Setting up Cozmo robot for Participant handout:

Requirements for this setup:

1. Cozmo robot
2. A device running Android OS

We used Lenovo Android Tablets running Android Lollipop 5+

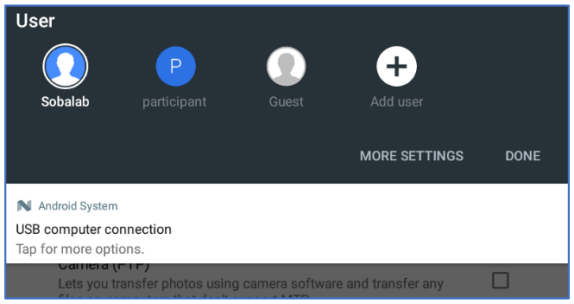
- Lenovo Tab 7 (1GB RAM + 8GB storage)
- Lenovo Tab 8 (2GB RAM + 16GB storage)

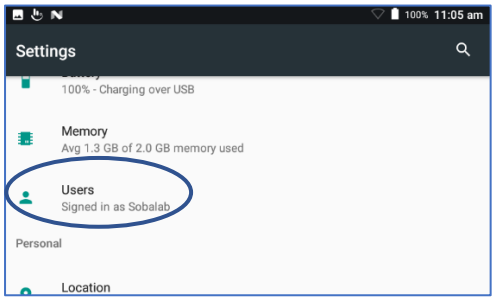
Of these we would recommend the latter due to larger RAM capacity. Anki has a whole list of compatible devices listed here: https://support.anki.com/hc/en-gb/articles/360004696273 . The list is by no means exhaustive. They say that if a device can download and install Cozmo app, it can probably run it. However, for our purposes we have tested it with devices that are only running Android version 5-7.

Create two Users:

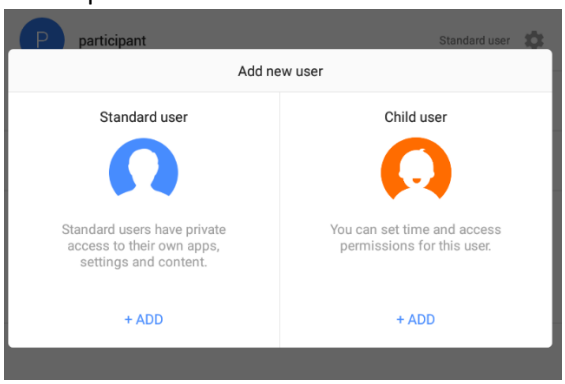
This step is only for those devices that allow the facility to create additional users. Otherwise do not do this step.

1. We want to add a new user so on the device, so find the functionality to do so. It may be in the utility dropdown or in Settings





2. Add the new user as a "Standard User" with a relevant name but **without any password**. We named this user 'Participant'.



3. Do not allow participant user any additional rights. If they are automatically assigned remove them.

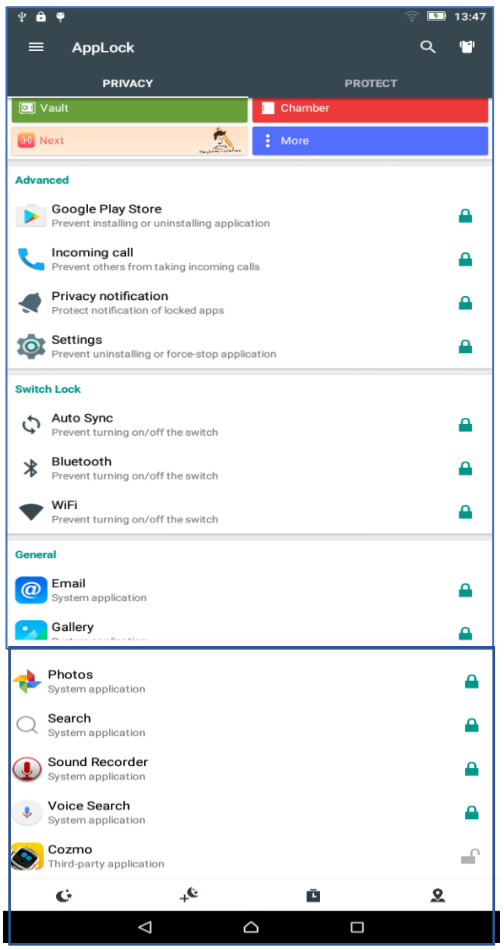
Device and Applocker Setup:

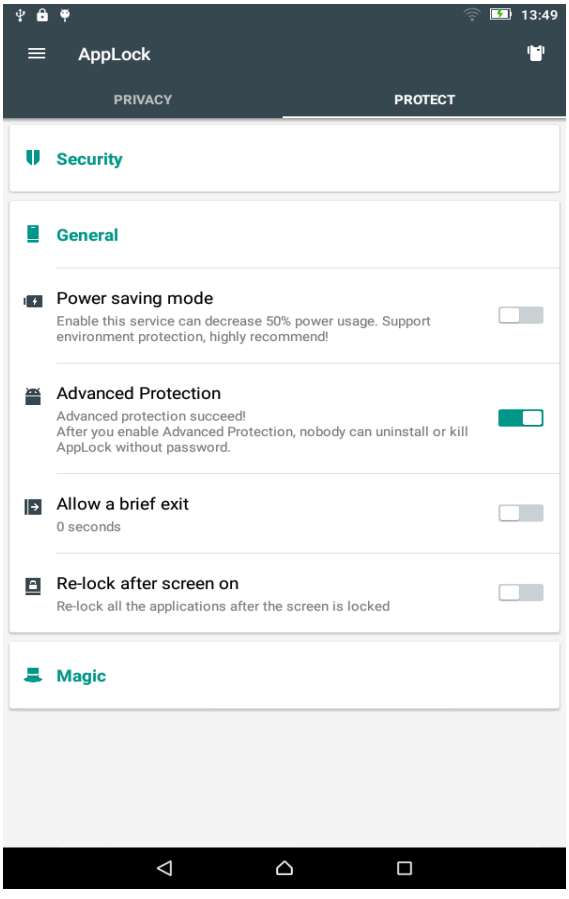
This step is slightly different for those with the ability to create Admin and participant user and for those who are allowed only one user. We will be setting up multiple security codes. Every unique security code we set will need to be remembered, so best to keep a note of it. We want to install an AppLocker. There are several free Applocker available on GooglePlay Store. Choose one that allows the facility to lock installing/uninstalling software or has an ***Advance Protection add-on.*** *This add-on will sometimes be a separate app to download*.

Single User Setup

This setup is for when the device allows only one user.

1. An email will need to be provided to log into GooglePlay.
2. GooglePlay will try to synchronize all different Google apps on different devices associated with the email. Select to not do so if option is provided.
3. Download and install the Applocker (and the Advance Protection add-on). Check it has installed on both the Admin user and the participant user. Do not setup anything now.
4. Remove email account provided for GooglePlay from Settings>Accounts
5. Select and remove everything from the home screen so that it has nothing on it.
6. Uninstall all apps other than AppLocker that allows you to do so. *(optional to help with memory usage)*
7. Disable all google and non-android apps. *(optional to help with memory usage)*
1. Access to this **must not** be locked **or** it should use a security code that is different from all other code as this code should be given to the participant. *(Note, we have used the first no lock option)*
8. Install Applocker if not already installed. If the Applocker Advance Protection add-on is a separate app, now is the time to install it. Once installed it will merge with the Applocker and hide it or give the option to hide it.
9. Start the Applocker and setup the locking code
10. Use the Applocker to ***lock all apps***. And, use the "Advance Protection" option to prevent uninstallation of the Applocker itself. See the screenshots included for Applocker settings on the participant user side.
11. To test whether e the advance protection has been done successfully, try to uninstalling the Applocker. It must ask for the security code to allow uninstallation. (Don't actually uninstall Applocker)





Applock settings in Single user mode

From this point onwards everything other than access to participant home screen should require security code. If not, revisit last steps. Also, check if the procedure is different to achieve this on your device.

Dual User Setup

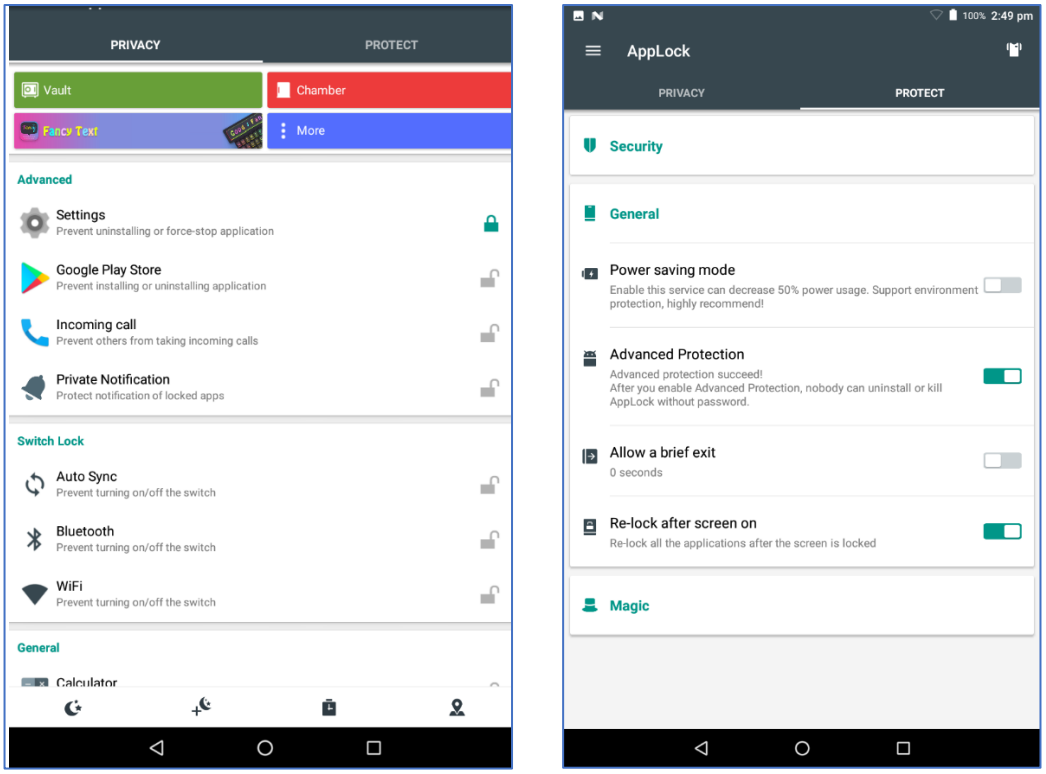
This is for setting up Applocker for dual users. This might need to be done as the Admin user for both users or may need to be installed separately for Admin user and participant user. This depends on the device used.

2. Provide email to log into GooglePlay.
3. Select not to synchronize device with others with the same email.
4. Download and install the Applocker (and the Advance Protection add-on). Check it has installed on both the Admin user and the participant user. Do not setup anything now.
5. Remove email account provided to GooglePlay from Settings>Accounts
6. Now go in as the Participant users
7. Select and remove everything from the home screen so that it has nothing on it.
8. Uninstall all apps other than AppLocker that allows it. *(optional to help with memory usage)*
9. Disable all google and non-android apps. *(optional to help with memory usage)*

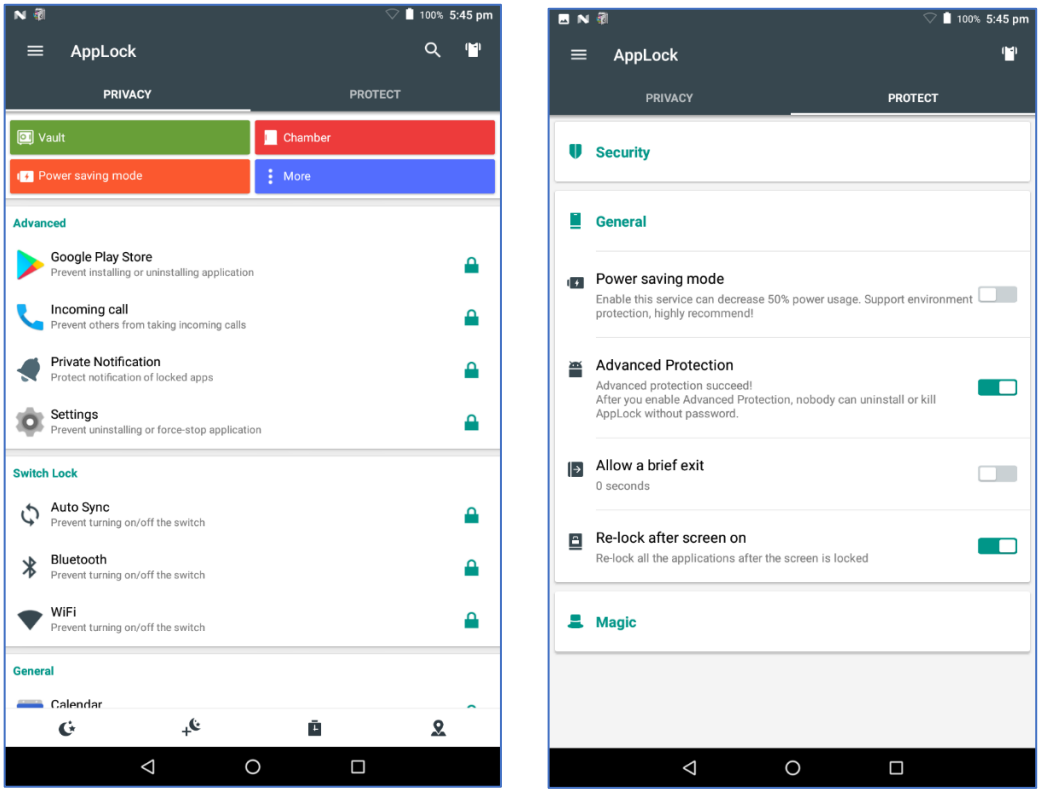
10. Now switch to ***Admin user.***
11. The access to the Admin user **must** be locked with password/pin/pattern or any other available method.
12. If the Applocker Advance Protection add-on is a separate app now is the time to install it. Once installed it will merge with the Applocker and hide it, or give the option to hide it.
13. Start the Applocker and setup the locking code
14. On the Admin side use the Applocker to lock the Settings app, the other apps maybe left unlocked. And, use the "Advance Protection" option to prevent uninstallation of the Applocker itself. See screenshot included for Applocker settings on the Admin user side
15. To test whether the advance protection setup is successful, try to uninstall the Applocker. It must ask for the security code to allow uninstallation. (Don't actually uninstall the Applocker)

16. Now switch to the ***Participant user side***. Access to this **must not** be locked **or** else it should use a security code that is different from all other code. And this code should be given to the participant. *(Note, we have used the first no lock option)*
17. Install Applocker if not already installed on the participant. If the Applocker Advance Protection add-on is a separate app now is the time to install it. Once installed it will merge with the Applocker and hide it, or give the option to hide it.
18. Start the Applocker and setup the locking code
19. On the participant side use the Applocker to ***lock all apps***. And, use the "Advance Protection" option to prevent uninstallation of the Applocker itself. See the screenshots included for Applocker settings on the participant user side.
20. To test whether the advance protection setup is successful, try to uninstall the Applocker. It must ask for the security code to allow uninstallation. (Don't actually uninstall the Applocker)

From this point onwards everything other than access to participant home screen should require security code. If not, revisit last steps. **Also, check if the procedure is different to achieve this on your device.**



Admin User Applocker Settings in Dual User mode



Participant user Applocker settings in Dual User mode

Installing Cozmo app version 1.5:

(After completing this section everything other than the following should require security code.

- ***Access to participant home screen***
- ***Access to Cozmo app***

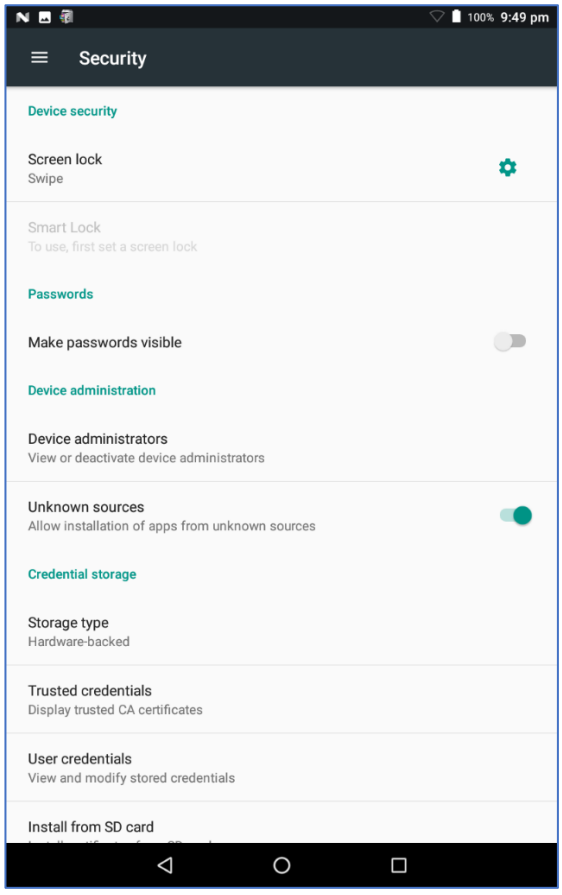
If not, revisit last steps. **Also, check if the procedure is different to achieve this on your device.*)***

We used Cozmo app version 1.5. The latest version of the Cozmo app can be installed from Google Play Store but it may have newer animations and events to log than those described for this study. To install the 1.5 version of the Cozmo installer (.apk file) and the data (.obb file) can be found here:

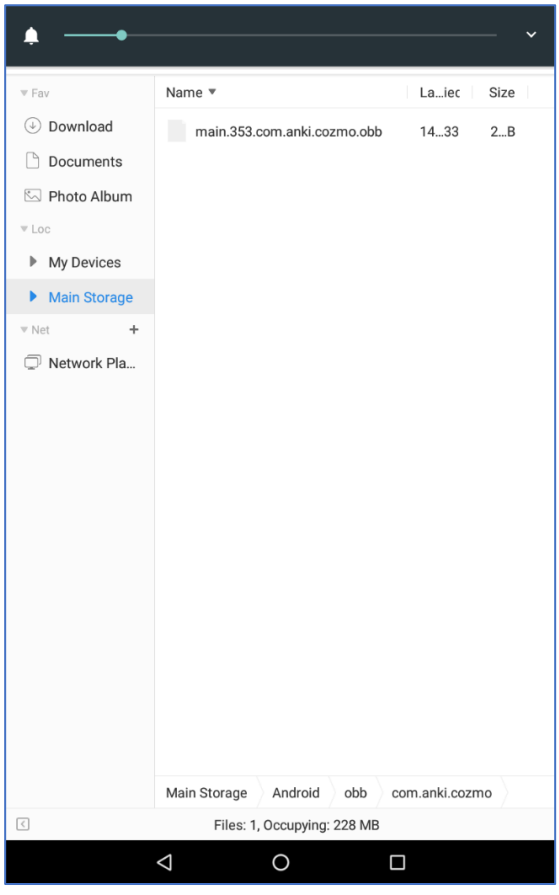
https://www.dropbox.com/sh/l8nkx91od4w9skz/AAAHRkqDGtRK8vnv73yuWSHNa?dl=0

For dual users, go into participant profile and connect to the internet.

1. Download and copy the cozmo-anki-cozmo.353.apk file to the Android device Download folder
2. From Settings> Security switch on installing app from Unknown sources.
3. Tap the apk to install the Cozmo app
4. Now go back to Settings> Security and switch off installing app from Unknown sources option
5. Download the com.anki.cozmo folder which contains the main.353.com.anki.cozmo.obb file.
6. On the device this needs to be put in ***InternalStorage/Android/obb*** folder. *Create the obb folder in Android if it does not already exist.* In the obb folder create the folder ***com.anki.cozmo*** and then copy main.353.com.anki.cozmo.obb into it (screenshot provided below)



Unknown Source Option



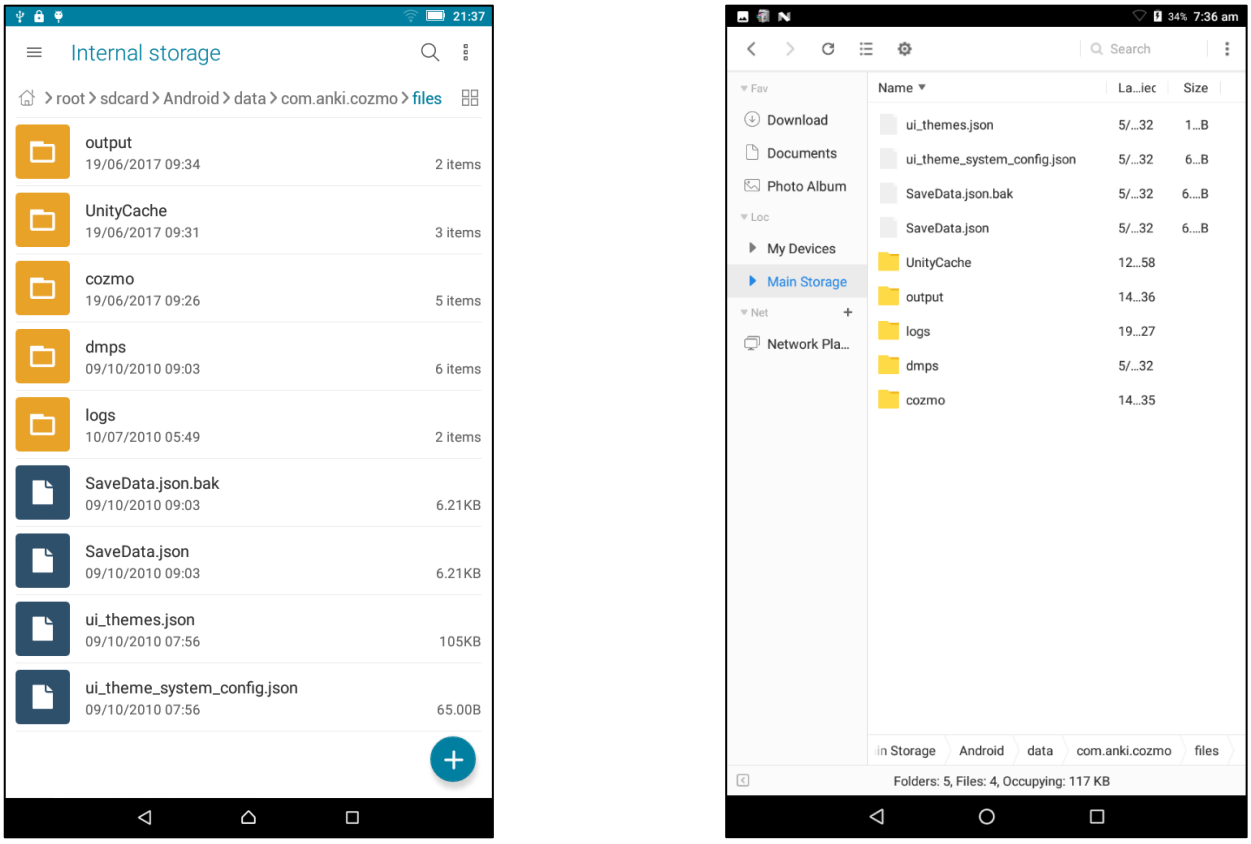
Location of obb file

7. Put a shortcut to the Cozmo app on the home screen. This should be the only thing on the screen. This is purely so that participant do not try starting up other apps but have a convenient and clean access to Cozmo without looking for it.

8. At this stage we will need to set up the tablet's wifi to connect to Cozmo's wifi. Cozmo's wifi shows up when it is on its charger and it's lift/arm is raised up and down once. Note Cozmo needs to be on its charger to do the next steps.
9. Put Cozmo on the charger and start up the app.
10. If the Cozmo robot that has already been synced and updated to a later version, then making it work with an older app will ask to update the app. To get around this we will need to factory reset the Cozmo robot following the instructions here: https://support.anki.com/hc/en-gb/articles/360003912894-How-to-reset-Cozmo-to-factory-firmware
11. With a new or factory reset Cozmo, after the initial update and synchronizing, it will ask to register the app with name and date-of-birth
12. Our advice is to use a generic research or lab name at this point and a date of birth that is not linked to any known person.
13. Once the previous step is complete, close the app and take a copy of the SaveData.json and the SaveData.json backup. They can be found here: *Android/data/com.anki.cozmo/files*
14. Now delete all .das files from the log folder (*Android/data/cozmo.anki.cozmo/cache/DASLogs)*
15. Restart the app and play with cozmo for about 5minutes. Then check that there are multiple .das files in the log folder. If there is only one or two .das file then check the *Trouble Shooting* section at the end of this document.

Justification of storing the SaveData.json app:

The SaveData.json files are usually in *Android/data/com.anki.cozmo/files* folder. They save a snapshot of the latest progress of the games and tasks with Cozmo. When the app is closed and reopened again it would refer to this file to locate reload point. The point at which we are recommending saving the file is just after first registration. We have just completed the saving of sensitive data such as name and birthday. We do not want the participants to enter these, so, we are setting our own generic information. Also, we are saving it at a loading point when there are no coins and sparks reward collected. This is our level playing field for the first and the subsequent participants.

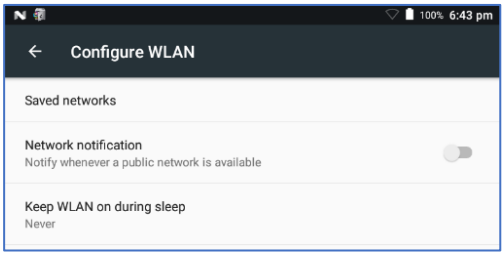


The Android/data/com.anki.cozmo/files folder containing SaveData.json in Lenovo Tab 7(a) and Lenovo Tab 8(b)

Steps before handout:

Before handing out the Cozmo we need to check and lock the Wifi to Cozmo robot's Wifi and the USB settings are reset. Also, any trace of previous use needs to be deleted to guarantees that every participant gets the same start-point. All the following steps has to be done on the participant side.

1. To not let the device change Wifi. Go into Settings>WLAN (Wireless connection) and check
    a. Available Network notification is off
    b. Only Saved network is Cozmo's network
    c. The Wireless is on

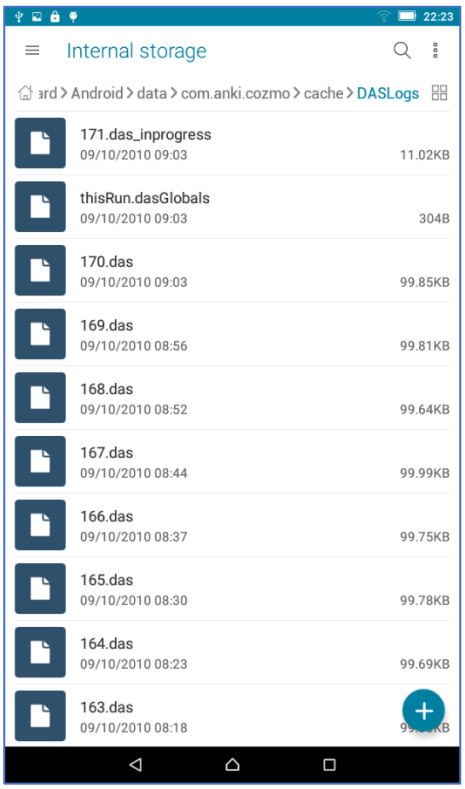


2. Open the Cozmo app and go to setting. Scroll right to find the inbuilt "Erase" feature. Press and hold to delete all games and feature unlocked and reset the Cozmo. However, the coins and sparks are still there.
3. Close the Cozmo app and copy Savedata.json and Savedata.json.backup to : *Android/data/com.anki.cozmo/files*
4. If there is permission problem with copying to the location, there is a workaround from comand-line or shell using the Android Debug Bridge (adb) . Once the bridge is setup, the debugging mode needs to be switched on the device. Information on how to do this is available from Anki via, http://cozmosdk.anki.com/docs/adb.html. At the command-line change directory to the folder to where the SaveData.json is saved and copy the following commands to the command-line

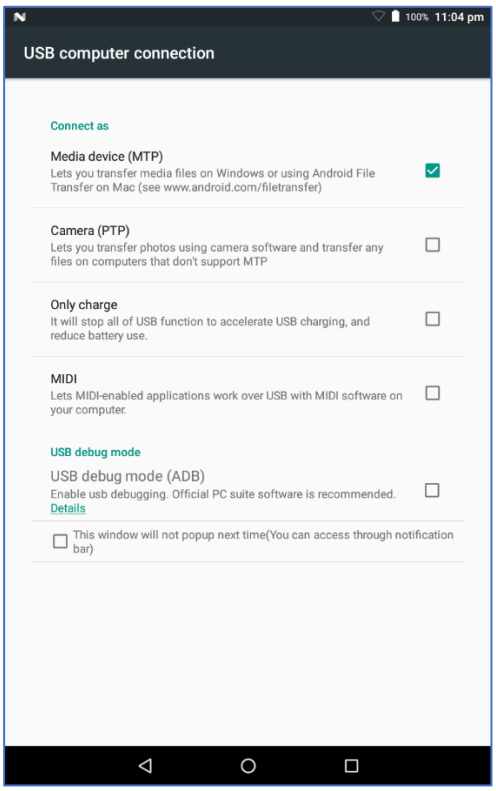
> *adb root*
> *adb push SaveData.json /sdcard/Android/data/com.anki.cozmo/files*
> *adb push SaveData.json.bak /sdcard/Android/data/com.anki.cozmo/files*

5. Make sure all the app logs have been removed. If it is the log data of the previous participant, check it has been backed up before deleting. For us, the log files were in the folder *Android/data/cozmo.anki.cozmo/cache/DASLogs*.

6. The USB connection setting to computer must be set to 'Charge Only' as shown below. If Debug mode was on this should be switched off too.



The indexed .das files logging from Cozmo app



USB connection settings

Extracting and backing up the data collected.

This is the point where the Cozmos have been handed out to the participants and they played for N number of days and have come back with the Cozmo and device.

1. To move the files to a computer or backup storage, connect it to the USB port as a "Media Device" or MTP permission.
2. For us the log file folder was in the folder ***"Android/data/cozmo.anki.cozmo/cache/DASLogs"***. In some cases, the Android folder is not visible on the computer depending on operating system and drivers. In such case moving the log files to the Download folder is a possible workaround.
3. For extracting using a macOS you would need an "Android File Transfer", which can be downloaded from the official android website: https://www.android.com/filetransfer/
4. Once log files are copied to the desired folder on the backup storage, they may be deleted from the Android. Alternatively, the device maybe reconnected to the internet for Anki's collection process to kick in.
5. Note, once the ".das" log files are removed from the folder the Cozmo app will start reusing the indexes. So, a method is required for tracking the chronology of the extracted logs. This may be done by maintaining timestamped collection folders or Participant_ID indexed folders on the backup storage each time the logs are extracted to it. Whether you need to use Participant ID or timestamp depends on how many repeat blocks you have with one participant. You may want to use a combination of both the suggestions
6. Now you will have to clean the logs to find the relevant information.

Trouble Shooting:

There are no logs or just one log after playing for 5 minutes or more:

There can be many reasons why that may happen. Here are 3 that we faced.

1. In A*ndroid/data/com.anki.cozmo/files* folder and subfolders look for documents that have the word "Privacy" in its name. Delete these and retry.
2. Check the Wifi is not getting connected to some open Wifi. Recheck the setup section.
3. Did your participants play at all? You can crosscheck by opening with the SaveData.json in a text Editor and seeing what loading point they have reached and what their current goals are.

When I start Cozmo the screen glitches:

This is the RAM (memory) overrun problem. We need to stop running all unnecessary apps so that the RAM isn't used up. These were mentioned as optional steps in the *Device and Applocker Setup* section. When we used 8MB RAM, we could not correct this, but the app ran after the initial glitched screen. This was fine for the purpose of our experiment.

When I start Cozmo, the loading screen shows and then goes black and freezes:

This is the RAM (memory) overrun problem. We need to stop running all unnecessary apps so that the RAM isn't used up. These were mentioned as optional steps in the *Device and Applocker Setup* section. For us, when using the 8MB RAM, the initial introduction video caused this memory overrun. To work around it we blocked some of the introductory videos. This can be done by changing the following entries to true/false in the ***SaveData.json*** file. Try one at a time and see if things improve.

"FirstTimeUserFlow":false	This prevents the first introductory video from playing.
"GameInstructionalVideoPlayed":{ **"FaceEnrollmentTest":true,** **"SpeedTapGame":true,** **"CubePounceGame":true,** **"DroneModeGame":true,** **"MemoryMatchGame": true** **}**	Each of these entries prevents introductory video for the corresponding game from playing.