# Process Overview:

In order to facilitate the process of creating the website we used the following procedure:

1. Before we started implementing anything, we drafted a website design so that everything was laid out in a user friendly manner. We also dealt with the logistics of the project.

* Before we began implementing any of the features that we needed for our website, we decided to consolidate our website’s requirements.
* Additionally, before we began implementing anything, we decided to define the scrum master and what their role would be. We also assigned one person to this task.

1. After we consolidated the requirements for our website, and everyone had a clear idea of what we had to implement, we worked towards segmenting tasks and delegating them to individual members in the team. The tasks were divided based on the skills needed and whether it could be coded as an individual piece and placed into the website at a later time. How the difficulties of tasks were decided and how they were assigned to members is further explained in the initial planning section.
2. Everyone had an individual set of intermediate deadlines to work towards throughout the weeks leading up to the phase 2 deadline. As these intermediate deadlines were different for each member, every member was asked to keep their own update files so that the scrum master and the rest of the group could have a realistic view of how much was done at any particular point without having a group meeting called.
3. The scrum master would call meetings every 3-5 days and decide the appropriate method of meeting based on everyone’s schedule.
4. At the meetings, every member would go over the work that they had accomplished since the previous meeting. Any work that could have been merged would be merged at this point. Additionally, anyone who was struggling with their part and needed help was encourage to ask for help and get advice from members during these meetings. Intermediate deadlines were extended based on the work completed. These were generally set by the scrum master with agreement from each of the members.
5. Steps 4-5 were repeated until our MVP was created.

# Initial Planning

For this phase, we segmented our task into various sub-problems and assigned at least one task to each of the members on the team. To co-ordinate our individual activities and ensure that we reached our deadlines, we held meetings – either on Skype or in person – to discuss our progress and next steps. The frequency and times of these meetings were decided by the scrum master. Additionally, the scrum master was responsible for taking notes at each of our meetings and recording the progress of the group. The scrum master also analyzed our team meetings and synchronized and adjusted our plans as necessary. Our team elected Daniel to be our scrum master, however due to personal matters, this was later changed to Allen.

In order to estimate the size of each task, our group took into account several factors. These factors included, but were not limited to, how long we perceived the task would take, how much knowledge the task would require, and how abstract the topic seemed. Since we all had varying degrees of understanding and background in web development, this meant that, while some tasks could have been perceived as “easier” according the requirements listed previously, they were not easy for the individual executing the task. Therefore, experience was also a factor when estimating task size (but not its difficulty).

# Sprint Backlog

Initially we planned to build a website that would be capable of teaching users C through a variety of methods. This website would have had to have been capable of compiling and testing C code, arranging topics in a hierarchical tree structure that linked to other pages, have interactive games, and more. After we designated tasks that we would have liked to accomplish in order to finish our product (listed above), we assigned deadlines and individuals to each tasks. We decided to implement a subset of our initial tasks in order to produce a functional MVP for this phase. The subset that we implemented is the minimum number of elements that we needed in order to produce a functional product that represented our idea.

### The tasks for this phase were divided and estimated as follows:

1. **User Account System** [Left for later phase]
   * This should contain a log-in page for existing users
   * Should also contain a sign-up page for new users
   * Needs a database to store usernames
   * Implement user interface for user to see their profile, settings, etc
2. **Home Page Interface** [Left for a later phase]
   * Using the interface implemented for the entire webpage, implement the conditions such that the user is able to see and access the Programming Tree interface when they login or register
   * Include in content for what the Programming Tree webpage is about, and what is offers to users who are interested in learning C.
3. **Programming Tree** [Shamama] - Shamama had some experience in HTML & CSS, but she was not familiar with JavaScript.

***Estimated Task Difficulty:*** Medium – There is no predefined method of implementing a visual tree on the web that the group knew of. Despite this, it was evident that this would only require the knowledge of HTML, JavaScript and CSS to complete. Therefore, this task was evaluated to be of medium difficulty.

***Intermediate Deadlines*:**

* Implement nodes that are capable of linking to new pages: Small – (February 25, 2016)
  + The two needed time to learn additional languages so despite the fact this is the easiest task, it was given the longest amount of time
* Arrange them in hierarchical structure as specified by the administrator: Medium – (February 28, 2016)
  + This is a somewhat difficult task to finish as it is a little abstract so was given more time for this one.
* Create visual links (e.g., lines) to show relation between different nodes: Small – (March 1, 2016)
  + This is should be quite simple to implement as there are methods of doing this listed online, therefore it was given the shortest amount of time.

1. **Content Material** [Mostly to be left for another phase – memory allocation game implemented]

***Task Difficulty:*** Hard – Requires a lot of research and thinking to come up with a useful tree structure that can

efficiently and easily test the users understanding of the subject.

***Intermediate Tasks:***

* Set up content material and pages for teaching users C
* Come up with one logical C Node Tree structure that will teach one full concept with a minimum of at least three nodes in the tree.
* Create ideas for activities and games that can be used to help teach students C (node content)
* Create ways to test C understanding by using C compiler and asking user to solve specific problems.
* Test the code obtained from the user to ensure that the user code functions as expected
* **Implement memory allocation game:** [Justin and Daniel] - Daniel was not familiar with any of the three languages. Therefore, despite the difficulty of the task, the assigned deadlines were longer than expected as the two had to pick up the languages to implement the tree structure.
  + set up page with canvas element as the base for the game

1. **Setting up webpage layout** [Flora]

***Estimated Task Difficulty:*** Flora was familiar with HTML and CSS and thus she was responsible for this task. Since her portion did not require too much additional learning (as none of these components require JavaScript and she familiar with the rest), she was asked to do more tasks.

***Intermediate Deadlines***: Since Flora was familiar with all of the languages she required for her task and all of her tasks were of the same difficulty we decided to split them evenly throughout this phase.

* Implement header for webpage name: Small - (February 24, 2016)
* Implement a navigation between the different pages in the header: Small (February 27, 2016)
* Implement a main section under header for page content: Small (March 1, 2016)

**[Complete the Estimated Difficulty and Intermediate Deadlines below]**

1. **Setting up Node.js and Server** [Allen and Wenfeng] – since these two had the most experience with web programming and were capable of writing code in HTML, CSS and JavaScript, they were asked to complete this task
2. **C Compiler for Exercises** [Allen and Wenfeng] – again as the two had the most experience with web development, they were also asked to research into how to complete this. This is a very integral part of our idea and as such, it was of high importance that it was completed by this phase.

# Update Meetings

**Meeting One:**

Date: Feb 21 2016, 12:00-1:00PM | Skype | Attendance: Everyone

* The group members all collectively went on Skype, and discussed the planning stages of the project.
* Considering different methods of implementation – Web vs. App
  + App development has a more limited scope in terms of user interaction and small screen interface (and possible challenges in expanding to larger devices such as a tablet). However, most members are familiar android development and are confident we can implement it.
  + HTML, CSS & JavaScript (web): It is beneficial because it allows us to implement more of the functionalities we need (e.g., a compiler) and would be easier for users to use. Majority of members are not familiar with web programming, but most are willing to learn.

**Meeting Two:**

Date: Feb 22 2016, 8:00-9:00PM | BA2159 | Attendance: Everyone

* Discussing concerns we had about our project idea since not all members are yet fully on board with the idea of the Programming Tree website.
* When talking with the TA the group asked questions on the transitions from phase one to phase two of the project, and listened to the feedback on our submissions from phase one. The group asked if our idea was good enough even though our phase one reports were not detailed enough.
* A few more concerns were addressed between the group members and the decision to implement the project with HTML, CSS and JavaScript was made.
* We will come up with a ideas for the next meeting to help solidify our design.

**Meeting Three:**

Date: Feb 24 2016, 4:00-5:00pm | BA3200 | Attendance: Everyone

* Met with the TA in order to ask questions regarding the phase two details and any suggestions to our project website.
  + TA suggested having a “simple” C compiler implemented to use in our project for the exercises.
* After TA left: Reviewed. Discussed the basic plans and different components to implement the MVP for the website. Different tasks were delegated between the members.
* A draft of the sprint backlog was created from this discussion.
  + The front-end (responsible for the content and activities of the webpage) are assigned to Daniel and Justin – they went on to discuss details of how to implement a game for teaching users the memory model in C.
* The back-end members are responsible for different components of the page. Allen and Wenfeng decided to take on the task of researching and implementing the C compiler; while Shamama and Flora decided on implementing the Programming Tree data structure.
* Talked about scrum master role. Daniel agreed to taking down the update minutes and the role of Scrum master.

**Meeting Four:**

Date: Feb 29 2016, 3:00-5:00pm | BA3200 | Attendance: Everyone except Daniel

* From discussion of the progress between members:
  + Server for the website implemented using Node.js
  + Website layout implemented using HTML & CSS
  + Basic format and figures for memory game implemented using HTML, CSS and JavaScript
    - Danniel needs more time to go over HTML, CSS, JavaScript -> Reassigned to Tree since Shamama is more familiar with those concepts and can help Danniel with them. Also she is behind so could use the help
    - Justin seems to have good handle on how to do this portion
  + Nodes with on-click window redirect; implemented using JavaScript
    - This is behind schedule, should be on finished visual structure –Shamama’s having difficulty with CSS and formatting of tree -> Hierarchy extended to March 2st -> Links extended to March 3rd
* Continued to work on our delegated tasks.
* Various discussions on whether to change some specific features such as whether to use the node popup system or node page redirection for the interface.
  + Redirection is kept - easier to implement, allows more flexibility.

**Meeting Five:**

Date: Feb 29 2016, 8:00-9:00pm | BA2159 | Attendance: Everyone except Daniel

* Group members discussed the project progression with the TA, stating that all was going very smoothly and the basic components were set up.
* The group members asked questions regarding the demo of phase two, and what was expected of us for the process and product reports.
* Group members then discussed about meeting up the next day in order to work on the two reports of phase two.
* A decision was made to meet with the TA to present the demo of the project on March 7th, 5pm.

**Meeting Six:**

Date: Mar 1 2016, 2:00-4:30pm | BA3200 | Attendance: Everyone except Daniel

* Current progress of the website’s implementation was discussed.
  + Most people are on schedule
    - Shamama and Danniel have yet to perfect the tree’s structure.
      * Might have to postphone links to next phase (minor inconvenience)
* Flora has her part done
* Justin has finished his goals for this phase as well
* Allen and Wenfeng have exceeded what they were supposed to do
* Will work on ensuring everything is merged properly tomorrow and that they work together as expected
* The process and product reports were discussed. Will be written/started tomorrow as well.
* Flora will work on the burndown chart
* Allen, Wenfeng, Justin and Shamama discussed the write-up of the technical product report.
* After Allen, Wenfeng and Justin left at 4, Shamama and Flora discussed the write up of the process report.
  + The other members are to finish up their version of “reviews” for the process report.

**Meeting Seven:**

Date: Mar 2 2016, 12:00 – 2:30pm | BA3200 | Attendance: Shamama, Allen, and Flora

* The group members continued to work on the process and product reports.
* Allen worked on the server and other content for the product report.
* Shamama will write up the initial planning and process overview.
* Worked on polishing the repository and getting rid or unnecessary/irrelevant/incorrect information in files
* Flora worked on the burndown chart and overview of the process report
* Still behind on links
  + Will postphone to next phase
  + Not detrimentally important – can still understand structure without links

# Review and Retrospective

In terms of implementation, our plan did not evolve very much. We brought up discussions on whether certain features should be changed but ultimately, when we held the group vote for actually implementing a change, the result was always no. Even though our plan did not evolve very much in terms of the idea, it did happen to change in terms of the execution of our project. As a group, we seemed to have done a pretty good job at delegating tasks such that they were the appropriate for the person assigned to them. We split tasks depending on their size and how independent they were. For example, setting up webpage layout does not necessarily depend on having the node tree done as the node tree can always be added into the webpage later. Following this line of reasoning, we came up with many different tasks that we could do and assigned each member to a particular task. Some members were asked to work on the same tasks while others worked independently. Allen and Wenfeng worked together as they were assigned the hardest task and had the most knowledge of web design; therefore, they would be able to talk things over a share any insights that one may have had that the other didn’t. Justin and Daniel were supposed to work together because they were both absolutely new to the languages. They were assigned a medium-level tasks that they could talk over together and learn as a team. While this division of labour worked well for the most part, there were still some miscalculations on our part. One of the parts that we expected to get done by the deadline that is still not complete is the links between the nodes. This constantly got pushed further and further behind due to problems at an early stage for the member working on the tree. When we found out that one of the members was struggling with the logic of the tree, we reassigned someone else who was new to the syntax but good with logic so that they could work through the problem together. This resulted in a quicker resolution to the problem than we had anticipated. However, despite resolving the problem faster than we had expected, we still were not able to get the links done on time. This was mainly because we did not anticipate the lack of time that we would have to code it today due the high volume of tasks that we had to complete before the deadline for this phase. For future phases, we should try and plan things such that nothing falls exactly on the deadline as there seems to be too much to finalize on that day. Another change in our plan that happened as a result of two extremely quick coders on our team was that we actually managed to start user account system before phase two.

We worked very well as a group. Each member was excellent at communicating their time availabilities, any issues they were facing, and how much progress they had made. One thing that worked very well was dividing the tasks into portions and having frequent meetings in which we discussed the progress of our individual tasks. During each of our meetings, we demonstrated how far we had gotten with our implementation of our task to the entire group. This was beneficial because it saved members a lot of time reading and trying to understand each other’s code. This allowed us to merge our individual tasks into one project a lot easier as well. Additionally, another feature of our meetings that was extremely advantageous to group’s project development, was the availability of help. We took our meetings as sessions in which we could explain bugs and issues we were having to each other. Those who were weaker with web programming were able to resolve their issues a lot faster because of this. In addition, our group’s flexibility and willingness to take on different roles also proved to be very helpful when some members were struggling while others were not.

While our group was very good at organizing ourselves once we had the division of tasks decided, we did struggled quite a bit to get to that phase. Because of disagreements within the group about project ideas and execution, we lost a lot of time trying to decide solely the specifics of how to begin. While constructive criticism is always welcome in our group and helps us get to a stage where we feel more comfortable with the product we’re creating, it seemed to have consumed a little too much of our time. Similarly while suggestions and new ideas are also great to have, our group lost a lot of time on the implementation of the basic structure because of these discussions. In the future, we must find some way to reduce the amount of time that we spend on perfecting our idea and plans before we go to implementing. Future improvements that our group can make would involve having a specific meeting just for the logistics of how we will execute the following phase. We feel as though if we had a designated time to discussing any concern or suggestions that members had, we would have more time to work on the implementation. This is because member would have been encouraged to think of these things cumulatively and at once rather than scattered throughout the meetings which led to a lot of debate during meetings not intended for that purpose.