School Emergency Response

New Mexico

Supercomputing Challenge

Final Report

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Team Number 80

Shiprock High School

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Executive Summary:

      We created the app, Campus Alert System (CAS) to act as a link between the teachers and principal. It allows the principal to send out alerts from his phone, and this will show up on the teacher's end. The teachers see what the situation is and what steps to follow. A thing to note is the app will not let them close the popup page with all the steps until they have checked off each one (see Figure 1).
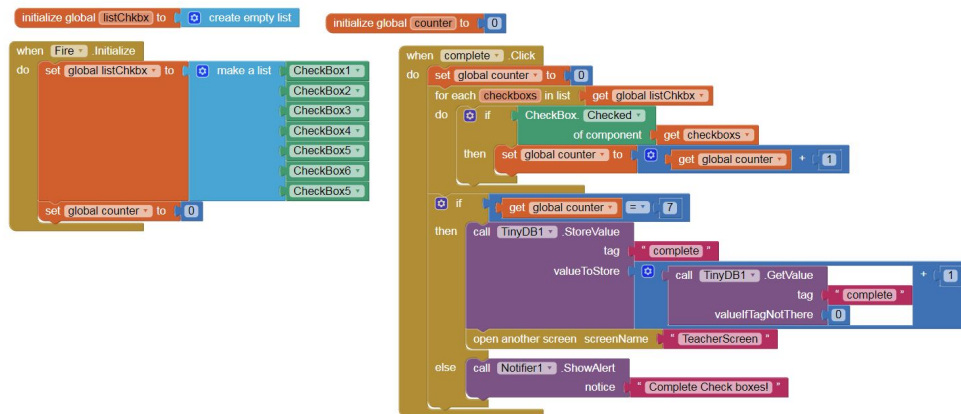

Figure 1 Fire Drill Code

      Once the teacher has checked off all the steps and has left the page, the principal will see a progress bar update in real time and is able to tell how much of the school staff has followed the drill procedures.

      CAS also allows the teacher to send back a technical reports.This being a conditions, actions, and needs (CAN) report. This allows for essential information from the classroom to travel to the front office much more efficiently. The current process has

the teacher fill out a google form that is sent to the principal. However this is only done

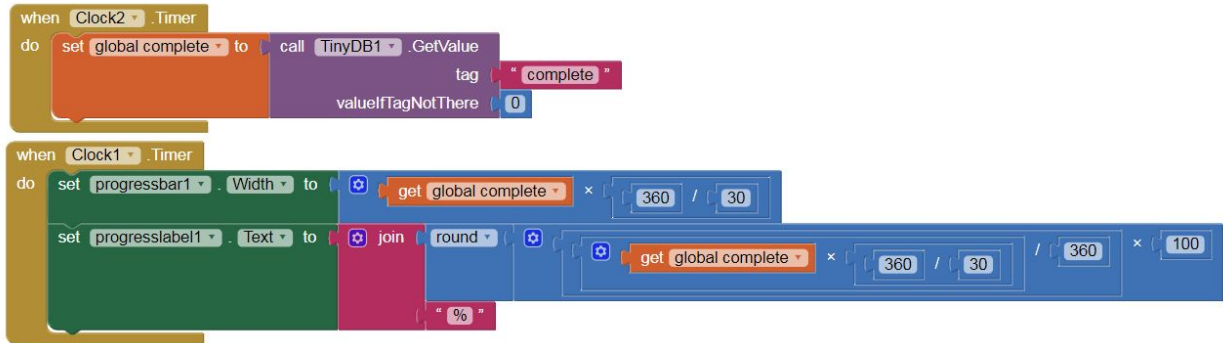after the drill is completed (See figure 2 and 3)
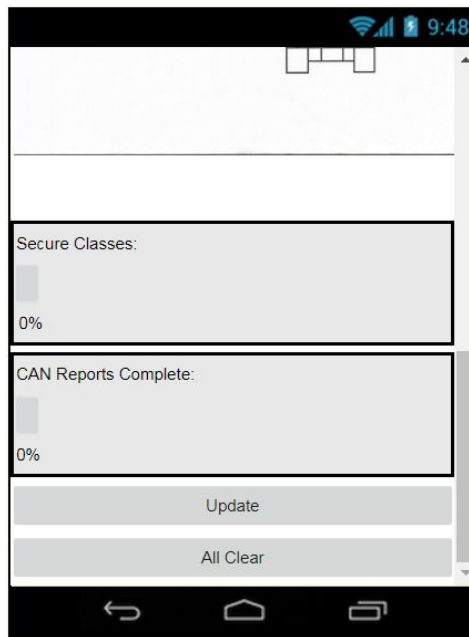

Figure 2 Progress Bar Code

Figure 3 Progress Bar Interface

On April 1st, we held one, and unfortunately our only, trial run of our CAS app. It

had not gone as we envisioned, but it did provide us with a new perspective. With this

event fresh in our minds, we took in the suggestions and revised our code. This has also caused us to reflect on the fundamentals of our app, communication and organization. Currently we are all taking a look into our code and user interface and deciding what we can improve for a more successful trial run.

Introduction:

Our project revolves all around school safety. In the past decade school safety has been in the national spotlight. In the past year alone, 2017 through 2018, there was a 62% increase of threats and incidents at schools (Klinger, "Violent Threats and Incidents In Schools"). There have been way too many unfortunate incidents either within or around the school building ranging from emergency evacuations, to gun/bomb threats, to lockdowns. Many of these situations our team has experienced first hand. An issue we all saw during those situations was the lack of communication and organization between essentially the entire staff. While researching for our project, we found that there are school safety apps but they are made for colleges. There is next to nothing made for k-12. The one app we came across is Ruvna. Ruvna's main function is accountability. Just making sure the student is there and nothing about the drill or what the situation is.

The CAS app resolves this problem. This app allows the principal and teachers to communicate efficiently and effectively during any emergency situation in addition to accountability. The current system of communication is through radios. This system relies on the front office contacting each and every teacher about what the situation is

like in the classroom and then gathering information about halls. With our app, teachers will know what to do and then the app will automatically check in with the principal and if they need to, they can submit a CAN report.

Problem Description:

We are investigating the communication problems schools face during any emergency situation. Speaking from first hand experience, we are usually evacuated to a separate building next to the school and in that case, students are always separating from their classmates and teacher. This can obviously lead to lots of confused students and worried teachers. Our school district, Central Consolidated Schools District, has implemented the use of radios but this means teachers must always carry one wherever they go. Radios are also difficult to hear. Only one person can communicate at a time. Aside from teachers not being fully aware of the situation or how to react, parents are also notified of the situation from their students. Students will call or text their parents to check them out of school in these situations and that only adds to the confusion.

Results:

The drill itself was more or less uncoordinated and did not go as we had hoped. There were teachers who wanted to participate but never received the app and the teachers who were able to access the app were confused on how it worked and what to do with it. Unfortunately, we were only able to test CAS in one drill seeing as the school is allowed one drill per month and we ran out of time. However, we were able to learn

much more about our app. For context, our school has bad internet connection and this can make it difficult for the apps to update periodically. We were suggested that the apps allow the teacher to bring up the checklist for a particular drill themselves.
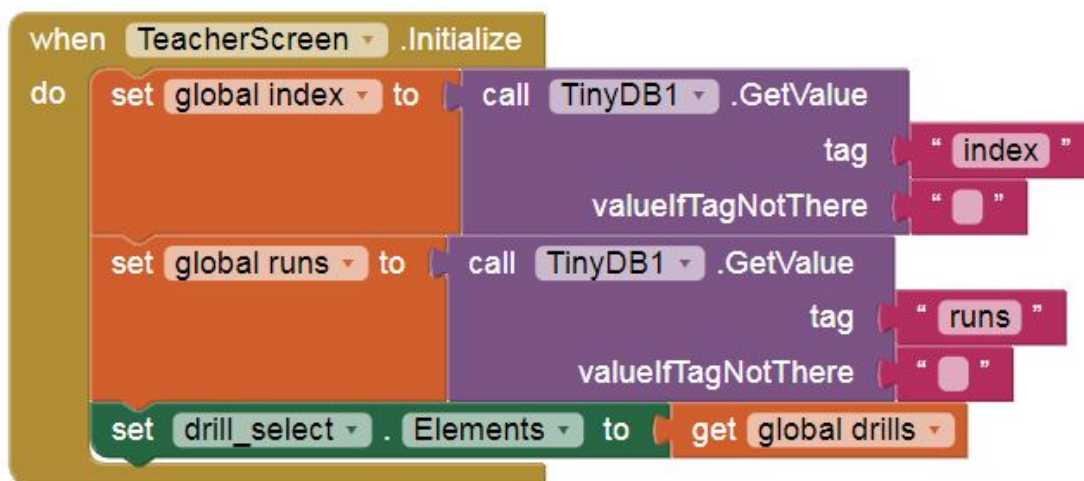
Conclusions:

From the small trial run and our numerous experiments with CAS, we can almost say we accomplished our main goal. We had many aspirations in the beginning of this project, but the time restraint limited what we are able to do. We prioritized communication between teachers and the main office more than anything else. For the time being, we have insufficient data to definitely say we accomplished our goal. We can only speculate what the main confusion stemmed from during our trial run but we are walking in the right direction with this app.

Achievements:

Our biggest achievement was being able to update all the other apps. The main struggle we faced in the making of CAS, was how the the apps would communicate with each other. The site we used to build our app, MIT app inventor, does have a database to store and keep information, but this is quite basic. It is not meant to handle all the information we are inputting but we have been able to work with this. Eventually was able to pass information between apps using many variables.

<u>Future Improvements:</u>

      At the very basic level, CAS is just a courier. From the beginning of this project we had we've wanted to implement more features such as a parent and student page, connecting it with powerschool data, location based services, and security camera feeds. After the drill, we implemented the suggestions we received (See Figure 4). Currently the teachers can bring the drill checklist up, but this does not update on the principals screen. This means the principal cannot see how many teachers have followed the procedures through the progress bar. We are still working on this feature.

Figure 4 Teacher Checklist Code

      The next step for the app would be to implement powerschool, a web based student information system, into the app. Powerschool is the way Central Consolidated School District tracks attendance and grades. In layman's terms, we wanted the teacher's class roster to show within their app so they can easily check off which

students are present in the classroom and which ones are not. With this feature alone, we would be able to find students faster and weed out absent students. For example teacher A would report that a student is out of the classroom and another teacher needs to pull the student into their classroom. Teacher B would then claim the missing student and their name would be taken off a list. If a student was absent that day, our algorithm would compare the student's attendance from that day and bring this to the teachers attention. For example, student A was absent the day of a fire drill and instead of going on that missing students list, the teacher would know they were absent and save everyone else the trouble of looking for someone who is not there.

We have wanted to add parent and student page to the app since the beginning of this project. These would be separate pages but show basic information and what to do, similar to the teachers page. The app would send alerts to the parents to notify them of the situation and to advise them on what to do next. Students however would see which drill is in effect and what they themselves can or need to do.

Additional improvements we were looking toward was the use of location based services and a direct feed of the security camera for the principal. Using the phone's location is a messier subject to approach because of privacy issues we could run into. It could potentially save a student's life but there can be backlash if the administration is able to see where a student is at all times of the day.

Acknowledgements:

We wish to thank various people for their contribution to this project; Mr. and Mrs. Einhorn, for their constructive feedback during the February Evaluations, the staff of Shiprock High School and Bond Wilson Technical Center, for their help in collecting the data and our eventual results, and both the head of security and data for their suggestions and help in collecting additional data for us.

Special thanks should be given to Ms. Johnston, our project sponsor for her invaluable support and constant encouragement on this project.

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