Think Aloud

INFR11158/11230 Usable Security and Privacy

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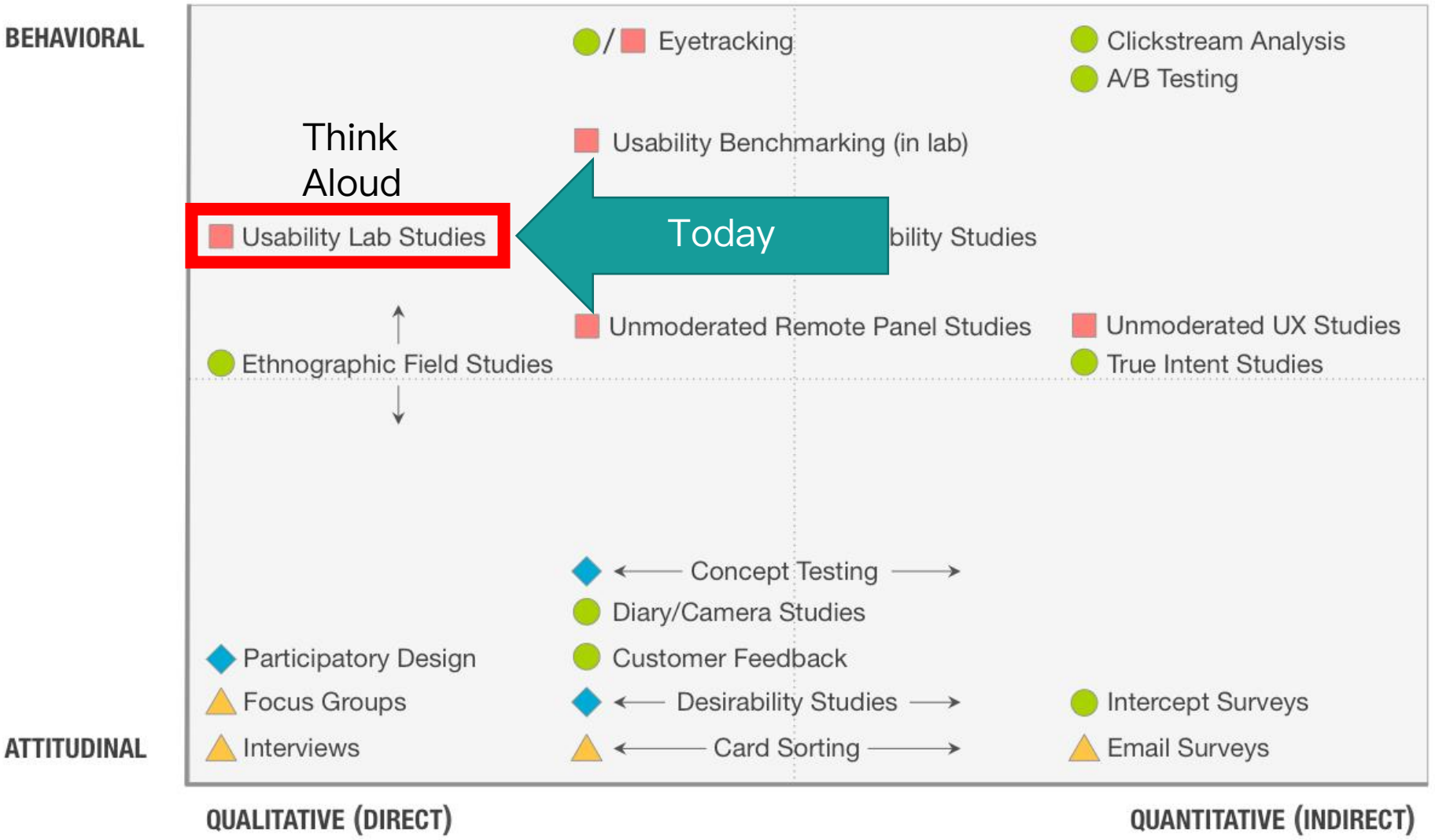
Lab studies are a simple idea. You ask a user to come into a physical space and ask them to interact with the interface there.

Lab Study

- Basic idea: Have a participant come to a physical place (lab) and interact with the interface there
- You setup the lab so it mimics the situation you want to test
- Pros
  - **Full control over the environment** so limited confounds
  - **Detailed data** from each subject
  - Ability to **ask them why** they did something
- Cons
  - **Small sample sizes**
  - Being in the lab **changes user behavior**. They feel safer and their normal distractions are gone. That can be bad for deception studies.

Think aloud

A Landscape of User Research Methods



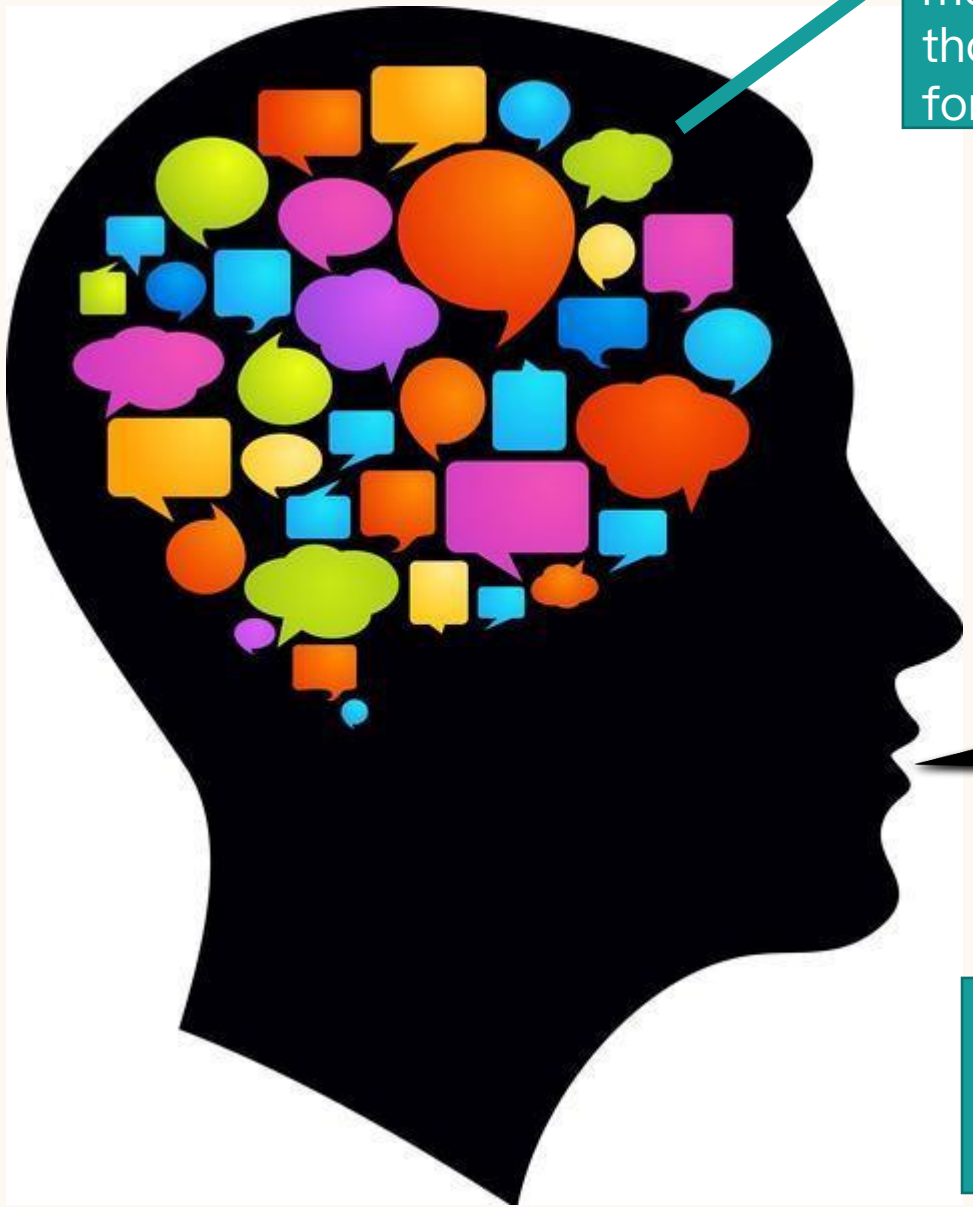
KEY FOR CONTEXT OF PRODUCT USE DURING DATA COLLECTION

- Natural use of product
- Scripted (often lab-based) use of product
- De-contextualized / not using product
- Combination / hybrid

https://www.nngroup.com/articles/which-ux-research-

Think aloud

- Basic idea: Have a participant use the interface and speak aloud while they do so
- Think aloud is a very versatile, can be long or short, detailed or minimal, planned or ad–hoc
- Pros
  - Learn what the user is trying to do and why they click on some things
  - Very detailed information
  - Testing with about 5 users will find the majority of major (usability) issues
- Cons
  - Only possible
  - (Concurrent) Talking aloud changes how long a user spends on tasks so this method cannot be combined with timing



Think–Aloud aims to measure **what is in the person's head** at that moment, even if those thoughts are poorly formed.

If we ask the user to **"explain"** their thoughts then they have to convert the jumble in their head into a linear English sentence.

Converting thoughts to sentences forces users to think more and **changes their behavior**

Hm… I'm thinking about what I need to say next… Maybe this button is the one I need.

We ask users to "talk aloud" and we do not interrupt them so that they behave just as they would normally. If you interrupt or ask them to explain it changes their behavior.

Help users think aloud

https://www.nngroup.com/videos/think-aloud/

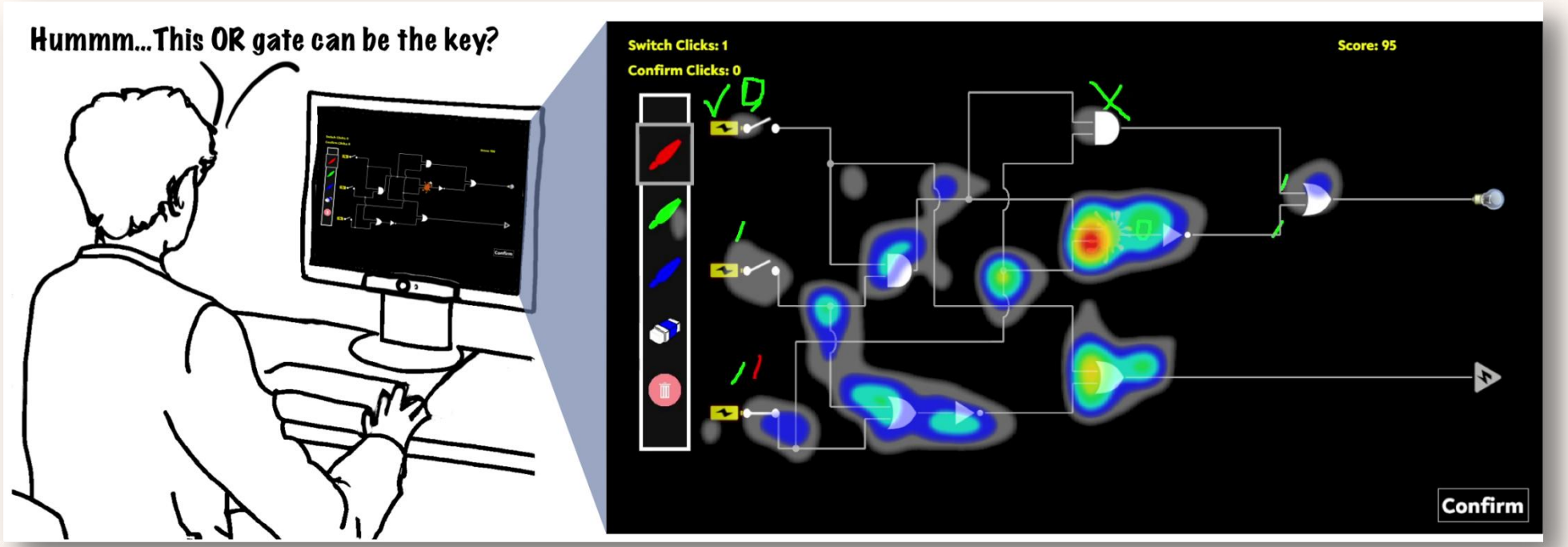
Concurrent and retrospective think-aloud

Concurrent and retrospective think–aloud

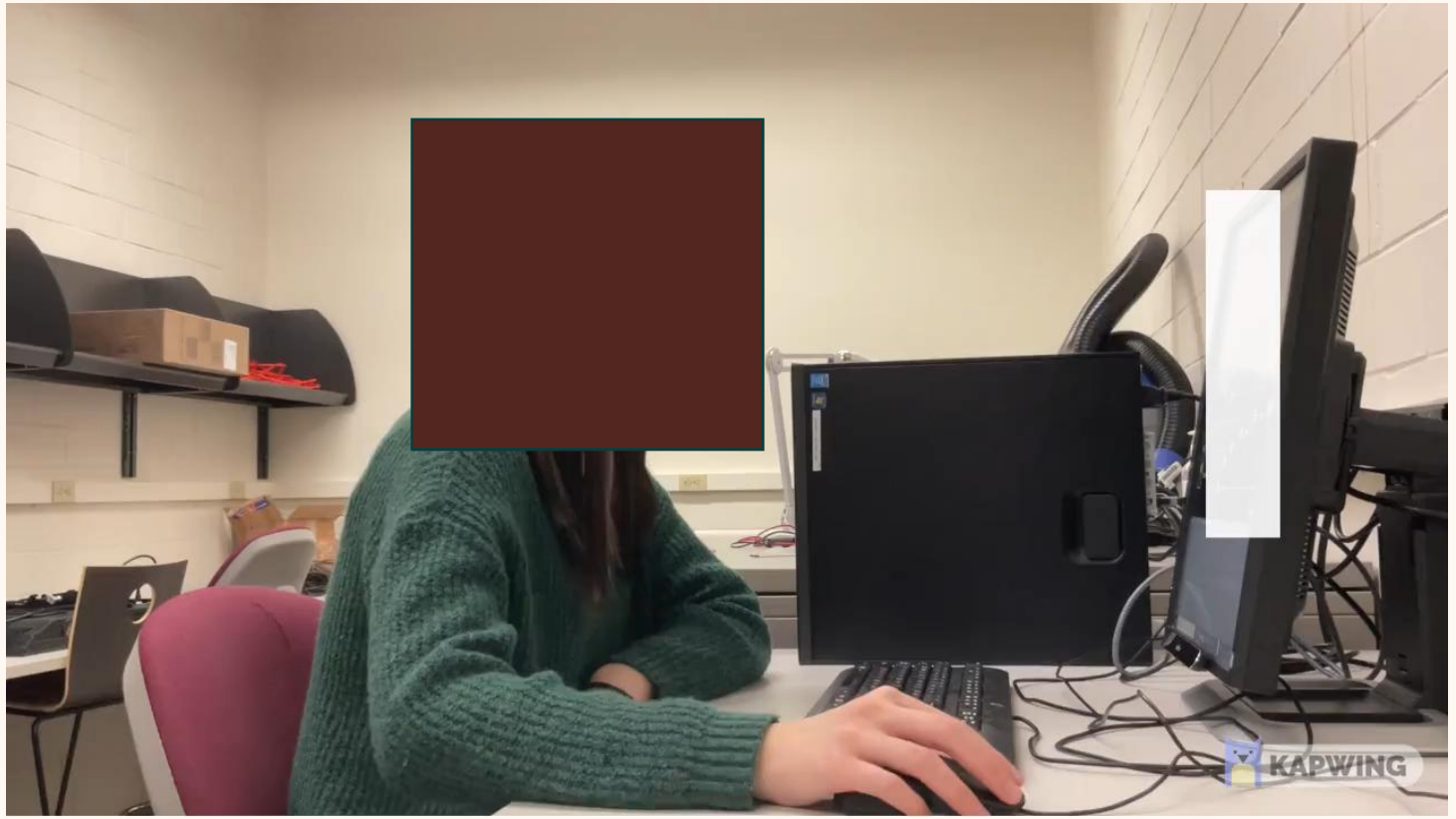
- Concurrent: participants verbalizing thoughts while performing the task
- Retrospective: participants retrace their steps after completing the task
  - Pro: better timing; less disruption
  - Con: forgetting; recency effect

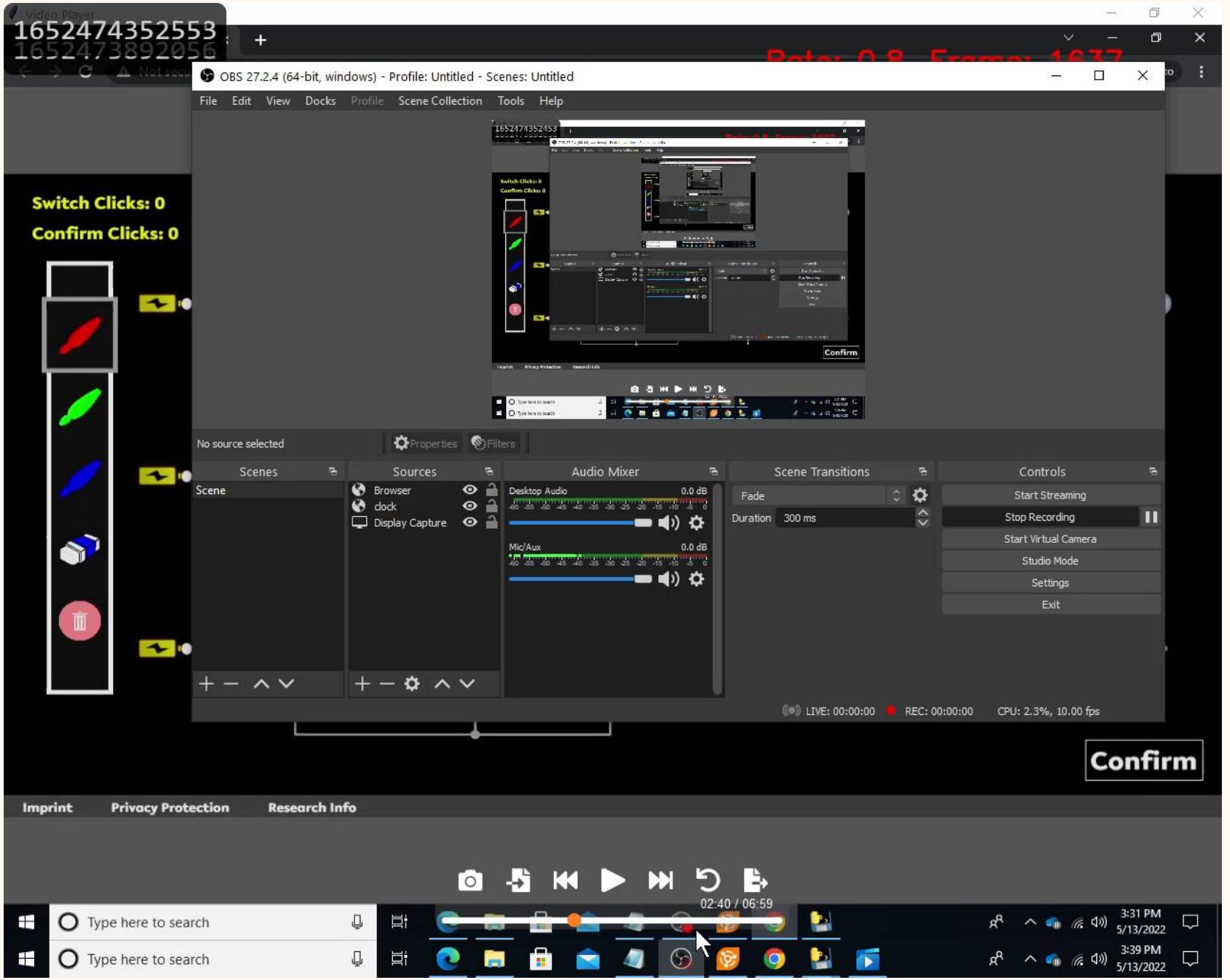
Think aloud + eye tracking

How people perform (hardware) reverse engineering?



René Walendy, Markus Weber, Jingjie Li, Steffen Becker, Carina Wiesen, Malte Elson, Younghyun Kim, Kassem Fawaz, Nikol Rummel, and Christof Paar. I see an IC: A Mixed–Methods Approach to Study Human Problem–Solving Processes in Hardware Reverse Engineering. ACM CHI 2024 (to appear)


KAPWING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OBS 27.2.4 (64-bit, windows) - Profile: Untitled - Scenes: Untitled
File Edit View Docks Profile Scene Collection Tools Help
Switch Clicks: 0
Confirm Clicks: 0
No source selected
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Filters
Scenes
Scene
Sources
Browser
dock
Display Capture
Audio Mixer
Desktop Audio 0.0 dB
Mic/Aux 0.0 dB
Scene Transitions
Fade
Duration 300 ms
Controls
Start Streaming
Stop Recording
Start Virtual Camera
Studio Mode
Settings
Exit
LIVE: 00:00:00
REC: 00:00:00
CPU: 2.3%, 10.00 fps
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Imprint
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Research Info
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Type here to search
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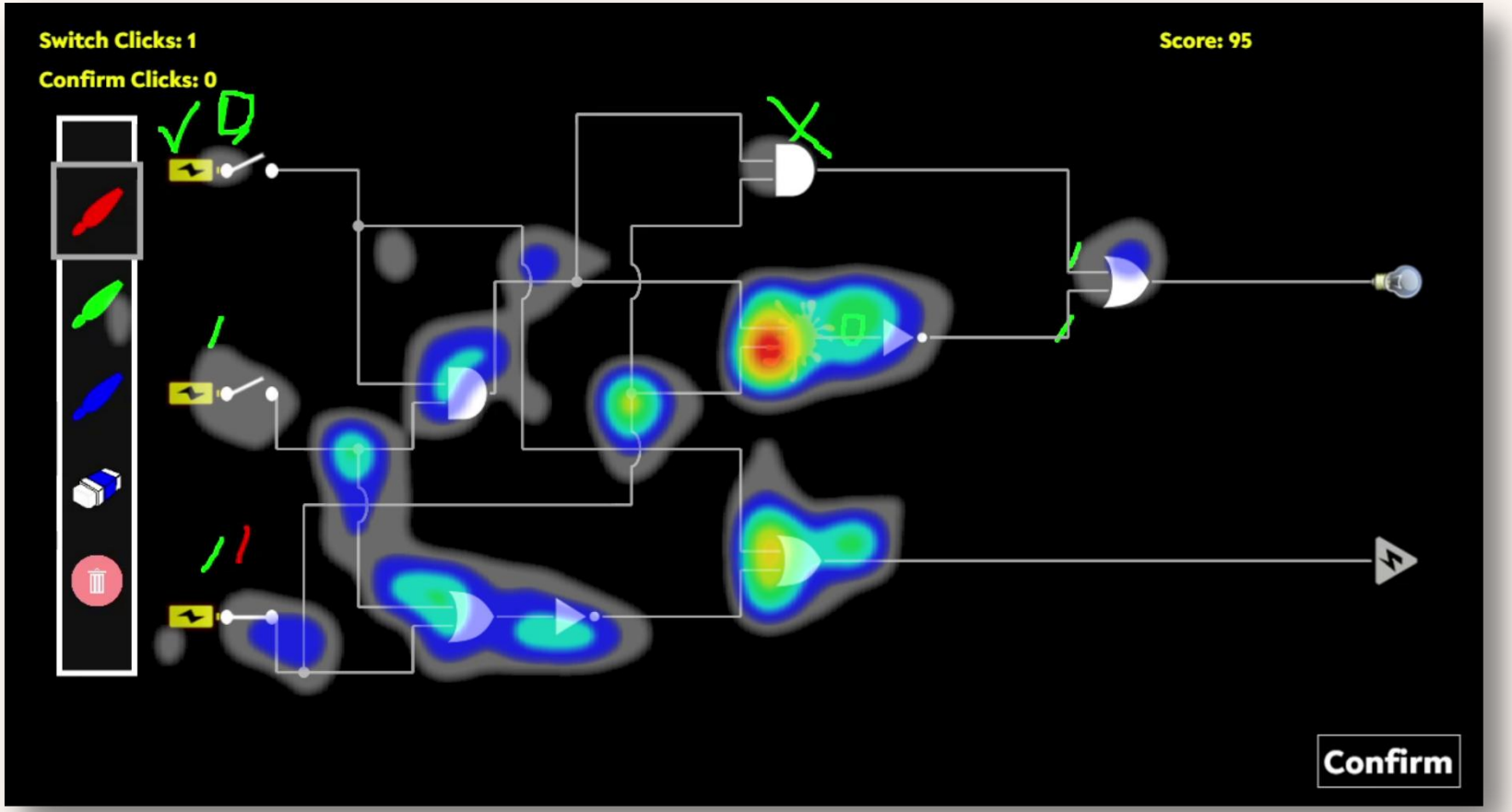
3:39 PM
5/13/2022


Switch Clicks: 1
Confirm Clicks: 0
Score: 95
Confirm

How to design a (think aloud) study?

- Understanding the security and privacy implications of the technology
  - Ask (yourself) a set of questions
    - What is the purpose of this technology?
    - What threats is the technology designed to protect users against?
    - How should an end–user interact with this technology to ensure that they are “safe”?
    - Are there any steps they need to do?
    - Are there any errors they could make that might put them in a dangerous situation?
  - Who are the targeted users?

Hands-on: Exploring Cookie Opt-out pages

WebChoices: Digital Advertising Alliance's Consumer Choice Tool for Web US
http://optout.aboutads.info/

Your Online Choices | EDAA
http://www.youronlinechoices.com

- Go to the website and try to express your cookie tracking preferences. You can opt–out or opt–in if you prefer. Pick what you yourself prefer.
  - Take notes while you do this about issues you have. Terms that are confusing. Or any part of the interface where you tried doing something, but it didn't work.
  - Try and think about what other people might find confusing and write that down too.
  - It is ok to ask the Tutor questions about cookies or the interface during this part if anything is confusing.
- Figure out if you were successful in opting out (or in).
  - Use a search engine, like Google, to learn how to view stored cookies on your browser.
  - Pick a couple of the companies listed on the opt–out page and find their domain names (URLs).
  - Look through the cookies on your browser and see if you have been successful in opting out of (or in to) cookie tracking.
  - Did you successfully opt–out (or in) as you expected to?
- Look at the outcomes of 1 and 2 above. Make a list of errors you think other Informatics students might make when interacting with this page and what the consequences are of making each error. For example, failure to opt–out might mean the user is still being tracked, but thinks they are safe so they might do activities that they do not want to be tracked.

Design a think-aloud study

Preperation and Introduction

- Preparation
  - How you will introduce your project to the participant
  - What tasks you will ask the participant to do
  - Plan for note taking
- Introducing your project
  - Tell your participants what your study is about
  - Clearly explain the purpose and think of what you expect from the participants
  - Avoid biases :)

- Think about what tasks you will ask users to do
  - E.g., Log in to UoE's VPN; store a new password via Apple's password manager
- Design how you can instruct the users in an experiment, avoid jargon and bias
  - Bad example: *Today we will be studying the fact that Android devices take a long time to log in. I will be asking you to log into a provided Android phone several times in front of a camera to see if you can log in quickly*
  - Good example: *This study is about the usability of Android phone login screens. Today I will be asking you to log into a provided Android phone several times in front of a camera. We are using the camera so that we can identify small issues that make the login screen harder to use*

Task and subtask

Primary and secondary tasks

- A “primary task” is basically something **someone wants to do**. It is typically high level and expresses some state or activity that user wants to achieve.
  - Determine if I need to buy anything fridge–related from the store.
  - Spend an hour playing not–too–challenging games
  - Play the song I just thought of.
- A “secondary task” or “subtask” is a **smaller task that the user must accomplish to complete** the primary task.
  - What was the name of the song I’m thinking of?
  - Which music service is likely to have it?
  - There are two versions, which one do I want to play?

- Who are involved?
  - Instructor / experimenter
  - User (participant)
  - (Observer / notetaker)

Hands-on: Try and write down your introduction script

Extra:

Simple example:

Task: Set an alarm for 7:00am

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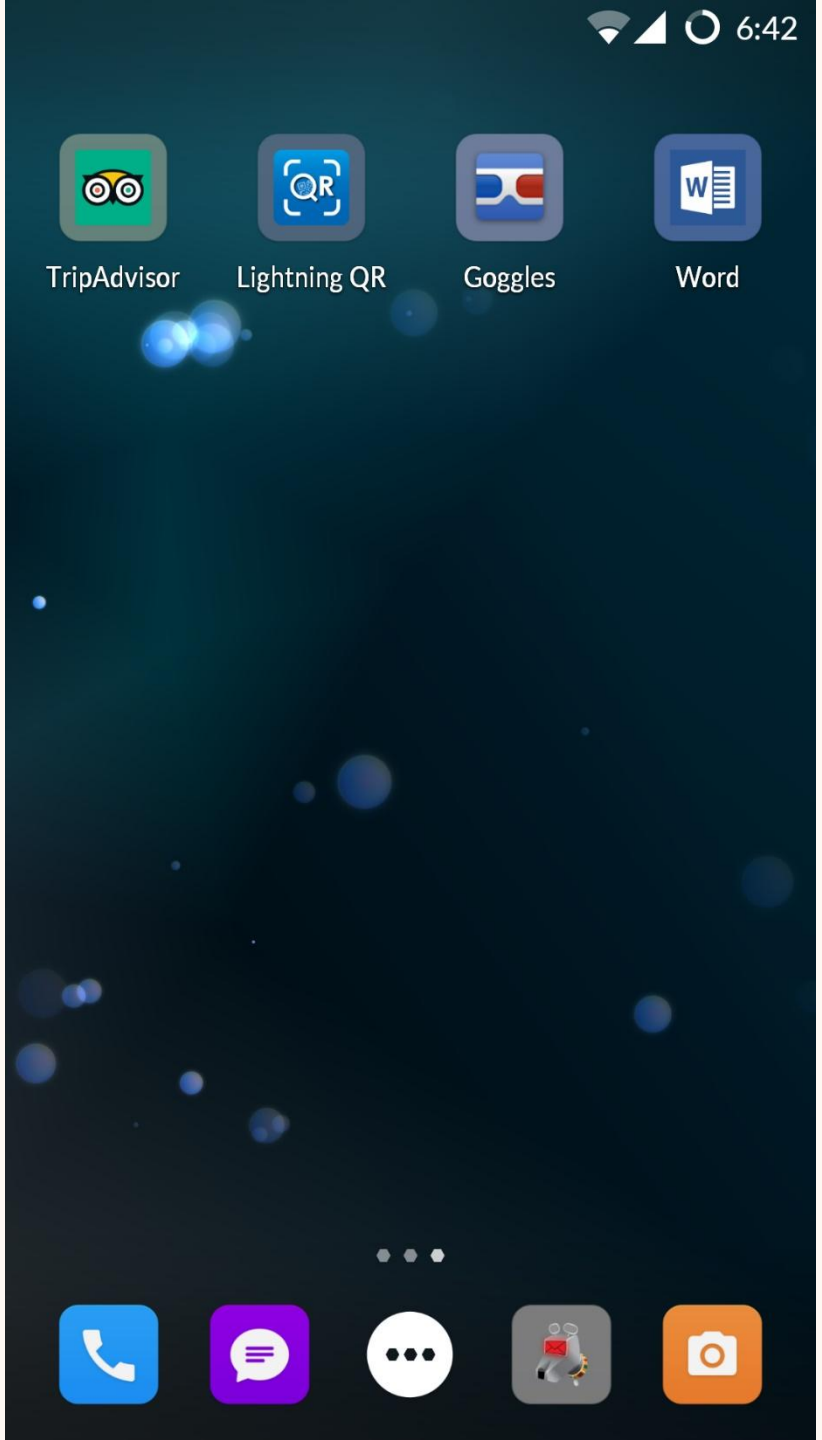
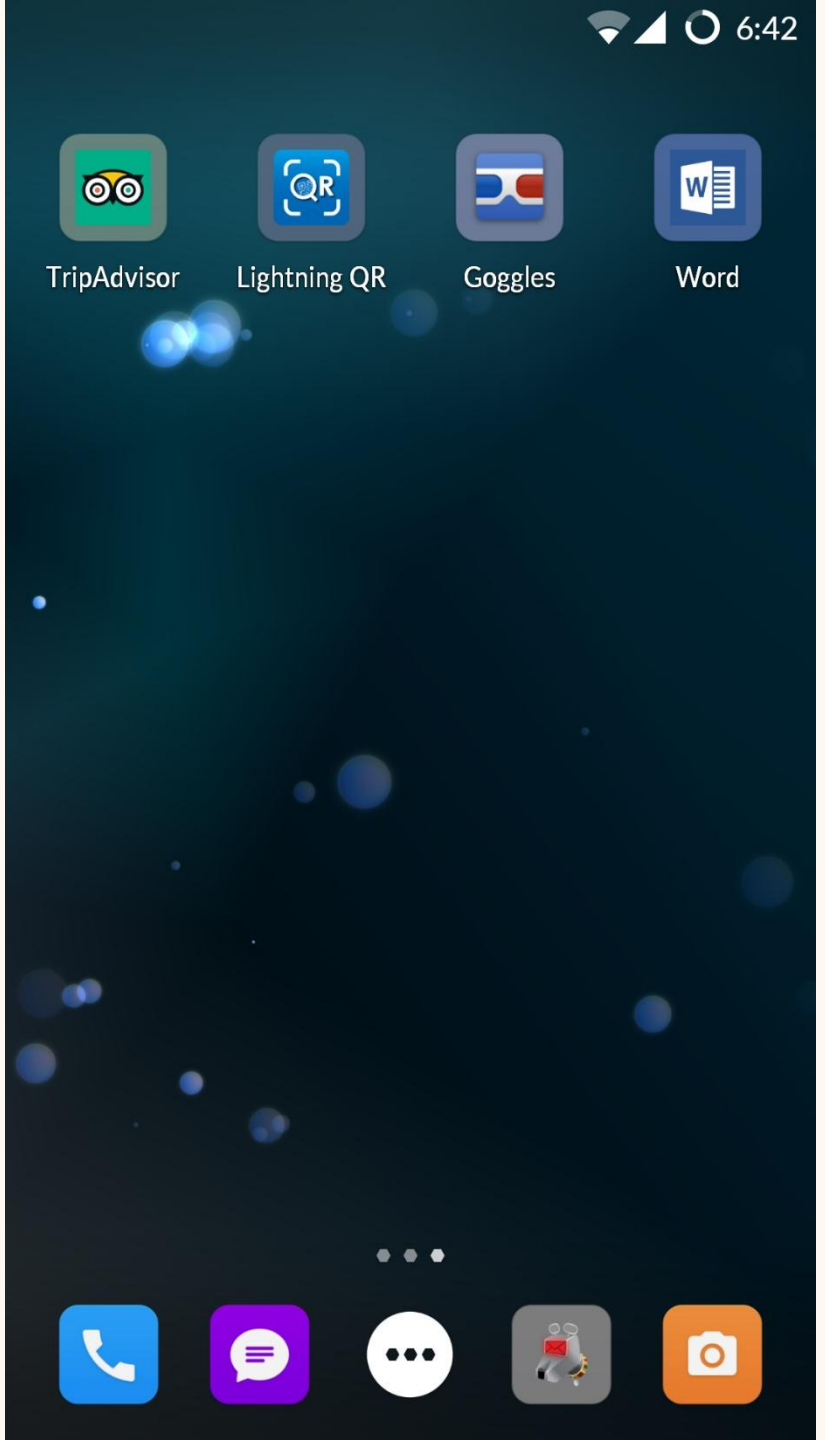


Task: Set an alarm for 7:00am

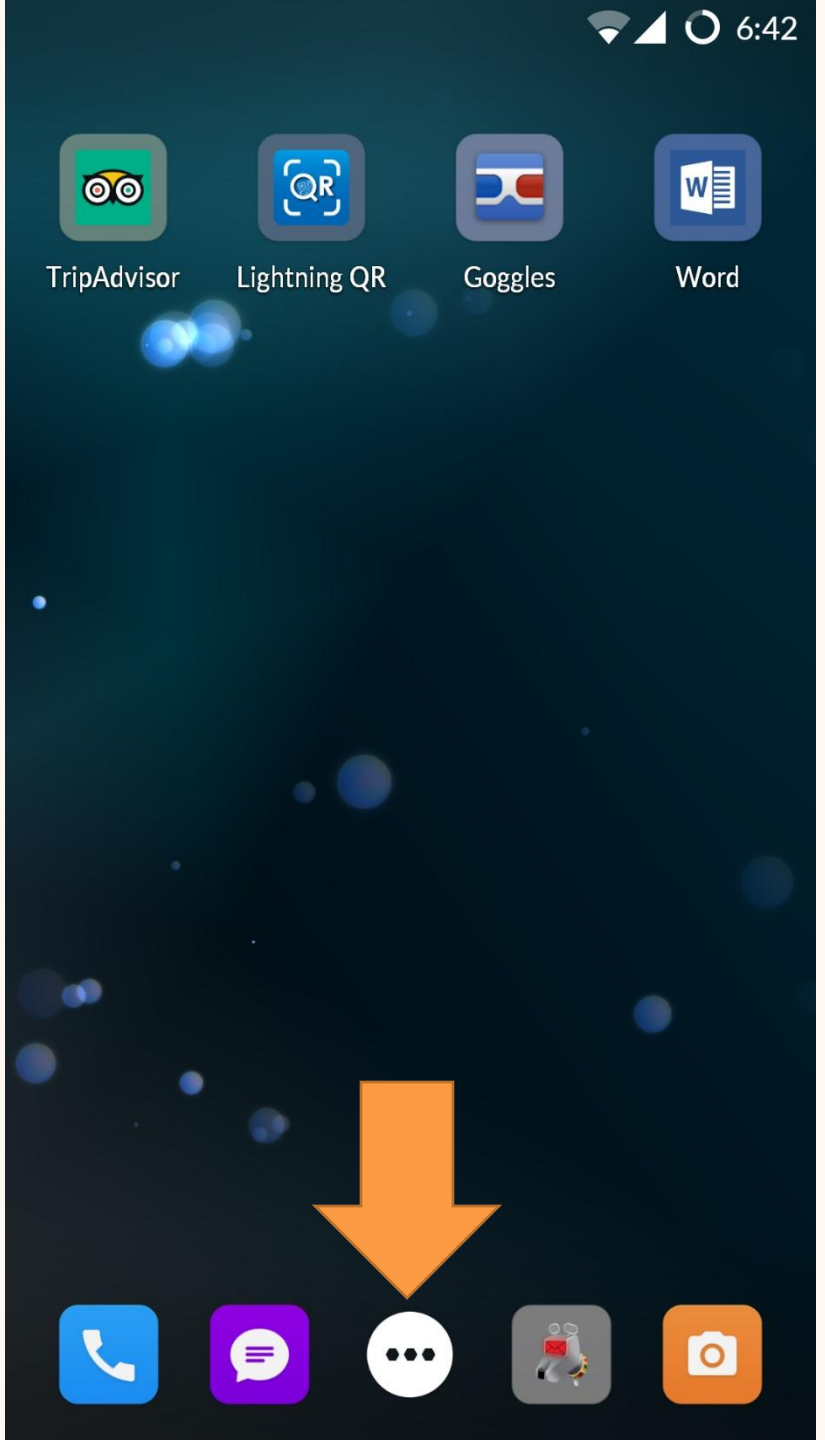
Subtask 1:
Find an app that supports “alarm clock” type functionality.



Task: Set an alarm for 7:00am

Subtask 1:
Find an app that supports “alarm clock” type functionality.

Subtask 2:
Find a list of all apps



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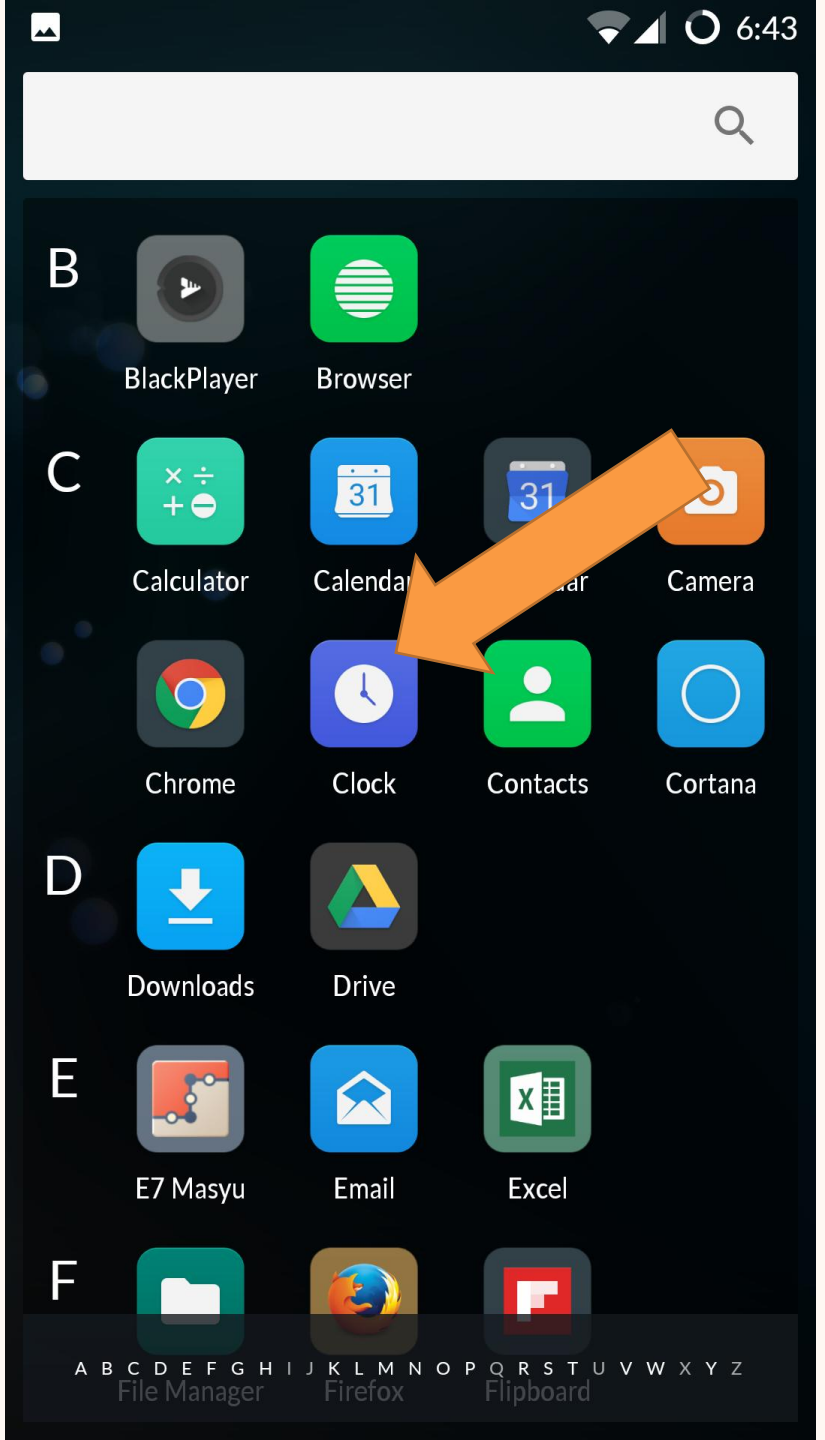

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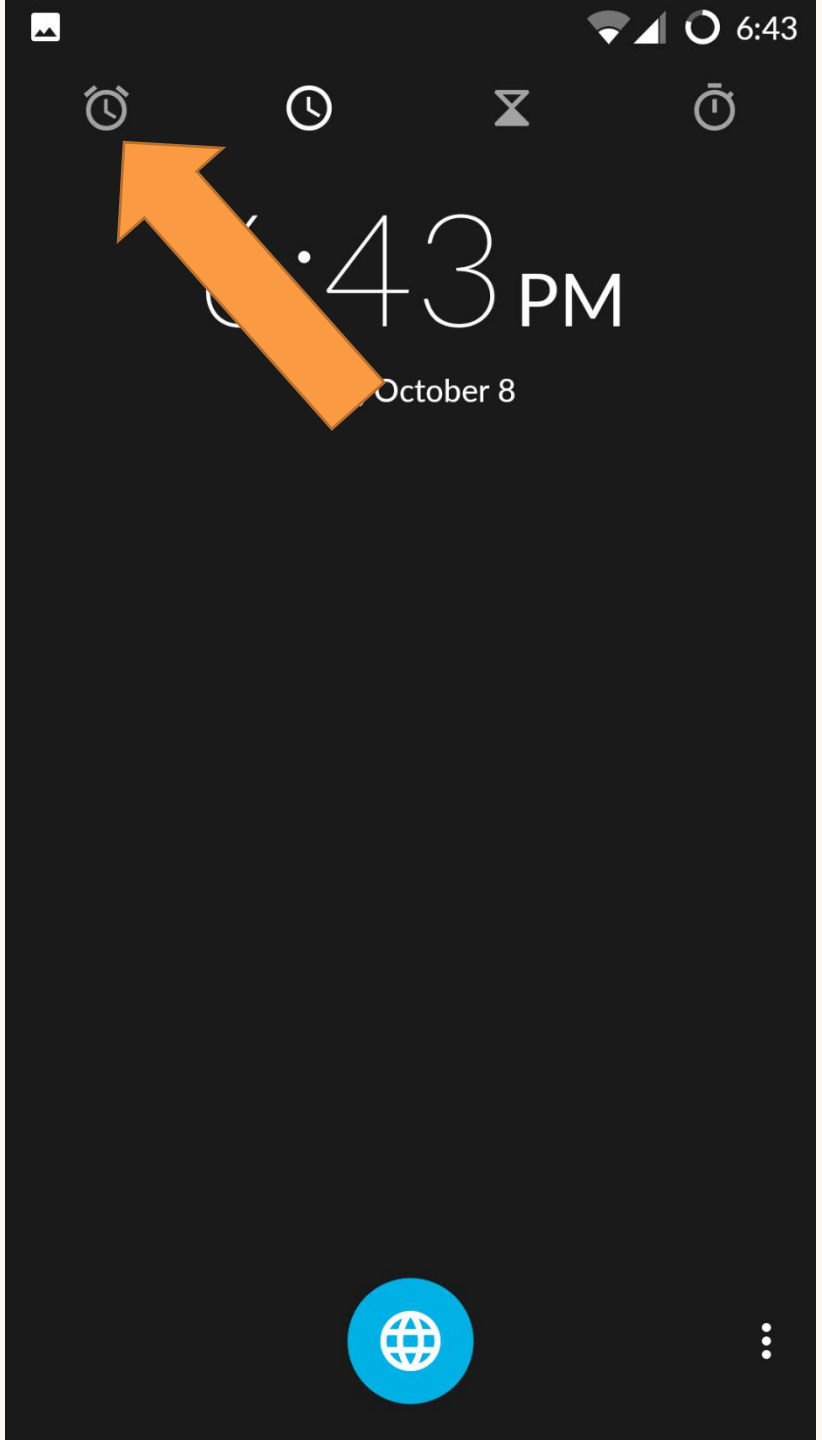
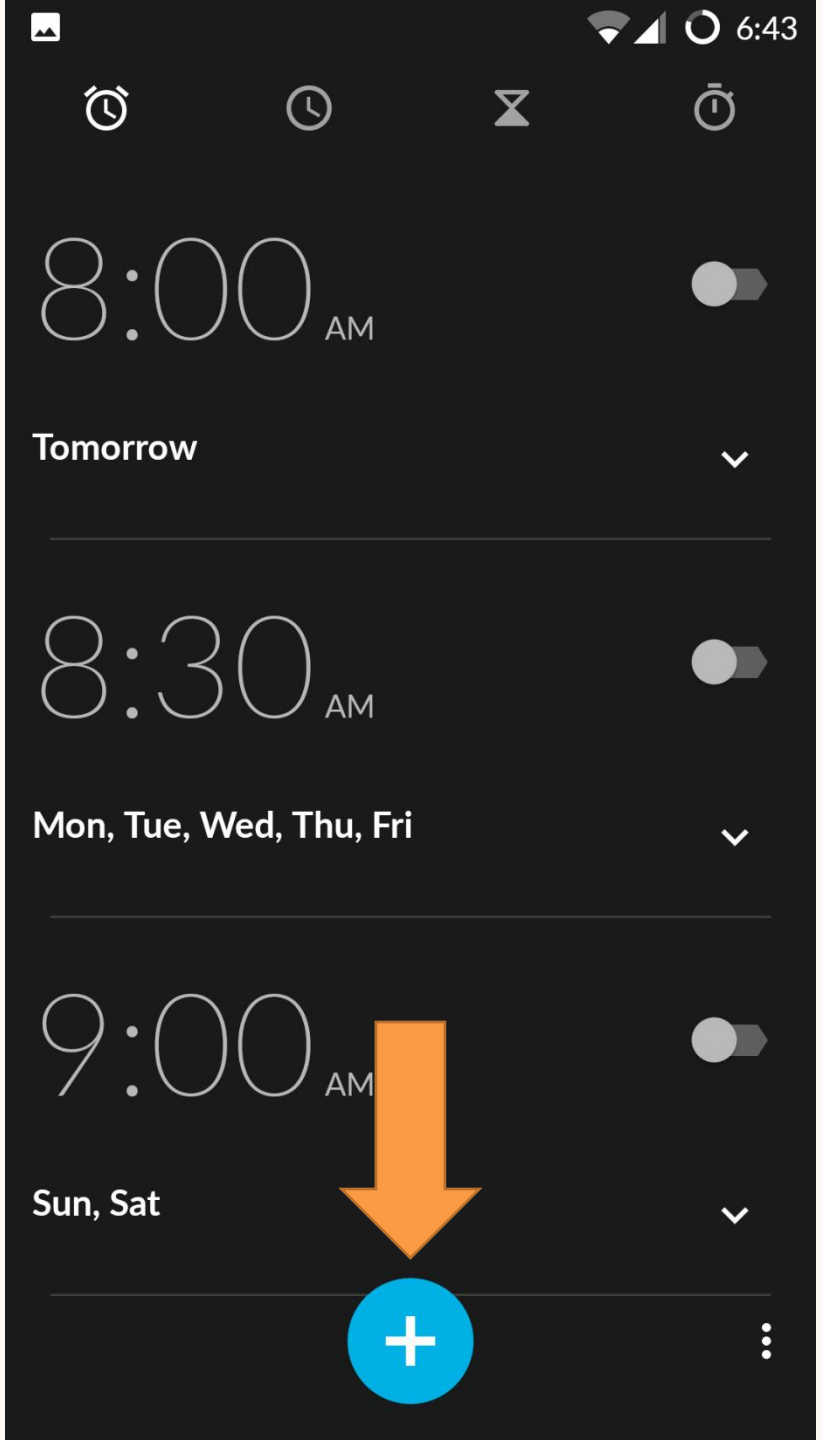


Task: Set an alarm for 7:00am

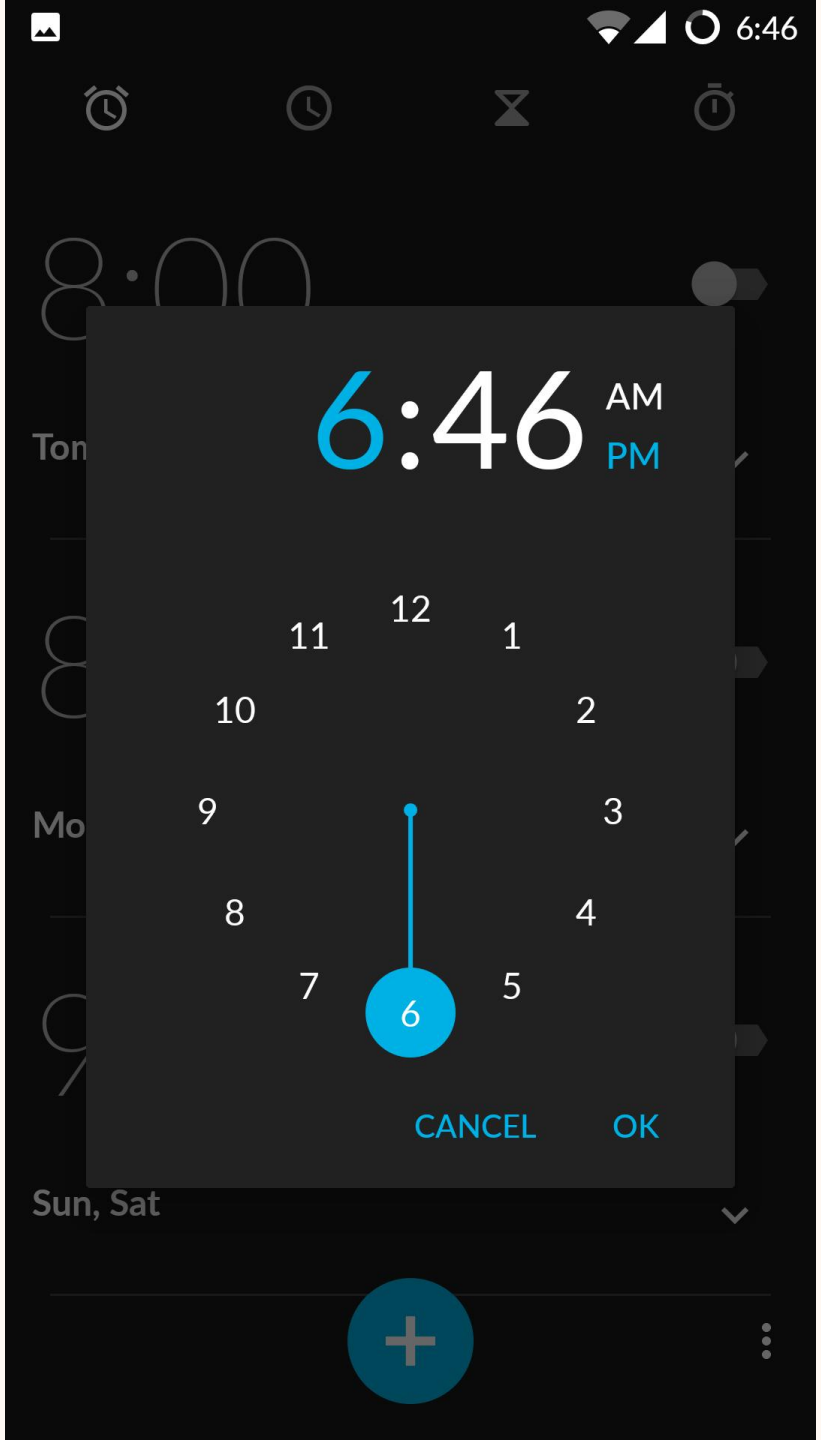
Subtask 3:
Create a new scheduled alarm.



Task: Set an alarm for 7:00am

Subtask 3:
Create a new scheduled alarm.

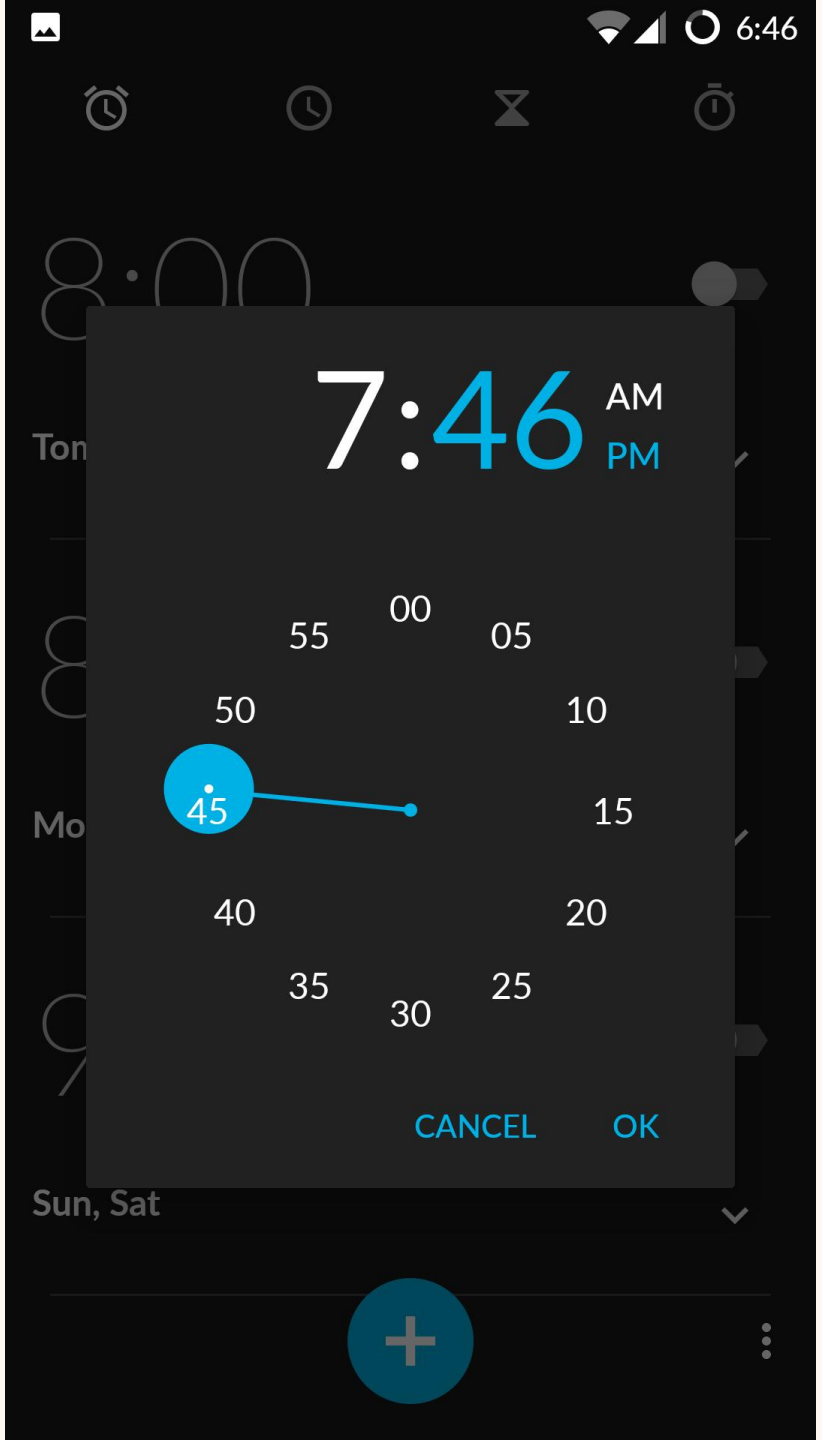
Subtask 4:
Set the hour to 7



Task: Set an alarm for 7:00am

Subtask 3:
Create a new scheduled alarm.

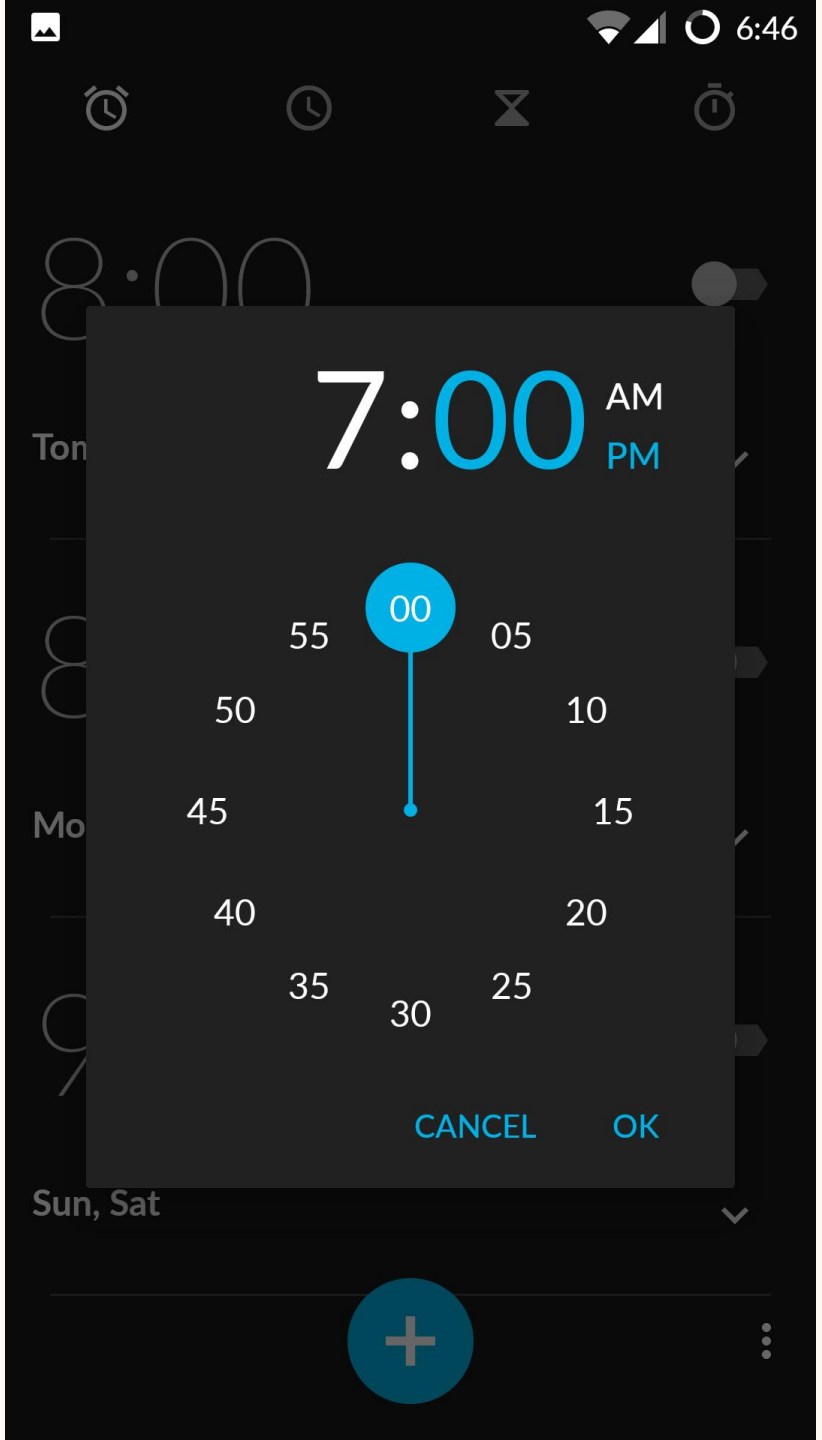
Subtask 5:
Set minutes to 00



Task: Set an alarm for 7:00am

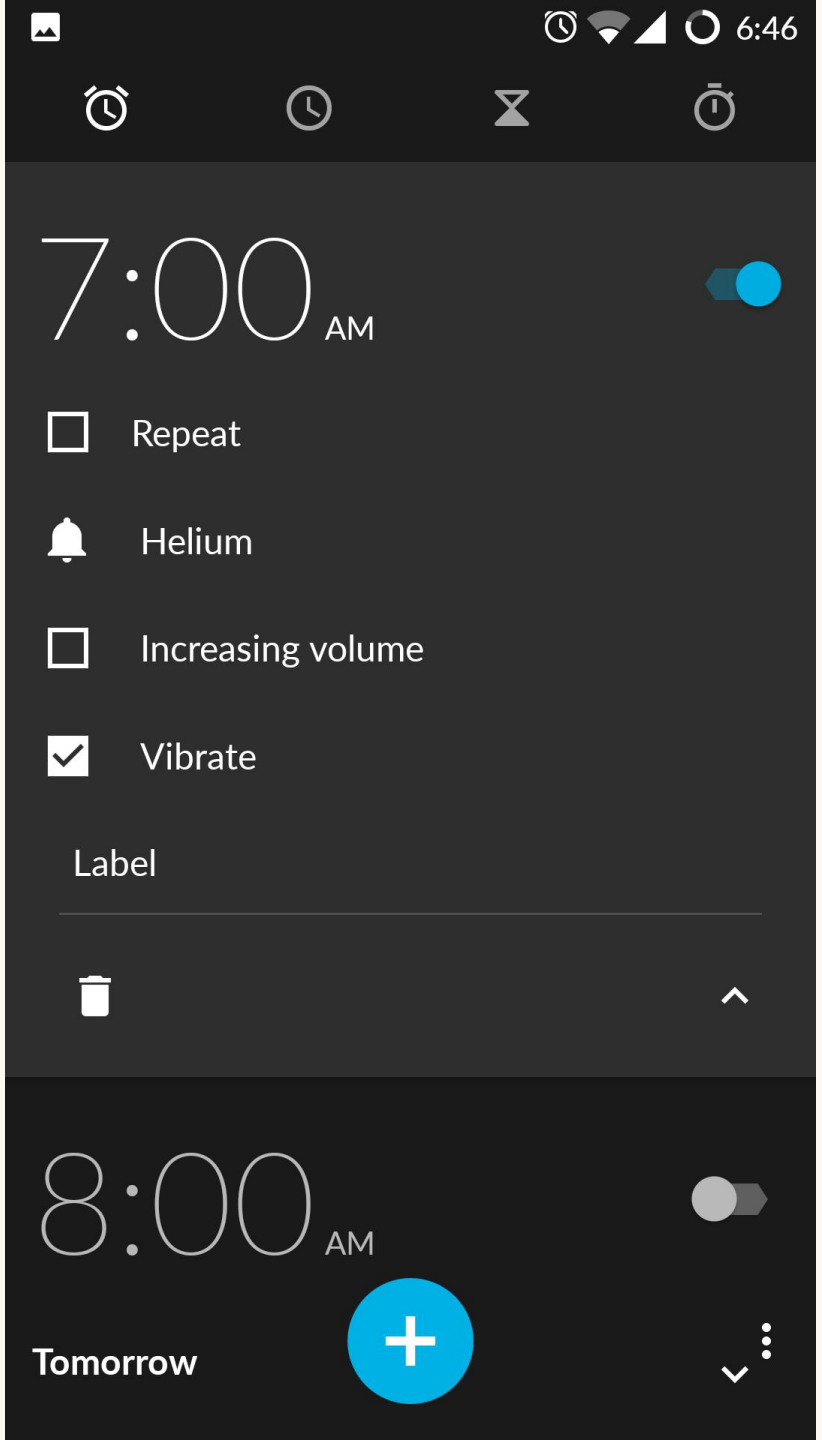
Subtask 3:
Create a new scheduled alarm.

Subtask 6:
Set to “AM”



Task: Set an alarm for 7:00am

Subtask 7:
Check that the time has been correctly set and the alarm is now “on”



Task Completed!