4-2 Milestone Three: Enhancement Two: Algorithms and Data Structure

There are many different approaches to a software development lifecycle. More traditional methods would be a waterfall methodology, where development happens in stages and any adjustments to errors found are made in the final stages. This creates the issue that many errors get built upon and buried creating many more problems. As the industry has evolved through the last few decades however, new methodologies have come to be accepted as more efficient. Most have adopted an agile approach that involves “sprints” of development, where at the beginning of a sprint the team would assemble and discuss the development goals for the allowed sprint time. During the sprint as the team works on the project a thorough update report and changelog is kept, referencing all adjustments made. At the end of a sprint the team gathers once again to discuss areas where they succeeded and primarily where they ran in to issues. A team member may have run in to a bug halting progress, or perhaps they did not make as much progress as expected. The team would then reevaluate and give the proper assets to assist in the areas needed and repair any bugs before progressing. This makes for a much more efficient lifecycle as it emphasizes the concept of failing forward and failing fast. The sooner an error can be detected and fixed the more the development of the project can grow. This cycle would continue throughout the entirety of development up until release and even continue afterwards with updates.

One framework that can makeup an agile methodology is scrum. Scrum works with an emphasis on iterative and incremental development to build on previous phases of a project. It also emphasizes on team collaboration and daily face-to-face communication between all team members. Scrum also attempts to recognize the fact that many times customers will change their minds about aspect of a project while it is in development. In order to adapt for this scrum does not work around a predictive or planned development plan. The biggest driving point of scrum is the roles it creates around team members. These teams work on an empirical approach and each has their own responsibilities while working through a project.

**Product Owner.** The role of the product owner is to represent the customer and stakeholders. They ensure good business decision are made in order to achieve the highest profits attainable. Their primarily role in scrum is to maintain and continually update the product backlog. This is the log that will record all changes made to the project and refer to which team member are and were responsible for each iteration. This part of the process is very integral in maintaining consistent workflow as the backlog will be referenced repeatedly through development. The product owner should also not be viewed as a supervisor or manager to the development team, however. Their primary role is to act as the liaison between the customer and development team. They should not be making any technical decision for the team and merely seeking a consensus between them and ensuring they understand the goals and scope of the product.

**Scrum Master.** The role of the scrum master is that of a team leader, though in a non-traditional sense. Their primary responsibility is to ensure that the scrum process is working as intended and efficiently. This goes hand in hand with expert knowledge and understanding of the scrum cycle and all aspect that the cycle requires to be effective. This role should not be viewed as a superior to those in the development team, but as a guiding force. The role of the scrum master often works best when they are a member of the development team who also has taken on the responsibility of ensuring the scrum process. Their role is to motivate the other members of the development team and to mitigate any obstacles they may find along the way.

**Developers.** The role of the developers is as you would expect. These are the people having their hand in the pot and making the product. The term itself is not descriptive and does not directly apply to a general developer title. The role of the developers falls on programmers, engineers, testers, analysts and etc. This role applies to every team member who has any impact on the development of the product. An import aspect that differs from more traditional roles is its emphasis on customer relations. The developers should all be encouraged to have customer and stakeholder interactions and build a positive line of communication between them. This ensures that the developers have a clear understanding of the scope and goals of the project being built and all are on the same page about what the end product is expected to be.

Throughout the scrum cycle there are many different phases each role can expected of. We have already discussed the idea of a sprint and the fast-paced working environment it creates. In order to have a sprint in which the goals are attainable, it is important to have sprint planning. The scrum team will need to come together and make a clear sprint goal. This should entail a primary focus of what is hoping to be achieved by the end of the sprint. This is also when the length of the sprint should be decided, which should typically be no more than four weeks. One within a sprint a daily scrum meeting will commence before each workday. This can also be referred to a stand up meeting, this name coming from the meetings emphasis to be quick and to the point where no one should be around long enough to need to take a seat. This should get all team member updated as to what progress was made the previous day, what problems were encountered if any, and what the expected progress for the current day will be. Participation is very important at these meeting and best practice is to have each developer provide a brief update about their personal progress. Finally, after a sprint a review and retrospective should be held. These are meant to assess what areas were successful during the sprint and which areas need more assistance. This allows the customer to be updated with the progress up to this point and make any refinements or updates needed. With all of this information a new sprint can be planned and be built upon the successes and failures of the previous.