/\*\*

This is the pseudocode I made for our thesis. It's in C syntax, and we'll have to turn it into Java syntax eventually, but this is just to show the flow of our application. There's a few things we'll have to figure out, like how to obtain sample data from both the gyroscope and accelerometer at the same time because you can only do one or the other, not both; and how to store that data in an efficient format.

I don't think we should use a typical array for storing those values. It would consume too much memory. Maybe a CSV file, and we'll just write into it after every sample taken. I'm only using arrays because it's easy to visualize in-code. We also have to determine when to turn on/off the sensors to save battery. One thing I'm unsure of is how to continue monitoring if either there's no sudden spike, or there's

no change in orientation. I'll note this in the pseudocode.

Comments will be placed above the area of interest.

Let me know if there's anything you want to change.

\*/

**void** obtainSensors(){

/\*\*

Scan for available sensors (accelerometer, gyroscope, GPS)

We should create a number system for different use cases.

For example

1-if only accelerometer available

2-if accel and gyro available

3-if all available

4-if none available

Depending on which use case, we should adapt our application's message-sending accordingly

\*/

}

//check if accelerometer value breaks threshold

bool monitor(){

**float** accel = sqrt(get(x)\*get(x) + get(y)\*get(y) + get(z)\*get(z));

**if**(accel < 0.6g)

pointSixFlag = TRUE;

}

//obtain sensor value for an additional one second for further analysis.

//changes in arrays will be used in checkIfImpact() and //checkIfRotation()

**void** monitorOneSecond(AccelValues[], GyroValues[])

//turn on gyro sampling

gyro(on);

//we have to figure out how to do both at the same time

synchronous{

getAccelData(AccelValues[]);

getGyroData(GyroValues[]);

}

}

//determine if there was an impact, which means a drop in accel-values, //then a sudden spike above ~2g.

bool checkIfImpact(AccelValues[]){

bool res = FALSE;

/\*\*

Traverse array of accelerometer values and determine if there is a sudden spike.

The array to be used is the same as the one-second sampling (monitorOneSecond method)

\*/

**if**(spike)

res = TRUE;

**return** res;

}

//determine if gyroscope records sudden change in angular rotation //(rad/s)

bool checkIfRotation(GyroValues[]){

bool res = FALSE;

/\*\*

Traverse array of gyroscope values and determine if there is a large change in radians per second (rad/s)

The array to be used is the same as the one-second sampling (monitorOneSecond method)

\*/

**if**(largeChange)

res = TRUE;

**return** res;

}

**void** locateUser(Coordinates[]){

/\*\*

Utilize Google Maps API to determine latitude and longitude of user;

Store coordinates in array;

\*/

}

Message prepareMessage(String message, **float** Coordinates[]){

/\*\*

convert Coordinates array into a street address. This function is available in the API

Generate GPS map from coordinates.

Store both, along with the personal message defined in the settings menu, in a Message object and return the object.

\*/

}

bool promptUser(){

bool res;

//Would you like to send the emergency message?

**if**(yes){

res = TRUE;

}

**else**{

res = FALSE;

}

**return** res;

}

**void** sendMessage(Message help){

/\*\*

Convert Message object into a SENDABLE format (SMS)

For each contact number, send the message.

Message should contain 'personal message', 'street address', and 'Google Map'

We have to find a way to make sure at least the personal message and street address are sent.

If possible, we should provide a link for the receiver to click on that will open up the

browser on their smartphone so they can view the Google Map

\*/

}

main{

//determine which sensors are available on smartphone

ObtainSensors();

//false if accel > 0.6g; true if accel < 0.6g

bool pointSixFlag = FALSE;

//turn on accelerometer sampling

accel(on);

**while**(pointSixFlag){

monitor();

**if**(pointSixFlag == TRUE){

bool ifImpact;

bool ifRotation;

**float** AccelValues[];

**int** GyroValues[];

**float** Coordinates[];

monitorOneSecond(AccelValues[], GyroValues[]);

//turn off gyro sampling

gyro(off);

ifImpact = checkIfImpact(AccelValues[]);

ifRotation = checkIfRotation(GyroValues[]);

//if one of these is false, how do we return to //monitor()?

**if**( ifImpact == ifRotation == TRUE ){

//determine GPS location of user

locateUser(Coordinates[]);

//prepare message and location in READABLE //format.

Message help = prepareMessage(message, Coordinates[]);

//allow user to cancel message if not injured

**if**(promptUser() == TRUE){

sendMessage(help);

}

**else**{

//return to application menu

exitMonitoringPhase();

}

}

}

}

}