Monitoring COVID Requirements

You are in charge of health at the University of Alabama in Huntsville. This is a tough year for you because of COVID-19. You have to make sure all the social distancing, mask wearing, and cleanliness rules are followed so that students, instructors, and staff are all safe from COVID. One aspect of this is monitoring compliance with COVID rules in the UAH classrooms. In order to save the cost of expensive networking equipment, you will use the Internet to transfer your data. Since you have recently learned AJAX (HTML, JavaScript, PHP on Apache web server), you will use this as your interconnection medium.

We will assume that normally each classroom provides space for 10 students and 1 instructor. We will be using hybrid teaching so at most half the class (5 students) comes each class period. Therefore, each classroom is divided into 5 Rectangles plus 1 additional Rectangle in the middle front of the room for the instructor. There is also a Rectangle (to the left of the instructor Rectangle at the front) where a student can wait to ask a (fairly private) question of an instructor, next to the instructor's Rectangle, for a total of 7 Rectangles (students are required to wait at their desks in their own Rectangle until the instructor's Rectangle is empty before moving to the instructor's Rectangle). Note that there is no desk in the question Rectangle (so there is nothing that need be wiped down). Only one desk is allowed in each Rectangle and only one student is allowed in each student Rectangle or in the question Rectangle, this ensures social distancing. Only the instructor and one desk are allowed in the instructor Rectangle.

There will be one bottle of Lysol sanitizing spray at each desk (inside each Rectangle). It is important that every time before class and after class the Lysol sanitizing spray is used to spray down the desk.

There will be one bottle of hand sanitizer at the doorway for student (and instructor) to use as they exit the room. It is important that after class each student and the instructor uses the hand sanitizer.

Each student must wear a mask. The instructor must wear either a mask or a faceshield.

Room Entrance: Hand Sanitizer Station		Instructor Rectangle DESK & Lysol	Student Question Rectangle	
Student Rectangle #1 DESK & Lysol	Aisleway	Student Rectangle #2 DESK & Lysol	Aisleway	Student Rectangle #3 DESK & Lysol
		Student Rectangle #5 DESK & Lysol		Student Rectangle #4 DESK & Lysol
Aisleway				

You will employ four different kinds of sensors:

1) A social distancing sensor that detects: zero, one, or more than one students/instructor present in each Rectangle (more than one is an alarm event)

2) A mask wearing sensor that detects: 1 mask worn correctly, 1 mask not worn correctly (alarm event), 1 faceshield worn correctly, 1 faceshield not worn correctly (Alarm event)

3) A weight sensor that detects events as follows: Event1: Lysol bottle lifted from desk, Event2: Lysol bottle returned to desk.   (If in any rectangle the Lysol bottle is not lifted and replaced at the beginning of a class *after the student enters the rectangle* it is an alarm event.) (If in any rectangle the Lysol bottle is not lifted and replaced at the end of a class *before the student leaves the rectangle* it is an alarm event.)

4) A hand sanitizer sensor that detect events as follows: EventA: student leaves room after hand sanitizer dispenses, EventB: student leaves room with hand sanitizer bottle not dispensing (alarm event).

You will have one of each of sensor type 1 and sensor type 2 in the question rectangle. You will have one of each of sensor type 1, sensor type 2, and sensor type 3 in all other student rectangles and in the instructor rectangle. You will have one of sensor type 4 in the Room Entrance rectangle.

You will support 3 classes total, with all 3 running simultaneously. You will have a button that marks the beginning and end of a class (this may be one or two buttons as desired). You will have a simulation of students entering and leaving the classroom, and sitting appropriately at their desks for class, etc. You will be able to set the number of students and which desk students will go to, each time. You will be able to set whether any of the above mentioned alarm events will happen. Make all of this information clearly configurable for each classroom/class session.

So you will do the following: 1) you will simulate student and instructor behavior and it will be configurable in all aspects discussed above, and 2) you will separately monitor using the above defined sensors all student and instructor behavior. 3) you will keep a running report of a classroom going on a central health server. 4) you will generate appropriate alarm messages on both server and in the classroom.

You will use XMLHttpRequest to communicate between your web browser and the servers in the central UAH COVID monitoring location.   All major events, including both normal events where students and instructors are following all the COVID rules, as well as abnormal events where a student or the instructor break COVID rules, will be noted to the servers.

Each alarm will show on the appropriate server. Also, a message will be returned back to the sensor (that sent the data to the server that caused the alarm) as a callback. This message will result in a JavaScript alert that will be associated with the appropriate sensor. It must be very clear which sensor is associated with which alert message. Also, at every message returned back to the sensor as a callback, it will update a line on the sensor giving the current status of that sensor as the associated server believes it currently is.

To turn in:

1. Your team will provide a demonstration of your working software.
2. Each member of the team will be asked questions related to the working of the software.
3. All source files submitted to canvas in a zip file with the names of all team members

Grading

Connects from client to at least one server	10 points
Hand sanitizer sensor+data sent+data returned+alarms	20 points
Mask sensor+data sent+data returned+alarms	15 points
Lysol bottle sensor+data sent+data returned+alarms	20 points
Social distancing sensor+data sent+data returned+alarms	15 points
Classes/classtime managed appropriately	15 points
Sufficient Comments	5 points