**SENSUS 101**

* Sensus is a system for “crowd sensing”
  + monitors various information coming through the sensors
  + prompts users to input their own information
  + collects the information
  + anonymize the information
  + stores information for analysis (local or cloud storage)
* Sensus uses multiple Probes - digital instruments that can collect information from the multiple sensors found in all smart phones
  + 2 types of Probes - Polling and Listening
    - Polling Probes - at set intervals these probes turn on and collect data from the phone’s sensors or the user of the device, then stores the data
    - Listening Probes - these probes turn on when a predetermined set of actions happen
      * example: the listening probe is programmed to turn on when the phone accelerates to the right or left - when the phone moves in such a way, it will turn on and collect specific data points

The following probes are all available for both Android and iOS:

-Facebook data

-Phone calls

-Sound level

-Battery level

-Screen on/off

-Altitude  
-Points of interest proximity

-Compass heading

-location

-acceleration

-speed

-WLAN access point - basically what Wifi router they are using

-Interactive scripts - surveys

-iOS has various health related polling probes (because of HealthKit)  
 -Many people do not have data stored in HealthKit so this isn’t as useful as it sounds

Step 1. Download Sensus from the App Store

Step 2. Run Sensus on your mobile device

Step 3. Create a new protocol (click the blue button in the top right corner and select “New Protocol”)

Step 4: Click on the New Protocol just created: labelled “New Protocol (Stopped)” select “Edit”

Step 5: Name the protocol as your test: “Questionnaire 3”  
  
Step 6: The shareable feature allows others to take the test, switch this to green.   
  
Step 7: Under “Description:” write a brief description about what you are testing (this will be displayed to the participants of the study).  
  
Step 8: Set the length of the test with “Participation Horizon (Days):” by placing a number  
  
Step 9: Insert your email or the email of the test administrator under “Contact Email:”  
  
Step 10: The groupable function is a feature in which participants are randomly assigned to a protocol variation when they enroll. To turn this on, switch groupable to green.  
  
Step 11: “Force reports” is if you want reports of the test sent directly to AWS or a console, turn this on  
  
Step 12: The reward threshold feature allows you to set a percentage of completion (a number between 0 and 1) that identifies if subjects that have completed *x* amount of the test.  
  
Step 13: Select “Remote Data Store” and select where you would like the data to be stored, you will most likely be storing it using AWS S3.

Step 14: If you would like to set points of interest (geographic locations that cause probes to be triggered) click on “Points of Interest” and then create one by clicking on the blue dot in the upper right hand corner and filling out the requested information. If you do not need to set points of interest just continue to Step 15.  
  
Step 15: Select “Probes” to be taken to a list of all of the probes available through Sensus. After the name of the probe, the type is listed in parenthesis (listing or polling). To use a probe you must select it, switch “Enabled” to green and make sure that “Store Data” is also turned on. Sensus offers various “Anonymization” options for data points such as Device ID, latitude, longitude, and timestamp. To switch between the options, select the box and a scrolling list will appear of other available options.  
  
Step 16: If you would like to use scripted interactions (interactions that require the users to answer questions) then you must select “Scripted Interactions” and turn enabled to “green”.  
  
Step 17: To create the interactions you must select “Edit Scripts” and then create a new script by selected the blue button on the top right corner.  
  
Step 18: In order to edit the script, select the one you just created and select “Edit”. Name the new script under “Name:” and to it on by switching “Enabled:” to green. If you would like to allow participants to cancel the interaction leave “Allow Cancel” turned to green, else switch this option off. In general, everything else should be kept as the default setting.  
  
Step 19: In order for a Script to work you must do two things, one is to set the input groups (groups of individual questions that can be displayed to randomized groups of people) and you must edit the triggers that tell Sensus under what conditions an interaction should take place.  
  
Step 20: To create input groups, select “Edit Input Groups”, select the blue dot in the upper left hand corner, and select “Edit”. Name the input group.  
  
Step 21: To create individual inputs, select “Edit Inputs”, and press the blue button in the top-right hand corner once for each input you would like to collect from subjects. When you select the blue button, you will be prompted to pick which type of interaction you would like to display. The choices are relatively self explanatory. The “Picker (Dialog)” option prompts the user to select an option from a scrollable option chooser. The “Picker (Page)” option prompts the user to select an option from a page, where all of the options are displayed at once.  
  
Step 22: The steps to set up an individual question will vary depending on which type of input you select. Select each input, choose to edit them and you will be taken to a page where you can type the question, give pointers, and various other options depending on the input type.  
  
Step 23: Once you have created all of the inputs that you would like to for your first input group, back out (pressing the back arrows in the top left-hand corner) until you return to the “New Input Group” page. If you would like to display different inputs to different groups this is where you would create multiple groups. Create a new group, then create all of the inputs for that group (repeating Step 22).  
  
Step 24: When you have created all of the groups that you need, back out again but this time until you are back at the “Script” page. Once here, select “Edit Triggers”, on the ‘Script Triggers” page, select the blue dot in the upper right-hand corner to create a new one (to do this you must have at least one script other than “scripted interactions” turned on). Under the “Add Trigger” page, select a probe, and the conditions in which that probe will collect data.  
  
Step 25: Back out all of the way to the “Your Sensus Studies” page and select your protocol, select “Start” in order to begin the test. **HOW TO CONFIGURE WITH AWS S3 Bucket (For Mac)**

Step 1: Open up Terminal

Step 2: enter the command: pip install awscli

If you get an error here and it does not install successfully, enter the command:  
 Downloads user$ sudo pip install awscli

Step 3: install jq with the following command:

brew install jq

Step 4: Sign up for an account with Amazon Web Services, the Free Tier should cover everything you need  
  
Step 5: Create a new bucket, name it based on your study, for the follow steps we will assume a bucket named ‘BUCKET’

Step 6: Run the following command in your terminal:

./ConfugureAwsForExperiment.sh BUCKET EXPERIMENT

The variable experiment here is the name for your experiment

Step 7: If the command is run successfully, the output will look something like this:  
 All done:  
 Cognito identity pool ID: us-east-1:b75b2775-215c-428c-bfbe-4ce5a8278627  
 S3 path: arn:aws:s3:::BUCKET/EXPERIMENT/\*

Step 8: At some point you may be asked to provide a AWS Access Key ID and a AWS Secret Access Key - both of these can be found by logging into your AWS Console. You may also be asked to provide a Default region name, if so insert ‘us-east-1’. If asked to provide a default output format, leave that blank.

Step 9: Once you have the Cognito identity pool ID, copy and paste it into an email and send it to yourself. Open the email on your phone, copy the ID and open the SENSUS app. Navigate to the Remote Data Stores and paste the ID into the allotted field.