses per day.

Tests:
1. Test for inputs where the single dose is correct but the frequency is too high.
2. Test for inputs where the single dose is too high and too low.
3. Test for inputs where the single dose * frequency is too high and too low.
4. Test for inputs where single dose * frequency is in the permitted range.

Output:
OK or error message indicating that the dose is outside the safe range.

- **Each coding task will have its own testing log.** A PBI could have many tasks needed to fully complete it. You should have one file with all testing logs. Name your test case log file, *testinglogs.XXX* where XXX is the file extension (e.g. pdf, docx).

ACTION REQUIRED:
You will put your log file in the */Project2/testing* directory under your team repository. Your code for the tests will be included in the */Project2/src* directory. You must complete this by Sunday, May 2nd at 11:55 pm.

ACTION REQUIRED:
All CSV files used for any testing should be placed in the the */Project2/testing* directory by Sunday, May 2nd at 11:55pm.

- Grading: We will be reviewing your logs to determine if your testing was thorough and covered boundary cases and common cases.
- If you are using any of your previous tests, you do not have to recreate new test logs. Just copy over your old template files and tests as is.

Due Dates:

Initial Product Backlog	Uploaded to GitHub under the /product_backlogs directory by **Friday, April 2nd at 11:55 p.m.** – You will clean up the backlog we work on in class
Initial Sprint Backlog	Uploaded to GitHub under the /sprint_backlogs directory by **Friday, April 16th at 11:55 p.m.** – You will clean up the backlog we work on in class
Daily Scrum Meetings	**3 daily scrum meetings held via Zoom/Google Hangout each week.** You will need to set up the agreed upon day and times for the meetings. Everyone is expected to attend these meetings. Follow the instructions as described above.
Ongoing Sprint Backlogs	At least **2 files a week** should be pushed to GitHub for you ongoing Sprint Backlogs. Follow naming conventions as described above.
Software, Test Logs, Documentation	Everything must be pushed to GitHub by **Sunday, May 2nd, at 11:55 p.m.**
Final Product Backlog	Uploaded to GitHub under the /product_backlogs directory by **Sunday, May 2nd, at 11:55 p.m.**

Project Grading Distribution:

Product Backlogs (2 entries)	10%	40 points
Sprint Backlogs (Initial and at least 2 per week updates pushed to GitHub)	15%	60 points

Daily Scrum Meetings (3 per week – at lea 12 hours apart on different days) logging on Team Discussion Board will be graded	15%	60 points
Software (see #6 above)	35%	140 points
Testing Logs	15%	60 points
Documentation (javadocs or doxygen)	10%	40 points
Total	100%	400 points