Our merkle tree will be owned by a university whose students and their class grades are stored in the data structure, and each merkle tree will be used for each department in a college (for example, the department of electrical engineering). The purpose of storing the data this way would be to be able to detect when changes to their grades, and therefore their GPA, are inputted. At this particular university, the GPA’s of students are updated every semester. The official grades of their classes are updated twice a semester, once halfway through (called a midterm report), and then again at the end of the semester. If the merkle tree detects that its data is changed not at the designated day/time for grades to be updated, then it will alert the head of that department who will check to make sure that the change made by a professor was done under correct university standards/regulations for editing grades.

The purpose of using a merkle tree for each department would be to efficiently store the grades/GPA data of its students and detect when changes are made. Each student’s ID is encrypted using the hashing function of the merkle tree, which protects their identity and grade safety if someone were to hack into the system and tamper with it. The university finds it important to follow their protocols of only updating grades twice a semester, but they do allow certain edits when a professor might have messed up grading and needs to make a change. Using a merkle tree makes sure that the head of the department checks these edits, so that they are done for responsible reasoning and that the availability to edit isn’t taken advantage of.