



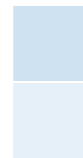
# BINGING ON RADIANT BLANDNESS



Interactive Technologies studio  
Semester 1, 2020

Lecturers: Chuan Khoo - Danielle Storm

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## Design research Compendium

Name of student: Hung Nguyen - S3821941



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## ABSTRACT FOR THIS STUDIO

The concept of ubiquitous computing (ubicomp) nowadays has been continuously developed far more than previous generations imagined. So far, the promise of a calm walk in the woods as Weiser mentioned in his vision for ubicomp systems becomes likely utopian, when people nowadays are more concerned about the deepening impact of computer-based technologies on human behaviors and human social life.

In terms of social media, I want to go further understanding about the impacts of social media “instant convenience” aspect - how easy it is for people to access to new information (the fake news phenomenon resulted), to give instant statements, to buy goods online and to have new relationships, etc. How do these conveniences become overwhelming, harmful to human social life?

The proposal I want to focus on is more visible and physical rather than invisible and virtual; more mixed convenience than individual convenience. It relates to the public realm, assisting/supporting system which could be integrated onto streetscape, plaza, etc to strengthen the social connection by giving playful experience, helping other vulnerable parts of society felt more involved; how the proposed design can challenge us to walk out of the comfort zone of “instant convenience” produced by social media and pique our interest stepping further to the public realm.

Keywords:

human-computer interaction, social media, public realm.



# 1. Design research

ON STUDIO

## 1.1 Background

### My vision through research for social medias:

Bring back the values of physical elements to social life.

### My theme through research is to:

Create hopeful devices

### Framework I aimed for studio project:

The framework I want to focus on is somewhere between discursive and experimental, which could possibly stimulate people's minds to think about essential questions and help them enjoy current moments through some playful, interesting experience.

### Target of users:

Users is emphasized. No individual demands, but public demands.

## 1.2 Method

### Mind map illustrating my approaches during studio:

Beginning with the wondering mind about the reasons for making design, I aim to understand about discursive design practice including fiction design, speculative design, as the first steps help me visualize the complexities in context, perceive plausible and possible impacts of technologies, trigger my imagination for solutions to current state and near future issues.

The desired ideas should provoke activities and some reflections for participants.

The undesired ideas which should be avoided are those having potential risks towards private security, mental health, pursuing high-end fashion and unclear purposes.

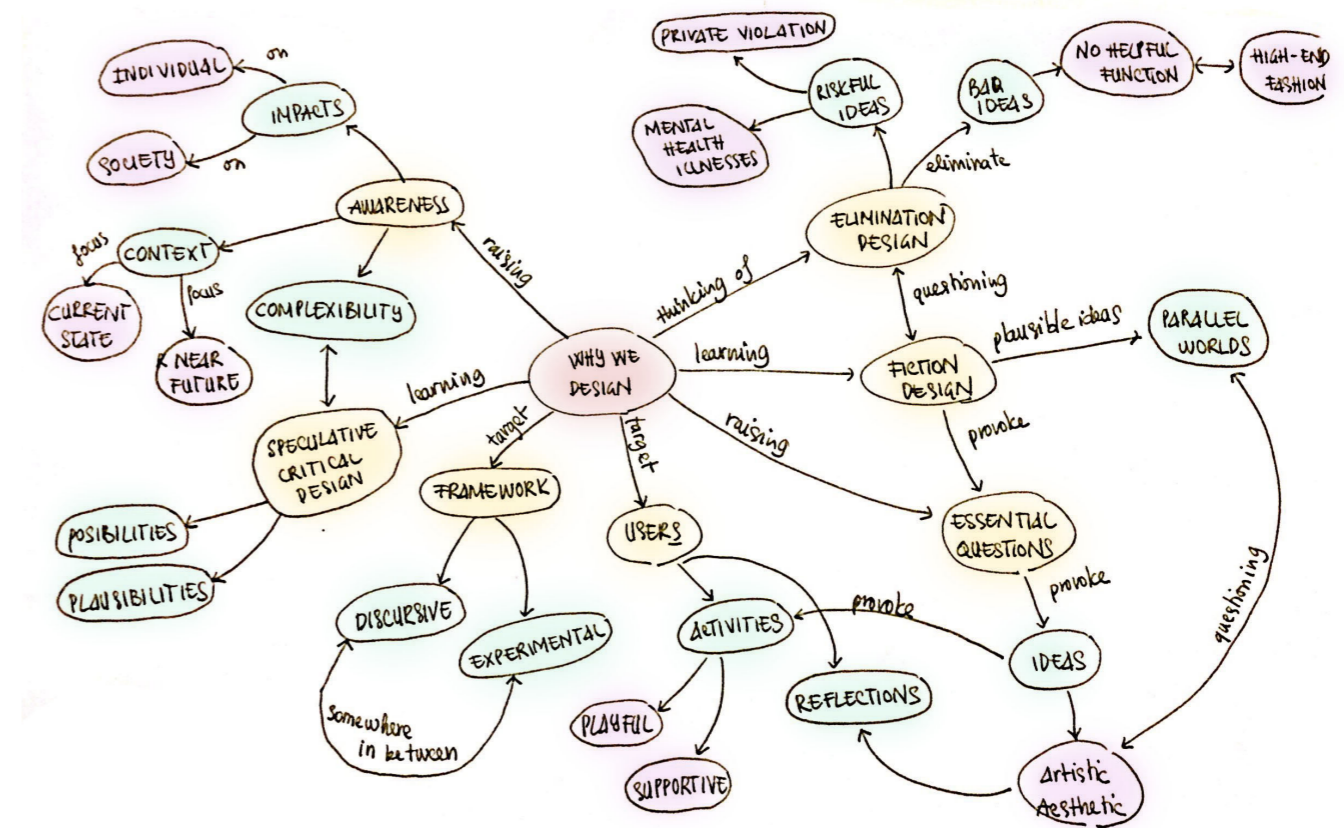


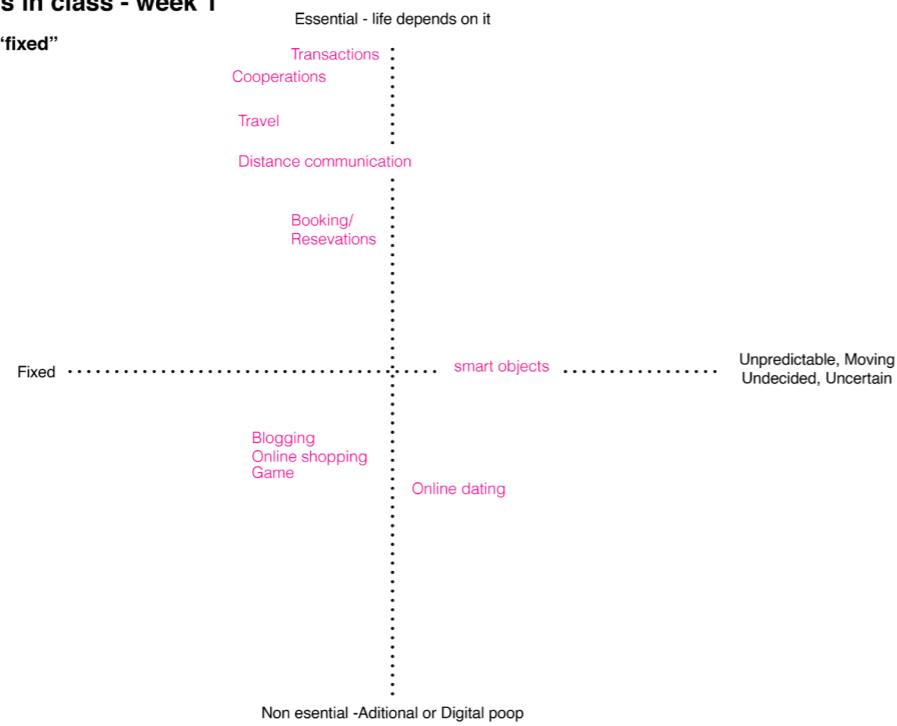
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**Method in class:**

Each group tried to explore their points in "human-computer interaction" topic by using "axis-frame" diagram to answer weekly questions suggested from tutors.

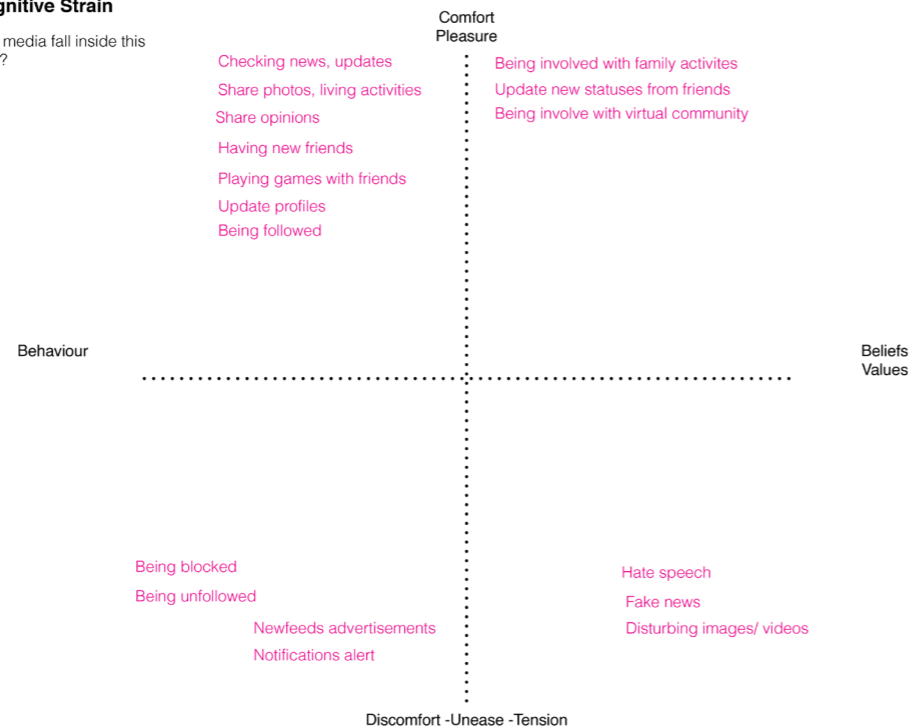
**IV. Explorations in class - week 1**

**Ia. Internet is "fixed"**



**Ib. Cognitive Ease, Cognitive Strain**

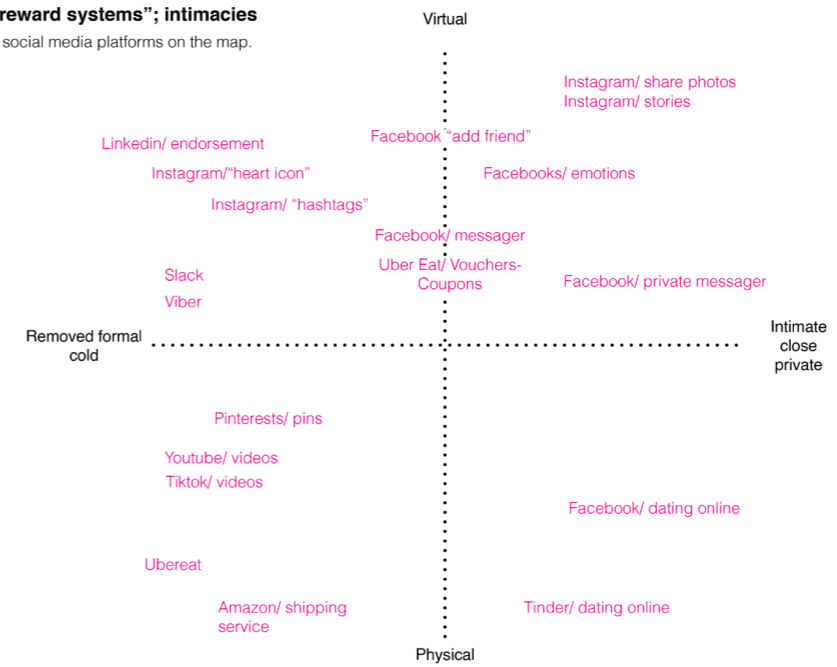
What various aspects of social media fall inside this sliding scale of cognitive effort?



**IV. Explorations in class - week 2**

**Separating, investigating "reward systems"; intimacies**

Place various selections of online social media platforms on the map.



**IV. Explorations in class - week 3**

**Ia. Functional vs. Semiotical**

Place various selections of online social media platforms on the map.  
Unpack how it makes use of both of these: Function and semiotics

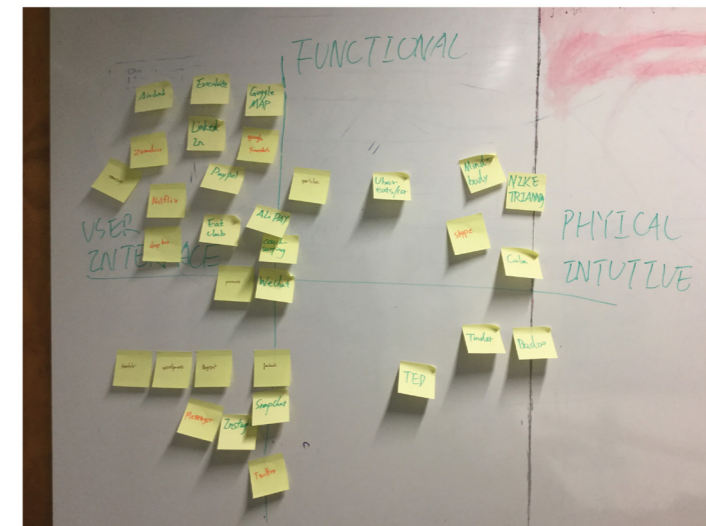
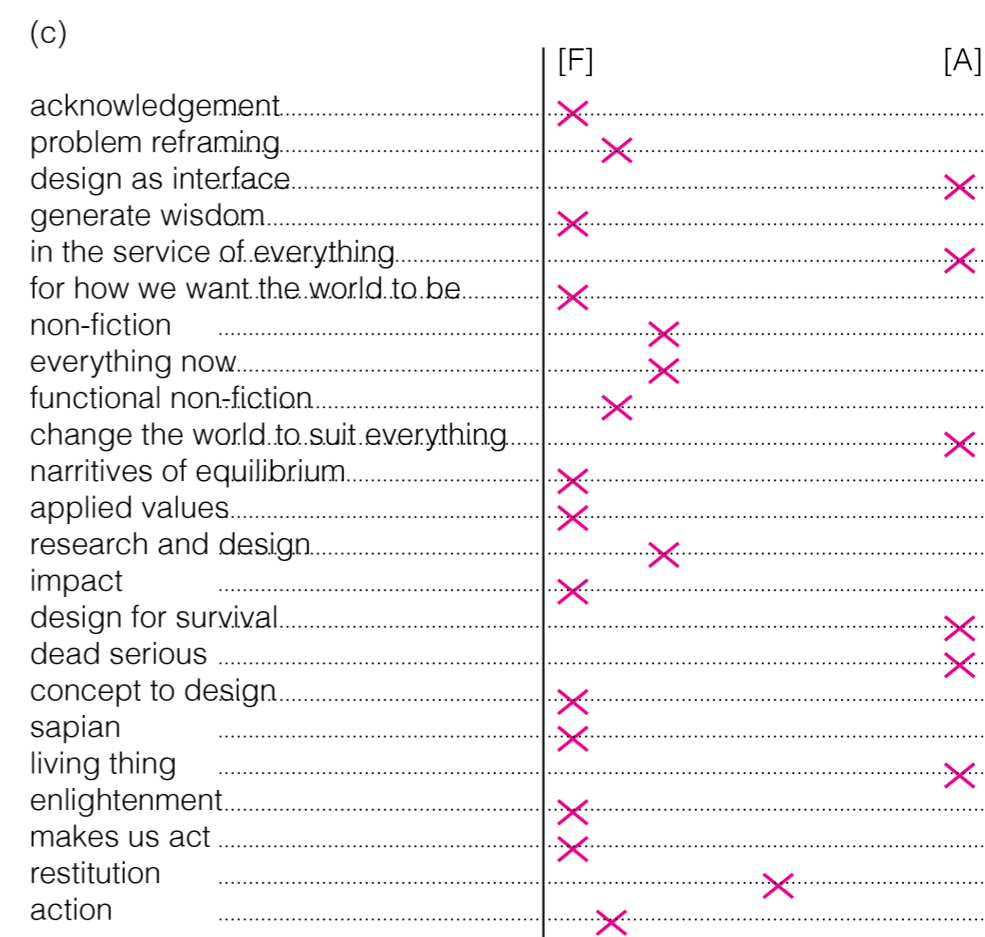
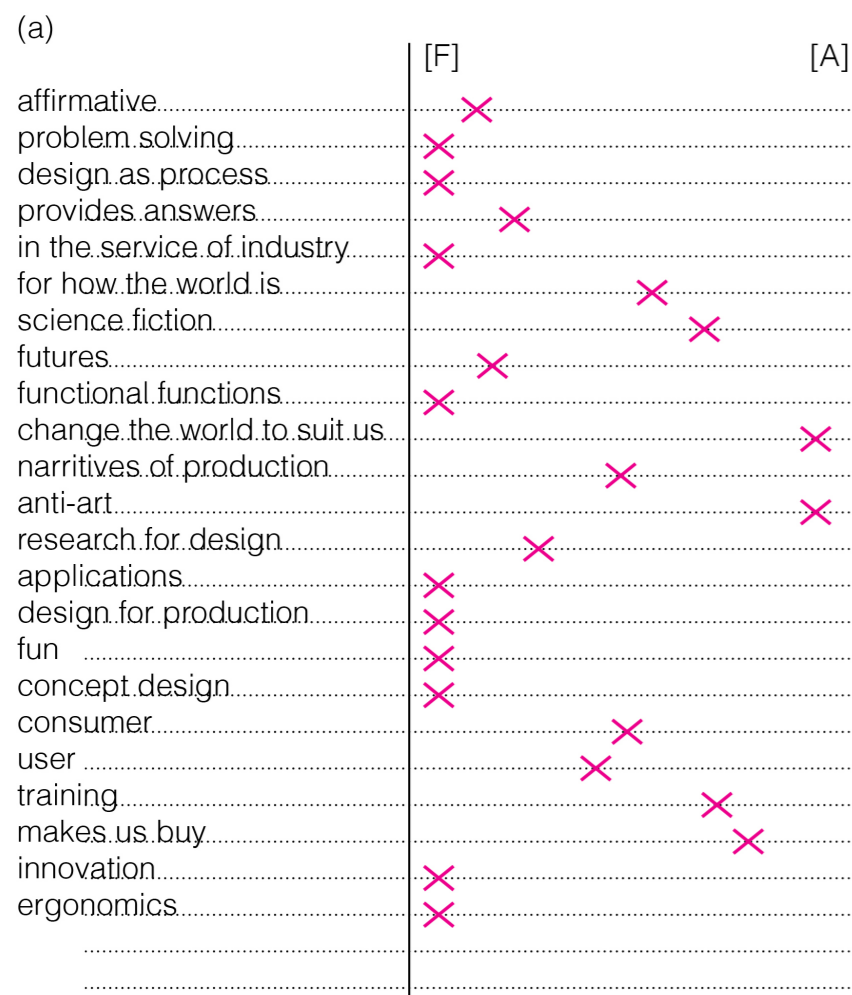


Image source: Group 4

Method in class:

Writing on spectrum for against, developing an approach



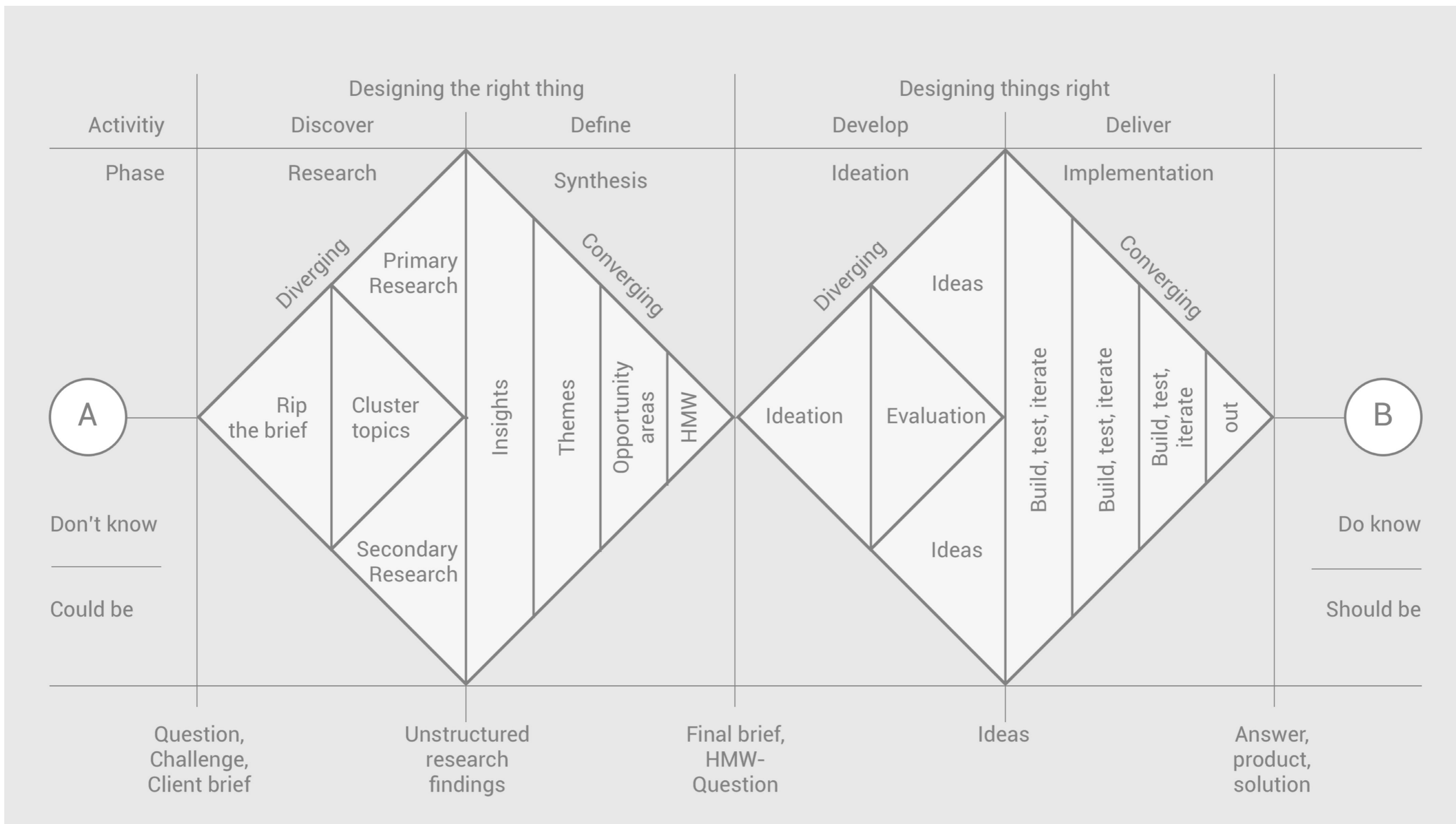


Figure. 1 Design process by Dan Nessler [1]



## 2. Discourses and Precedents

Academic discourses, precedents

### 2.1 Academic discourses

#### 2.1.1 Cognitive thinking - How we make our decisions

Social media companies try to boost the economic value by creating many strategies to attract users keeping using their products. One of the strategy included is to understand users' economic behaviors, cognitive behaviors, how we make our decisions. In his book, "Thinking, Fast and Slow", Daniel Kahneman pointed out the principles explaining our complex cognitive process by proposing 2 systems inside our mind. The systems themselves are just the forms of simplication visualizing the way how our mind works. System 1 is automatic, unconscious, and aimed for quick responses. In the contrast, system 2, is effortful, slower and conscious. The term of cognitive ease is to present the way our system 1 responding to the outside world but against the beliefs from system 2. Most of our faults from decisions are made by system 1. Even though we possibly could be aware of what is wrong through our decisions, or what against our beliefs, still, we would rather choose to behave the way we feel eased. For example, in the pandemic of Corona-virus 19 ocured in 2020, Australia government set out rule of social distance for all states. However, there has been reported of such a number of people who gathered on Bondi beach (Sydney) in the middle of crisis regardless of warning announcement and government's rule. The warning is not enough for people resisting their desired action even though they possibly knew that their actions may spread virus to community.

Back to social medias, from the way we know how our mind operate, we can understand how eased we feel when using social medias to interact with our friends though we can sense something bad is going on in our mind but still we cannot resist it. We become addictive to social medias and fail to against these companies' strategies.

#### 2.1.2 Technological Solutionism

Technological Solutionism<sup>[2]</sup> is the belief that technologies can solve all human's problems (Evgeny Morozov, 2010). Ironically, the problem is the ideology itself. Technolgies support every aspects of our lives for the vision of perfection. Everything could be turned in to smart objects: smart phone, smart bed, smart tv, etc with multitask functions easily erasing our flaws in almost every corners. However, the im-perfection, the messiness have their own values to create our unique life and challenge us to live better by giving effort to improve our flaws. For Technological Solutionism, more and more, we are loosing the motivation for thinking, especially, creative problem solving thinking when technologies cutting off the wondering moment, giving us the answers instantly.

*« Design theorist Michael Dobbins has it right: solutionism presumes rather than investigates the problem that it is trying to solve, reaching "for the answer before the question has been fully asked. »*

- Evgeny Morozov, To Save Everything Click Here , 2010.

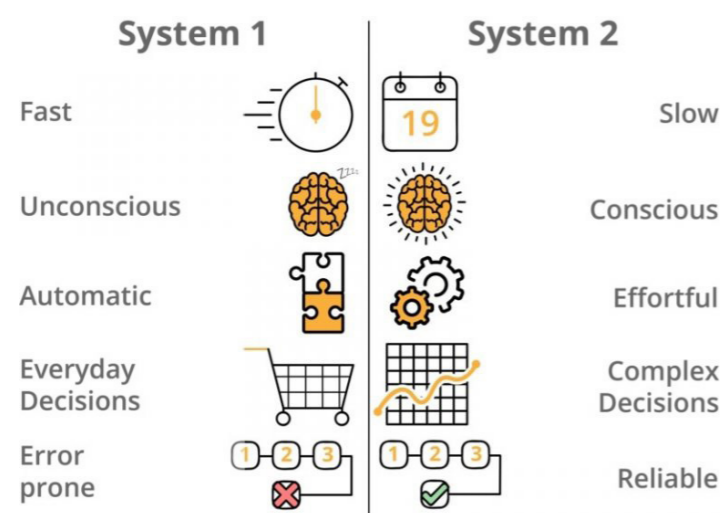


Image source: <https://imotions.com/blog/human-behavior/>

<sup>[x]</sup> This number refers to the reference link located at the end of this DRC.

### 2.1.3 Amara’s law and the difficulty to predict technology’s future

As Amara mentioned in his report “New directions for Innovation” ( 1990), most of the first versions of technologies are less successful than people had expected[3]. It could be too expensive, too bulky or unfriendly user interface... People tend to overestimate these successes and vision them making big changes though the results commonly fail their expects. The estimated time for the next successful versions of tech-related products is around 3-5 years or less[4]. However, for the long run, they underestimate technologies impacts, especially the impacts on human responses, behaviours and psychology aspect [5] . More importantly, it is almost impossible for us to predict the “discontinuous breakthroughs” of some of important basic technologies like transistors or genetic engineering (Row Amara, 1990). That could explain why there is always a blind spot in our prediction for the Ubiocompt.

Still, this evolution is going on and for sure, become more complex and risky. What we should do, at least for now, is that be aware of our inability in forecasting technology’s future and therefore be more conscious about implicating them into our life.

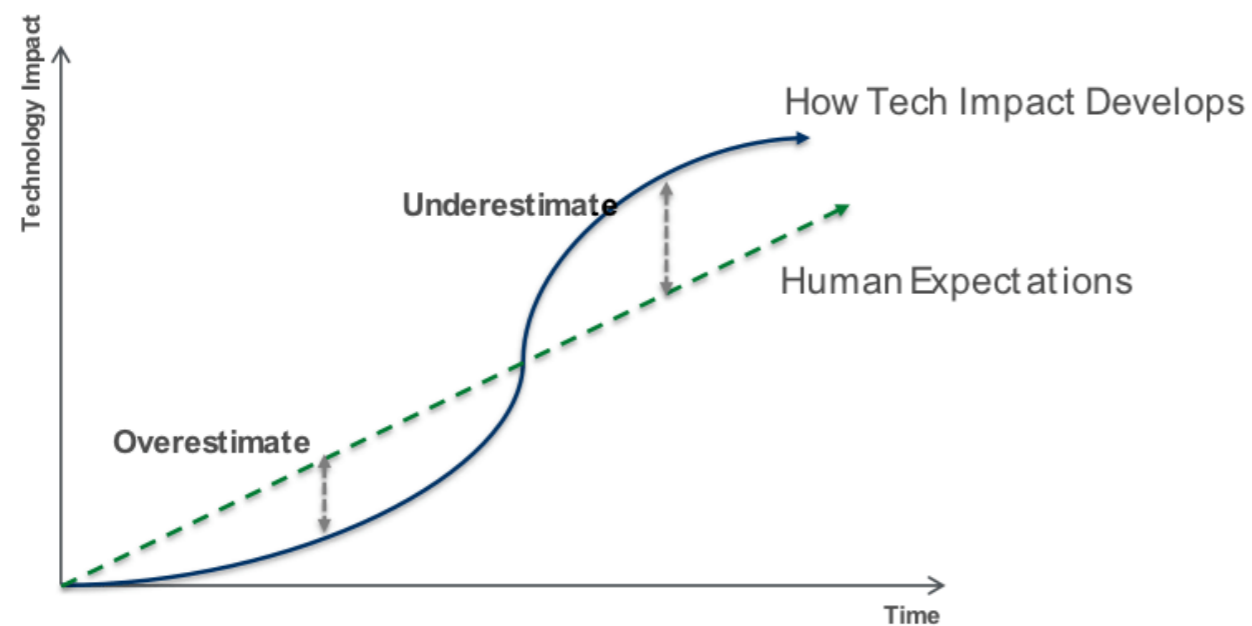


Figure. 2 Amara’s Law on the tendency Innovation and Technology forecast

### 2.1.4 Dunbar’s number

Ideal limit for social circle

Dunbar’s number[6] provided by Robin Dunbar (2010) describes the limitation of number of people we should have for our social circle, which is within 150 people, to maintain the bonded relationships.

New technologies, especially the most recent trend of social medias, extend this limit so far from the suggested number. A normal teenager could have 1000 friends on facbook, or celerities could have 1 million followers on instagram. This create certain benefits for our careers, finance through online trading, advertising our images, brands... but also it create a potential risks for our mental health.

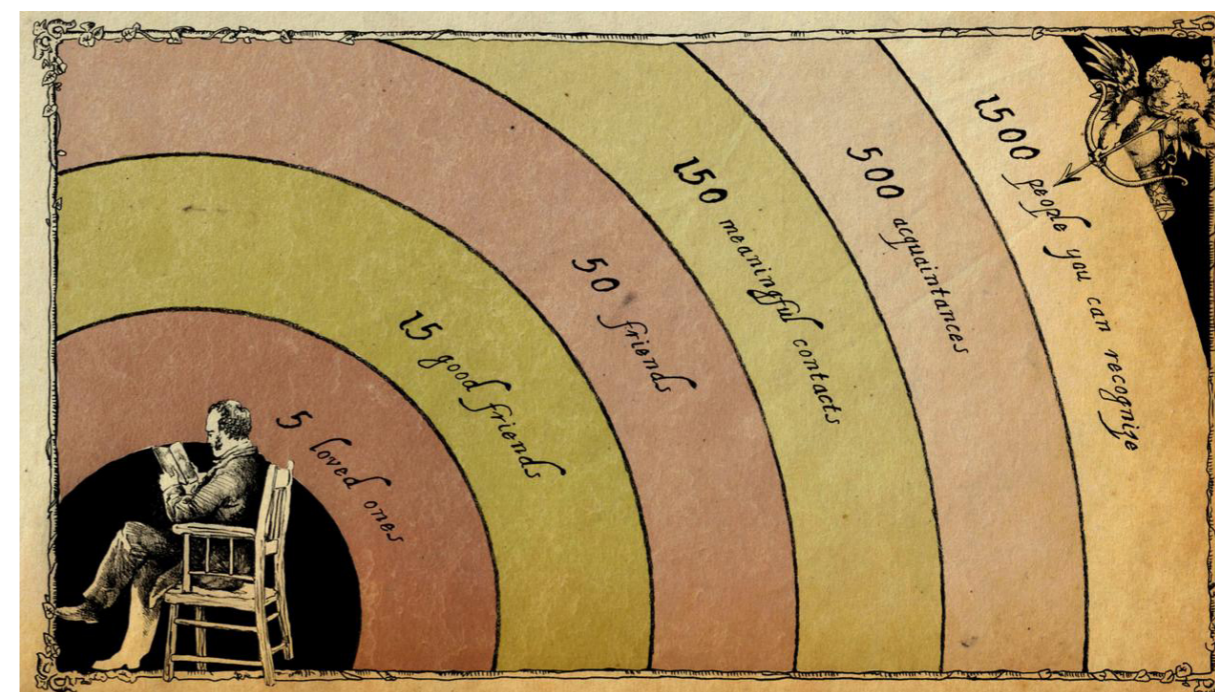


Image by Emmanuel Lafont, BBC

Image source: < <https://www.bbc.com/future/article/20191001-dunbars-number-why-we-can-only-maintain-150-relationships>>

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## 2.1.5 Beyond Death

by Yuxi Liu

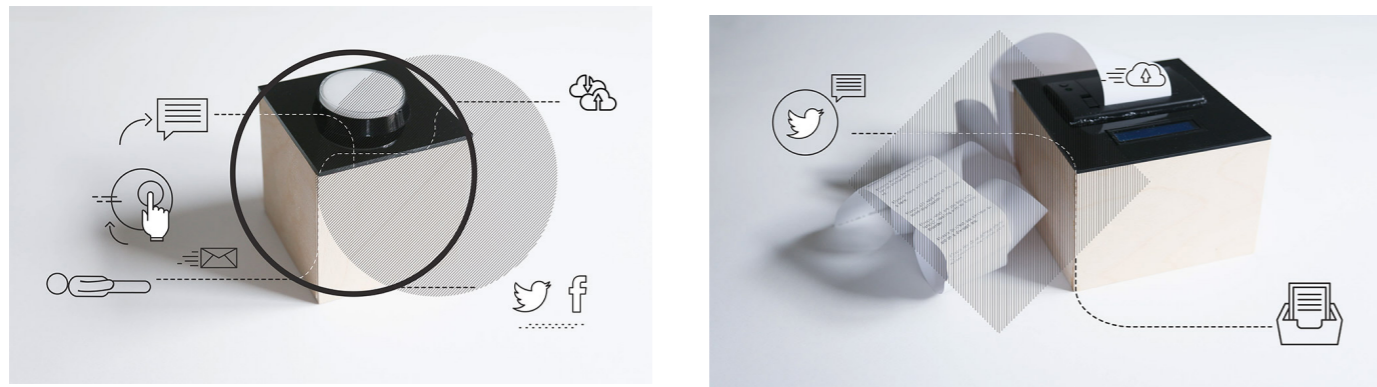


Figure. 3 The Final Button

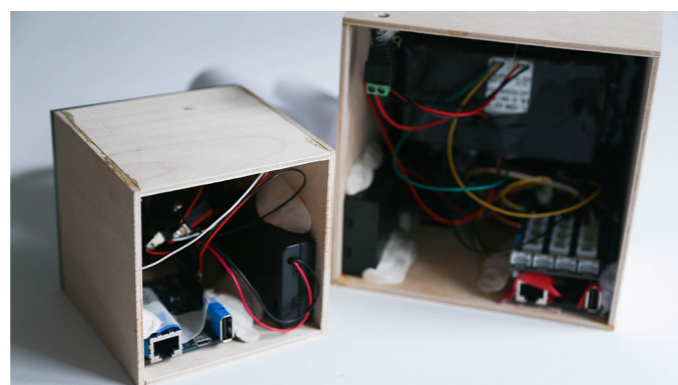


Figure. 4 The Memento

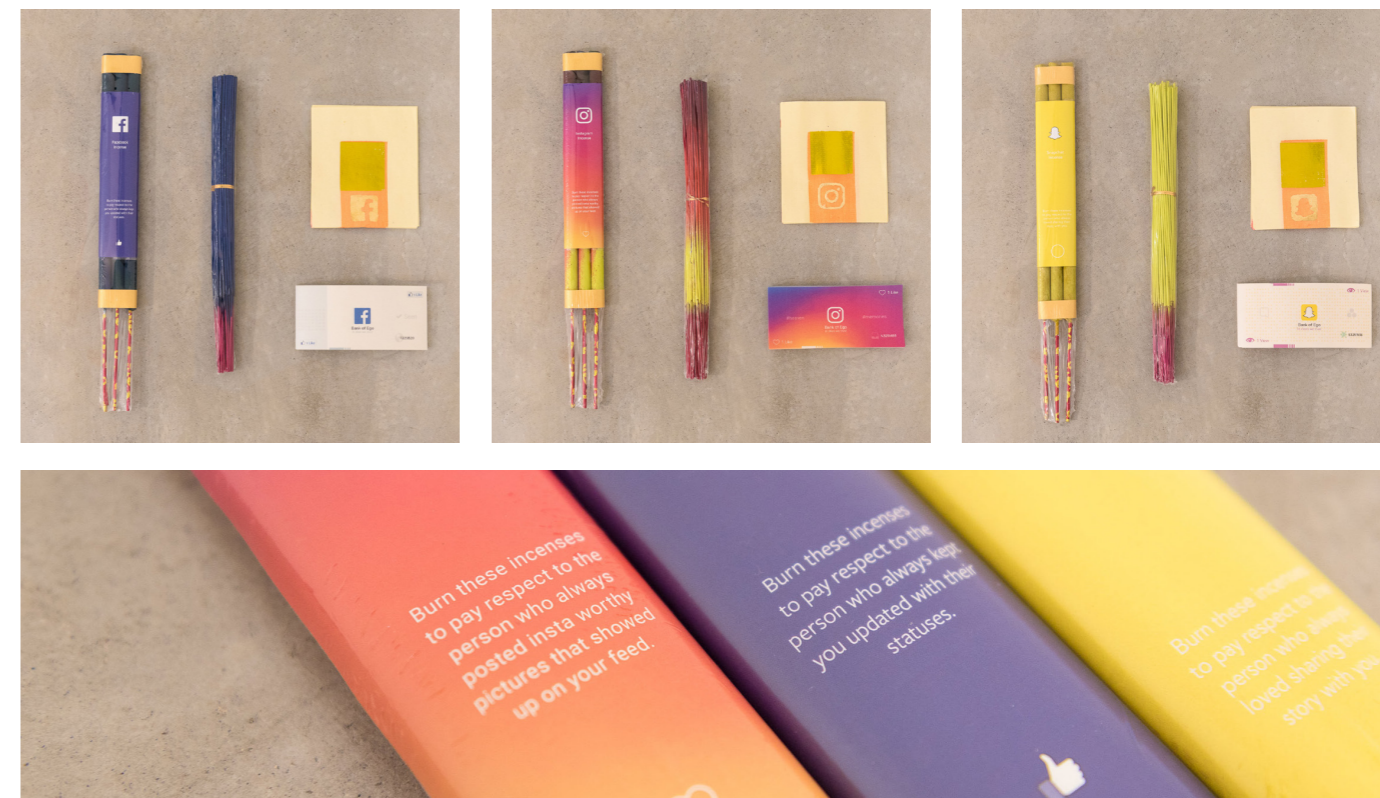
*Beyond Death* [7] is a project with 2 prototypes: "The Final Button" and "The Memento". With this pair of devices, the artist aims to propose a new way of death we can design for our own in this digital era. She pointed out the role of social media which has raised the complexity in human emotions and our reactions to death. The plausibility of technology at this sensitive subject can propose many questions for us to think about our well-beings in the information age.

*The final button*, a retrieving device collecting the likely suicide intention or the already-last words from someone's status on social media. Also, it is prepared for the likely cases in physical world by the final pushing-button as a way for people to say good bye.

*The memento*, considered as a last-words printer, stores suicidal emotional suppression someone has to deal with for a very long time before they decide to end their lives.

## 2.1.6 Social Media Incense Packs

by Adrian Mok



For what I can see through this project[8], this is a speculative design which less focuses on technology innovation, but more in the aesthetic sense between the sense of seriousness and the sense of humor for addressing social media issue.

Adrian use a common religious paraphernalia for "paying respect to passed away people" in Chinese culture to response to the social media issue: the desire of being feed their egos on social media, in a speculative way, even when they pass away.

For that context, "social media incense packs" can be used by followers, those who wants to keep habitting the way they interact on cyberworld, to give their respect, to the ones they know, have passed away.

The irony in this project creates argument about social media impacts on our behaviors in daily lives.

[x] This number refers to the reference link located at the end of this DRC.

### 3. Group work

In this section, I introduce group design project: from background research to final proposal.

Group members:

- Siyu Yao (Group leader) - s3752924
- Shrusti Basavaraj Malimath - s3803762
- Thanchanok Klabsong - s3770539
- Hung Nguyen - s3821941





Figure. 5 Project: Mood Tool

Image by Siyu Yao

#### PROJECT BRIEF

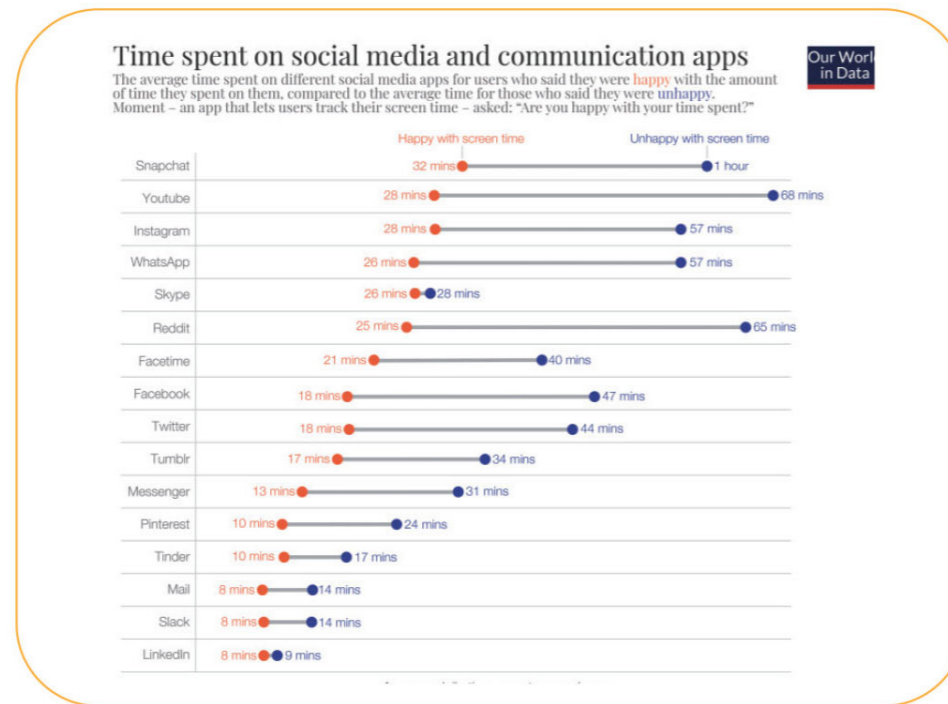
Social media addiction has been a topic of discussion for many years now. The consequences of overuse and over-reliance on social media are still being studied and understood but so far the consensus is that too much social media can have a negative impact on your mood and wider mental health.

Mood tool is designed to relieve the reliance on social media by sending push notifications to a user if too much time is spent on it. Mood tool also takes inspiration from music as a form of therapy. It uses music to help a wearers distract themselves from social media by offering musical selections which the user can select according to how they feel. Music helps to release emotions such as stress, anxiety, sadness, and anger, while reinforcing positive emotions such as joy and contentedness.

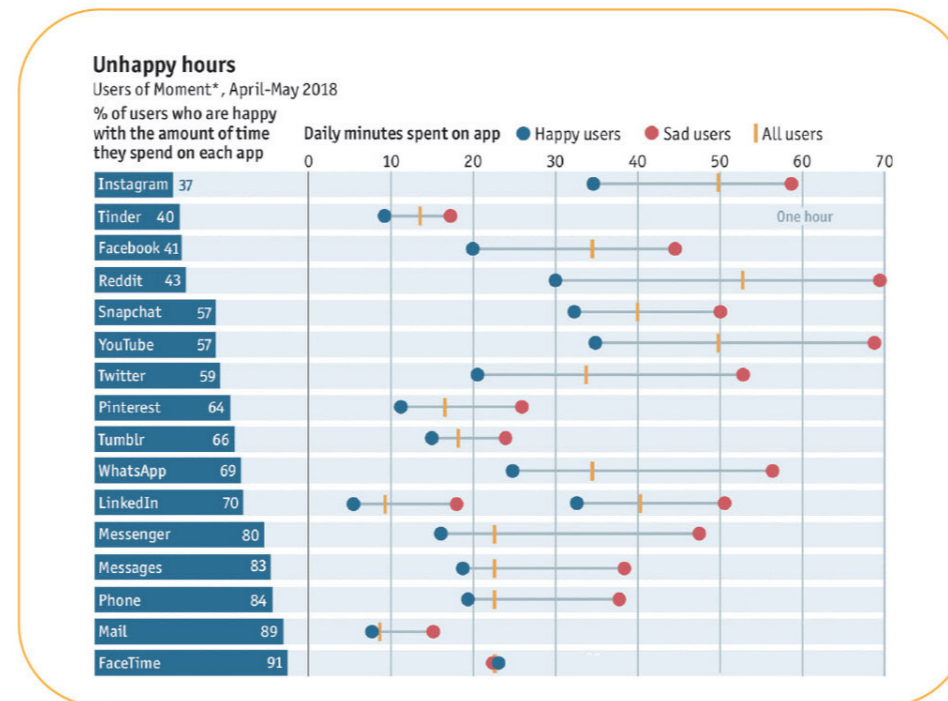
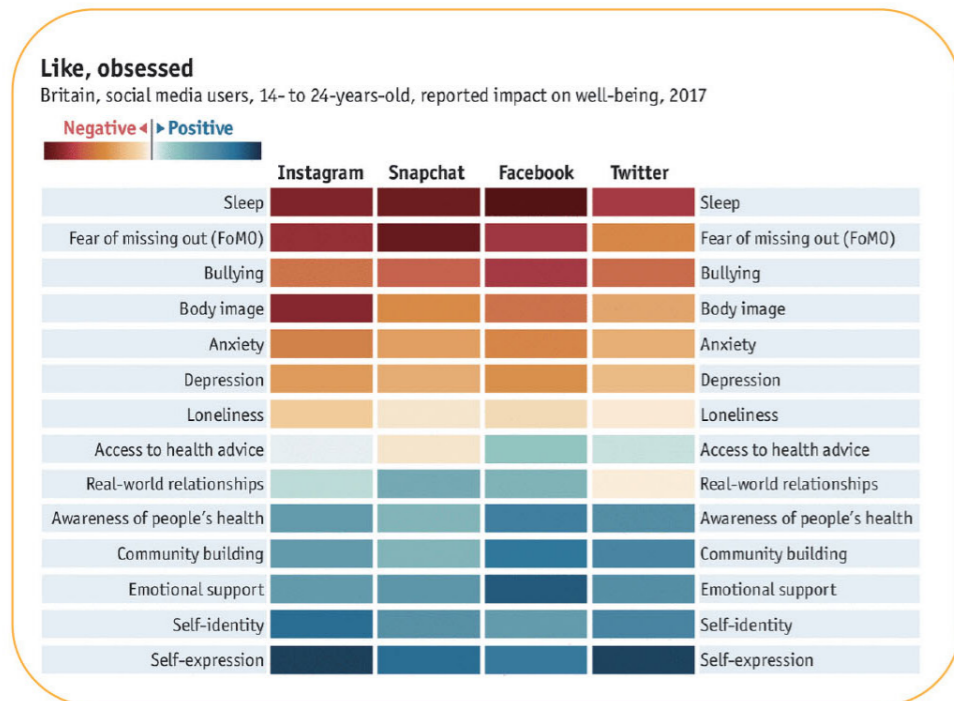
### 3.1 Research

#### 3.1.1 Emotion problems cause by social media?

By Shruti Basavaraj Malimath



The analysis of emotional experience of browsing social media, results in finding that the emotional experience of browsing social media is characterized primarily by deactivation (by winding down), with a slight tilt toward negative emotion. [9], [10].



[x] This number refers to the reference link located at the end of this DRC.

### 3.1.2 Why emotion problem will effect mental problems?

- Feeling sad or down
- Excessive anger
- Confused thinking
- Significant tirednes
- Trouble understanding
- Extreme mood swin
- Delusions

Excessive social media use can create a negative, self-perpetuating cycle

When you feel lonely, depressed, anxious, or stressed, you use social media more often—as a way to relieve boredom or feel connected to others. These worsening symptoms cause you to use social media even more, and so the downward spiral continues.

### 3.1.3 The vicious cycle of unhealthy social media use



Figure. 6 Applying the five systems model to social media use.

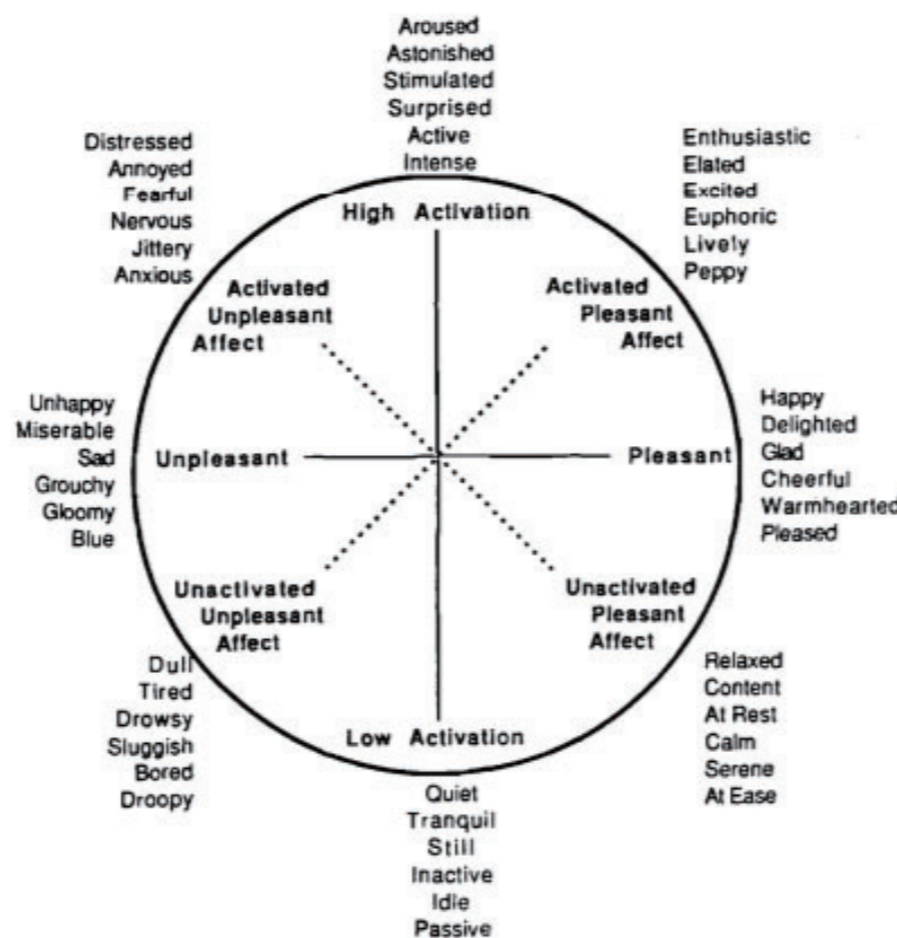


Figure. 7 A circumplex model of affect (Larsen & Diener, 1992).

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### 3.1.4 How music has positive effects on your mental health?

Music is a powerful thing. Aside from its entertainment value, listening to music is known to have incredible positive effects to our brain. More specifically, music can change the way we act, feel and think.

- Elevate your mood and motivation
- Reduce stress
- Improve focus
- Reduce anxiety and depression
- Help relaxation

## 3.2 Designing thinking

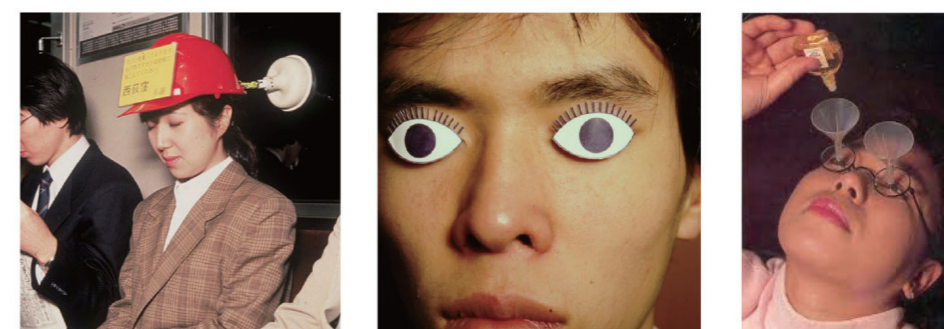
By Siyu Yao

### 3.2.1 Idea of inspiration

#### INSPIRAION

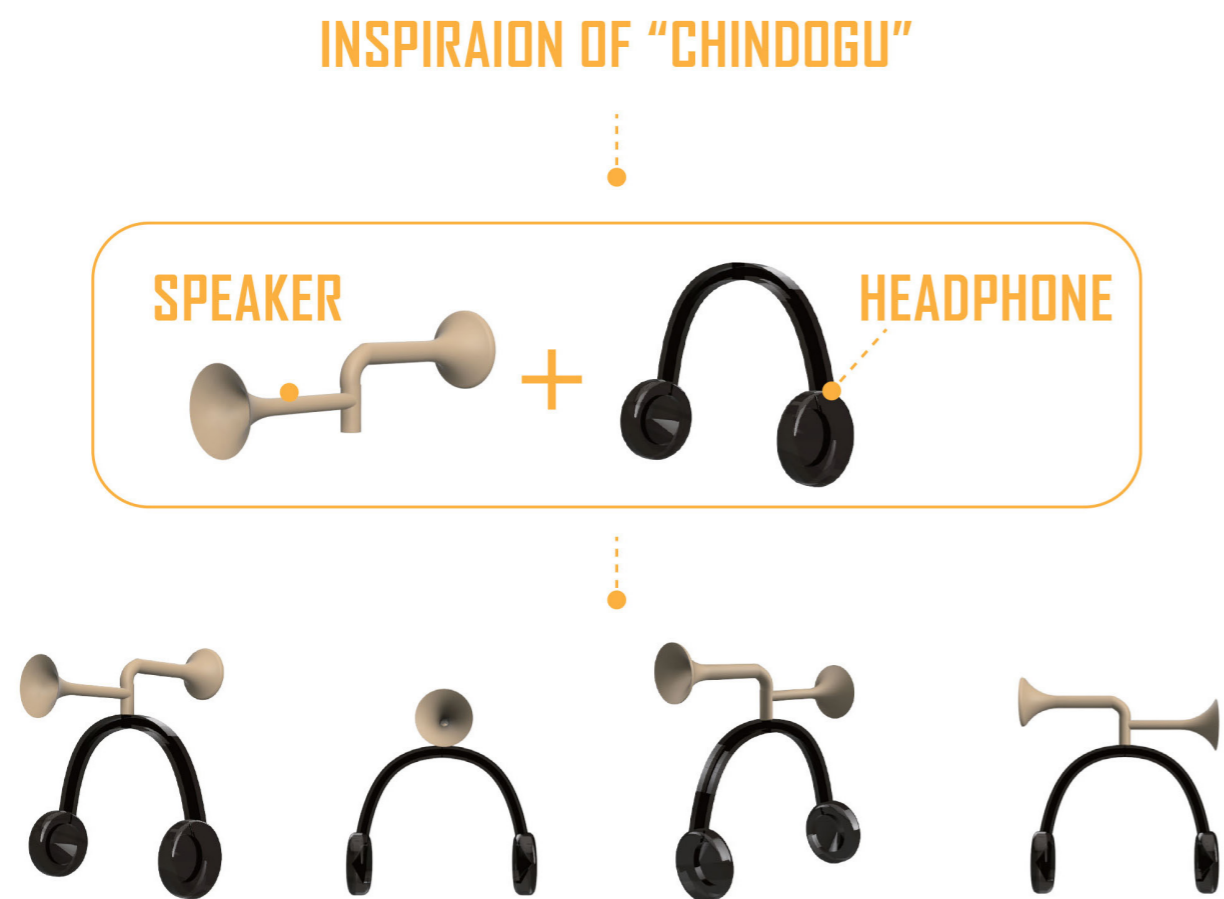
According to the "Chindogu", we have created a mood tool with a humorous appearance. This product may not be intelligent, but it is a good tool when we are in a low mood.

**"CHINDOGU"** Is the Japanese art of inventing ingenious everyday gadgets that, on the face of it, seem like an ideal solution to a particular problem. However, chindōgu has a distinctive feature: anyone actually attempting to use one of these inventions would find that it causes so many new problems, or such significant social embarrassment, that effectively it has no utility whatsoever. Thus, chindōgu are sometimes described as "unuseless" – that is, they cannot be regarded as "useless" in an absolute sense.

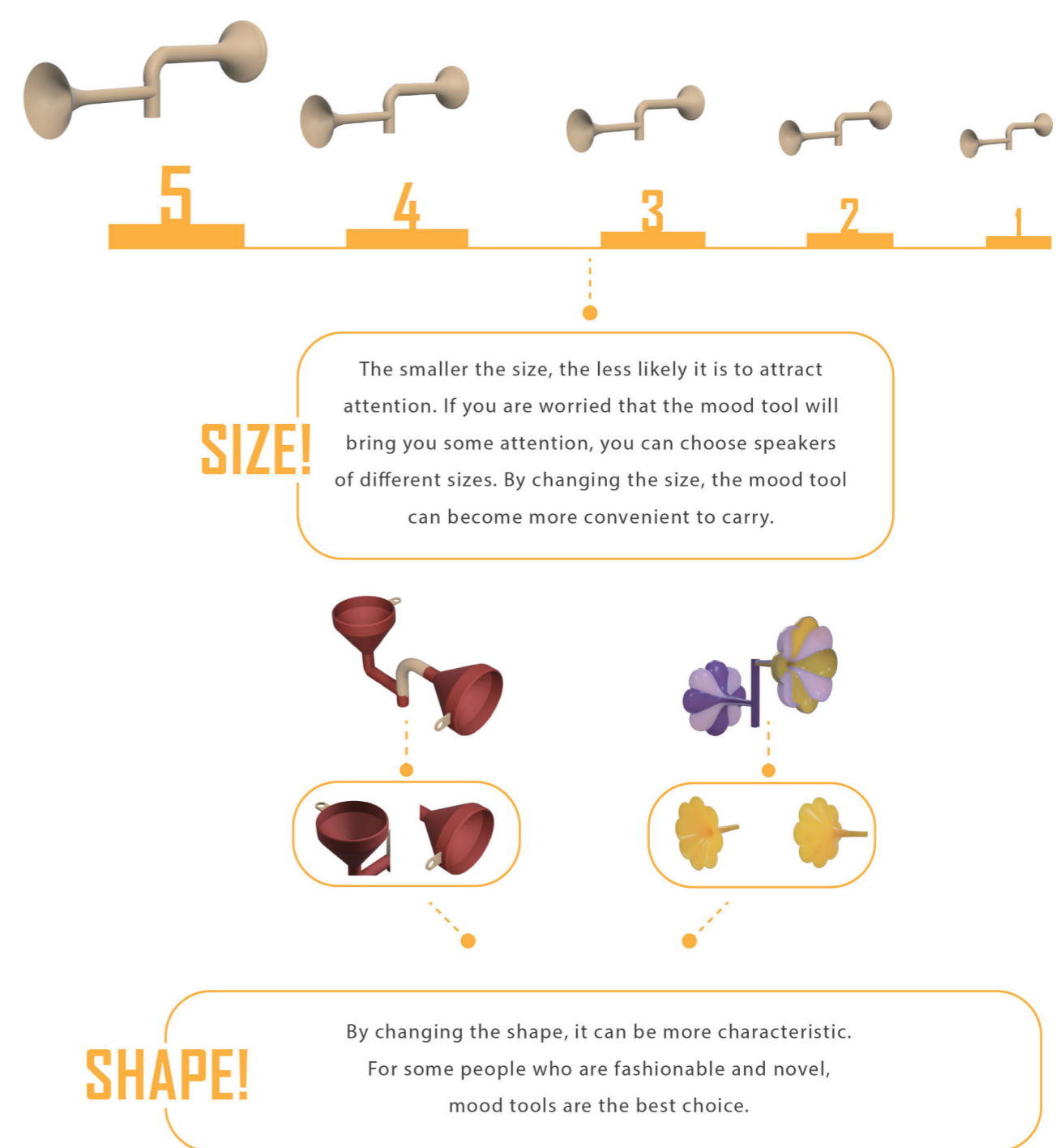




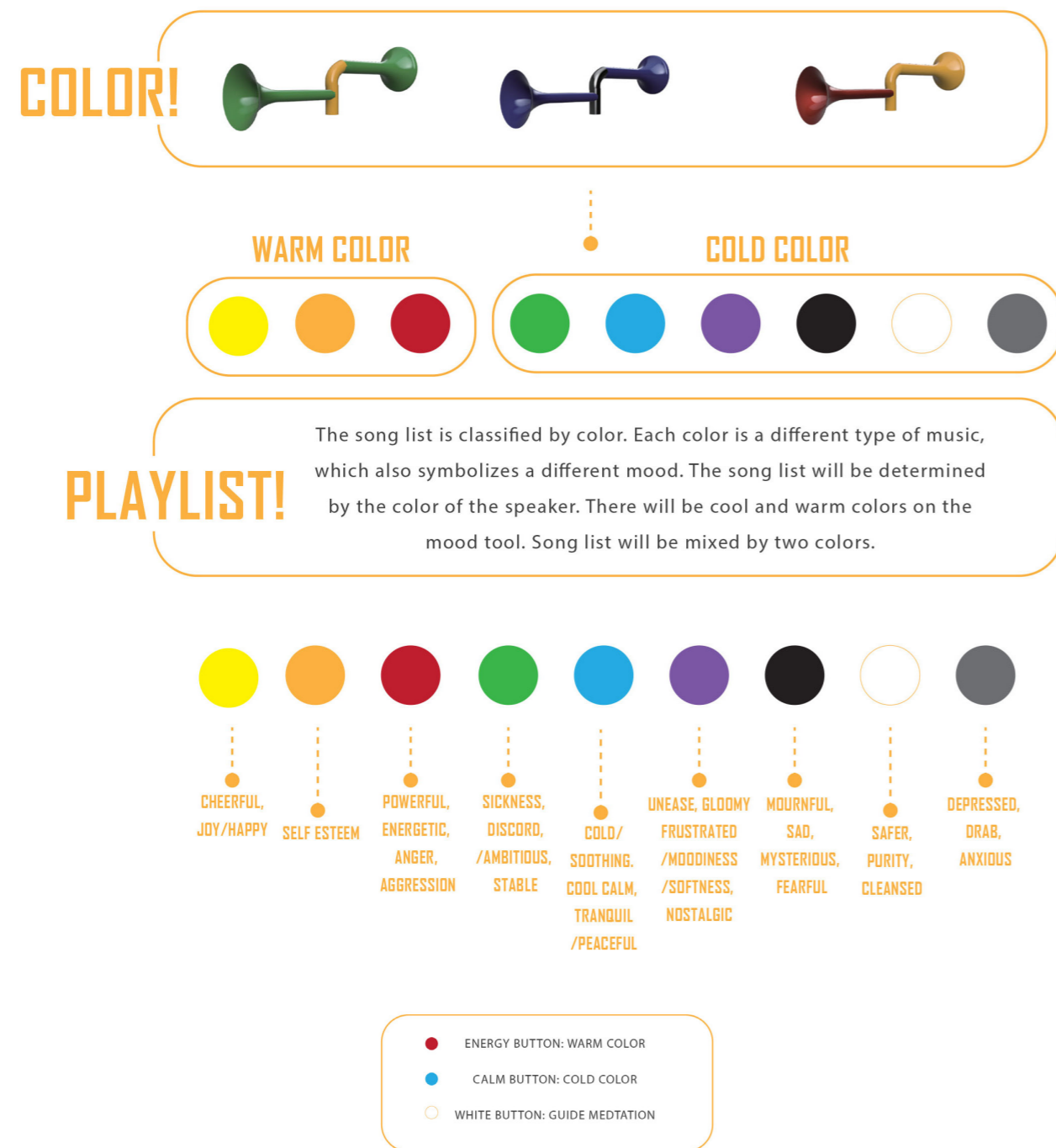
### 3.2.2 Idea of exterior



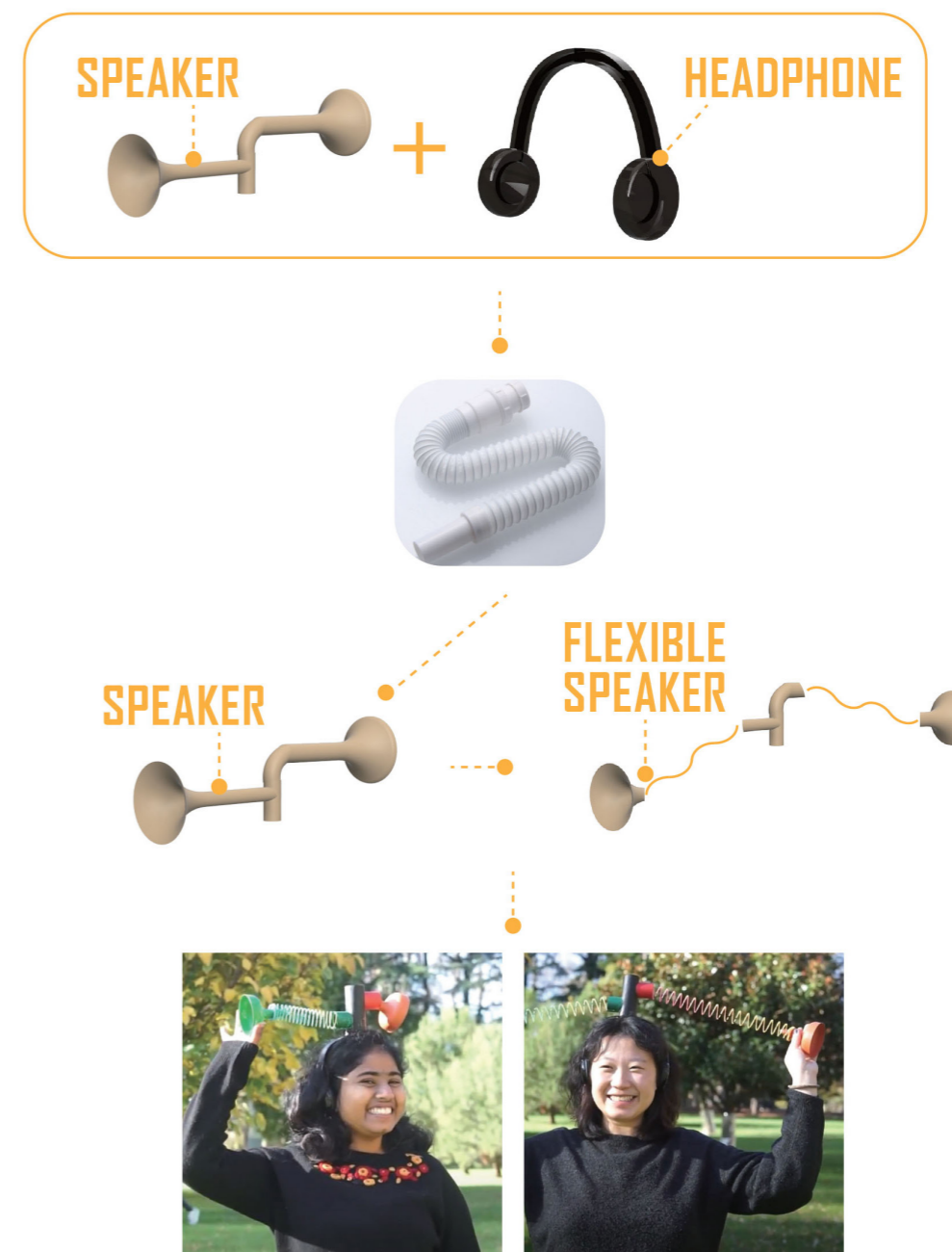
### 3.2.3 Idea development of size and shape



### 3.2.4 Idea development of color and playlist

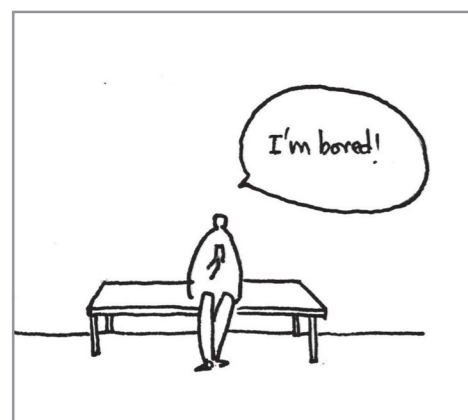


### 3.2.5 Idea development of flexible speaker

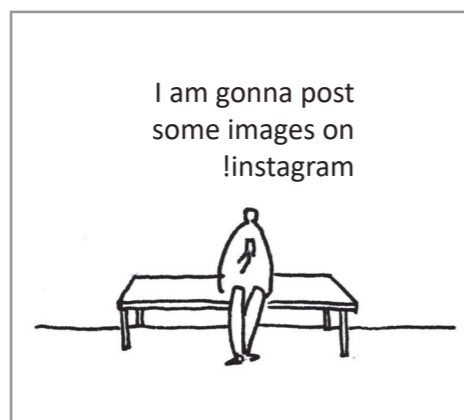


### 3.3 Story board

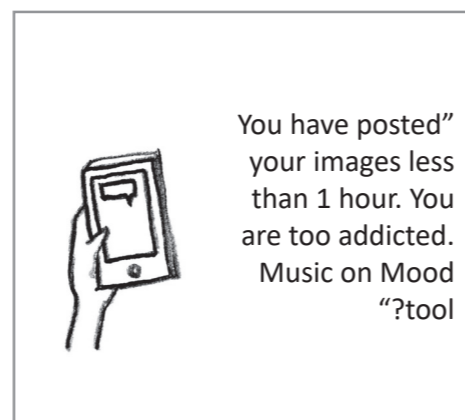
By Hung Nguyen



(1)



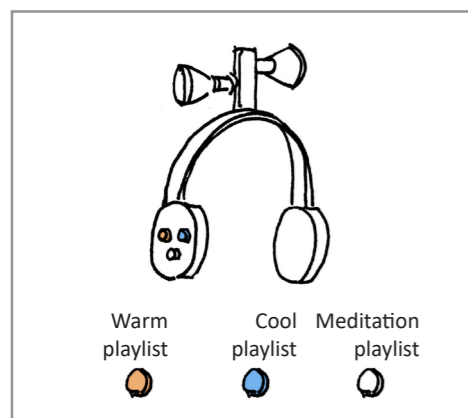
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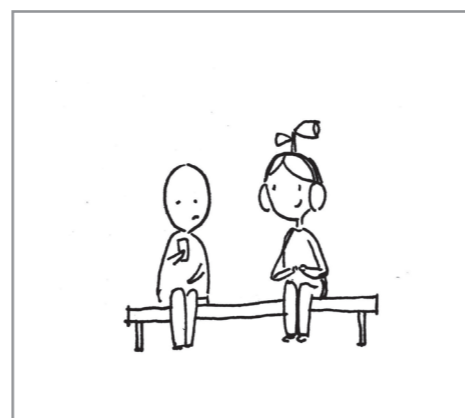
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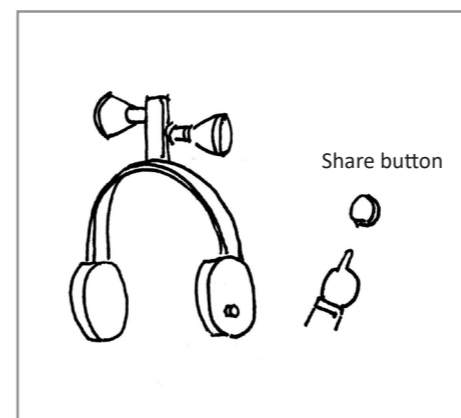
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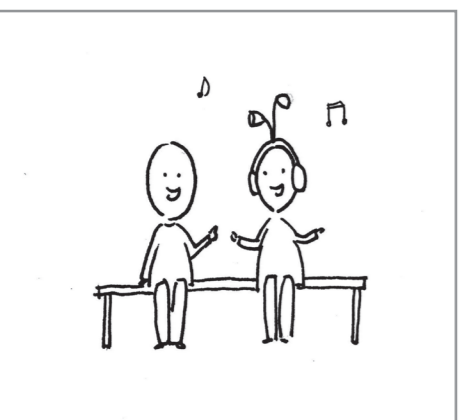
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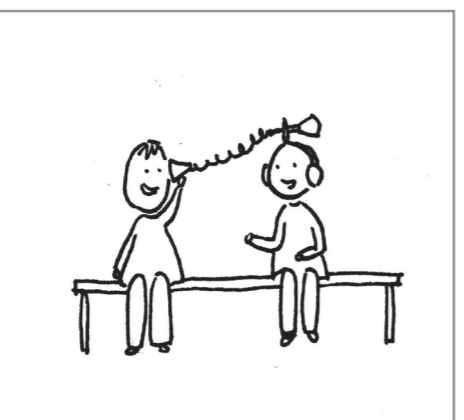
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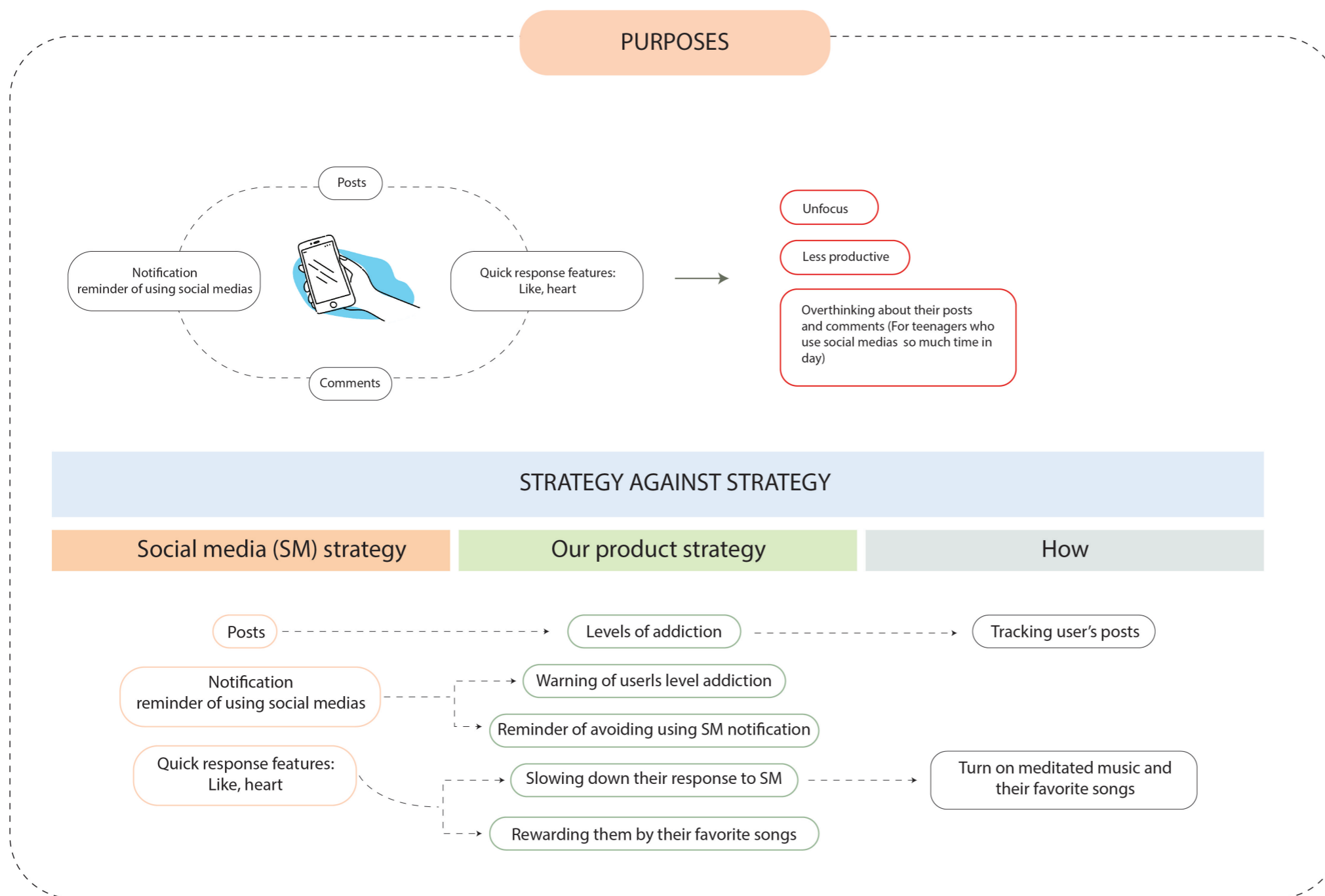
(11)

- (1): User spend his/her spare time binging on social medias.
- (2): He/she tends to post an image on social media app per 1 hour
- (3): A Notification warns him/her about their addiction and suggest him/her to using "Mood tool" listening to music.
- (4): He/she uses the product.
- (5): He/she can choose these 2 options by clicking buttons from left side of "Mood tool":  
"Warm playlist" for energetic songs - "Cool" playlist for calming songs - Meditation records.
- (6): User uses free time to listen to meditation music for calming their behaviors on social medias.
- (7): He/she wants to share music to other people surrounding.
- (8): Click "share" button on right side.
- (9): People join her/him and they start talking to each other.
- (10): "Mood tool" can be shared from distance for special cases.  
Such as: social distance rule during pandemic period.
- (11): Let's make weirdo friends with Mood tools!

### 3.4 From concept to technology

By Hung Nguyen

#### 3.4.1 Purposes



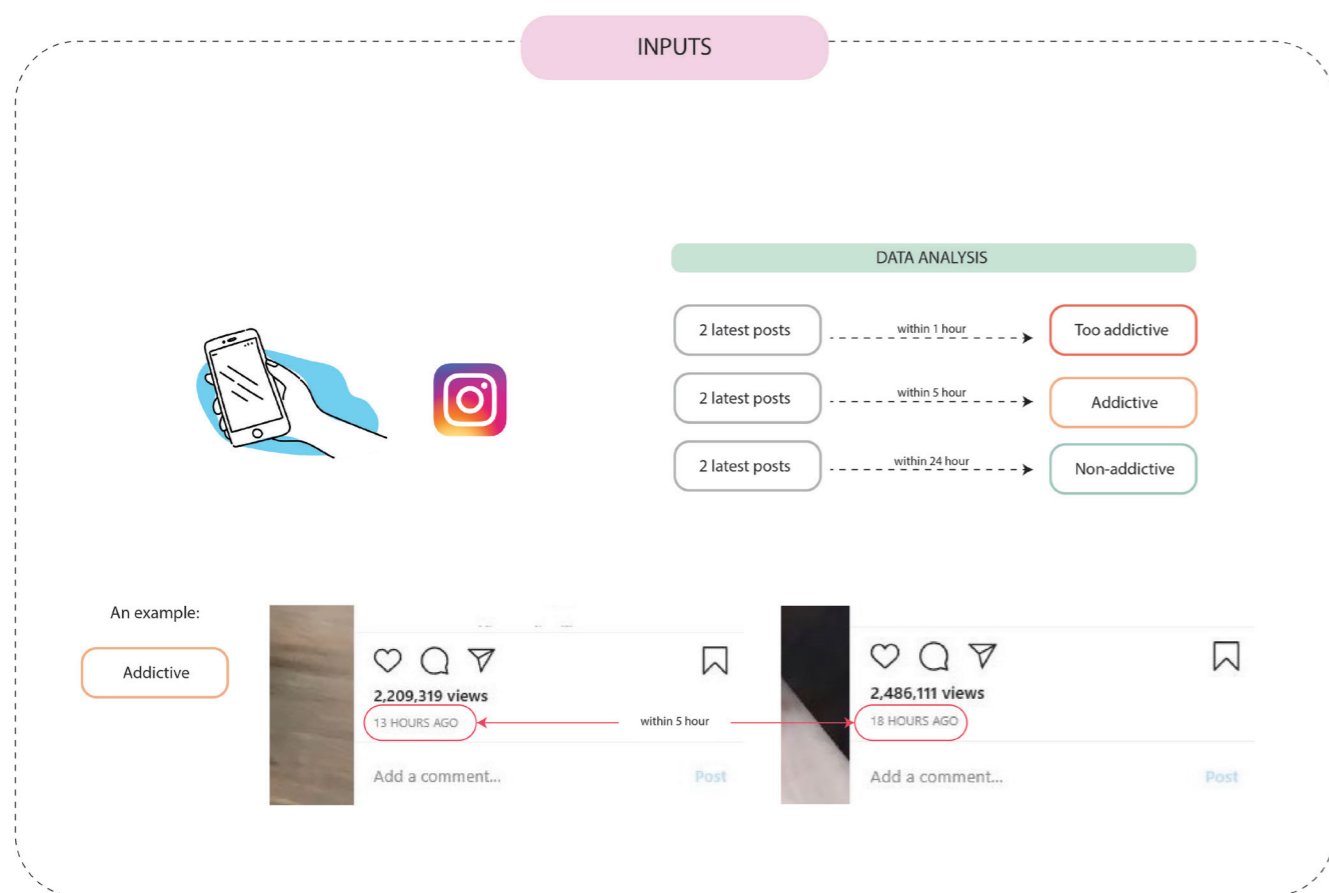
The strategy of social media companies is using many features attracting people keep using their products, such as: "like" button, "heart" button, a set of emotions choice, comments, reminder notification, email alert, etc.

Those features create some negative effects such as: being unfocus, less productive or overthinking phenomenon in young people.

Our strategy will interfere those pattern, step by step, breaking bad technological habit, helps users return to their healthy lifestyle.

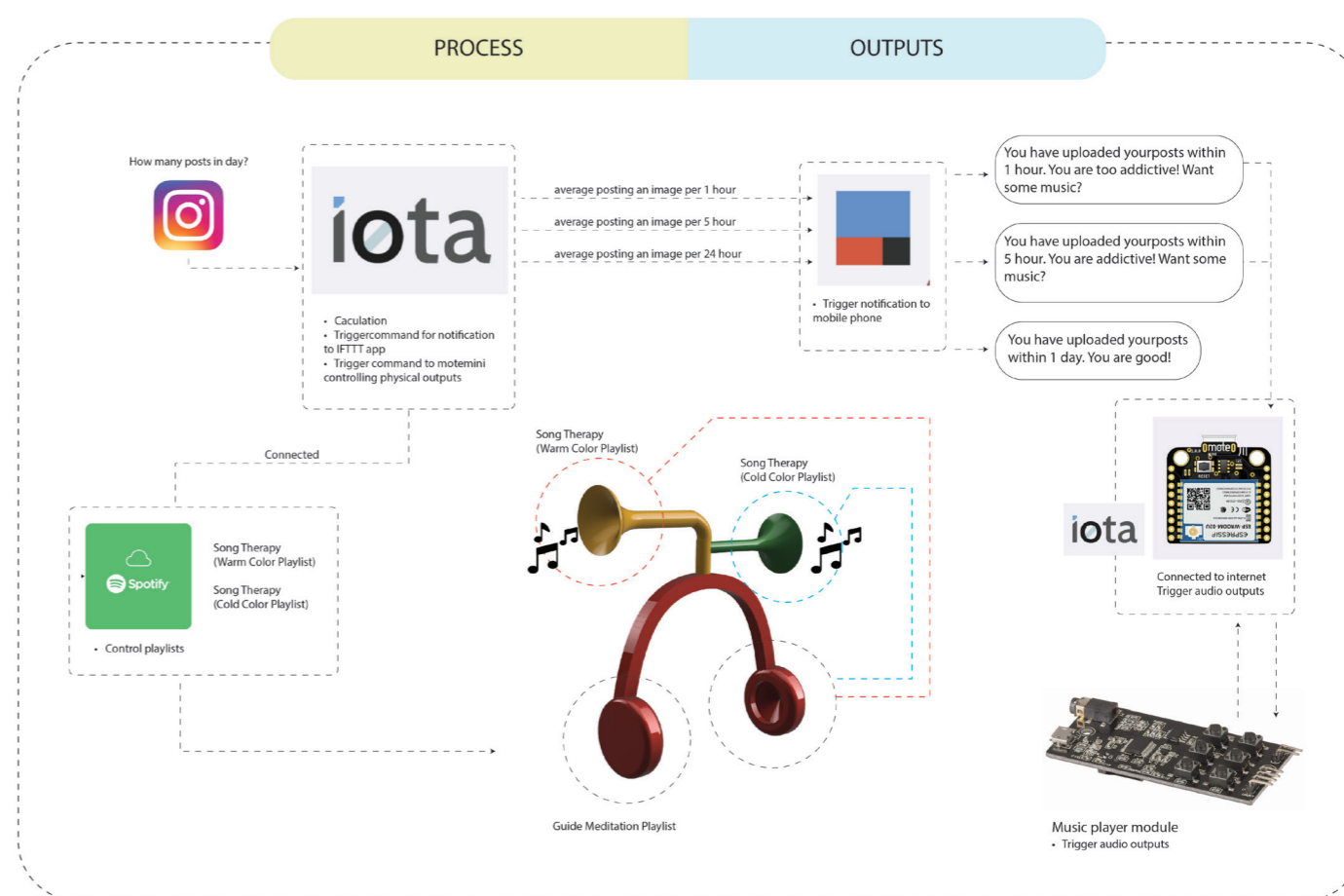


### 3.4.2 Inputs



We collected data from social media by tracking their time using mobile apps. Then, we analyzed and categorized data into addiction levels.

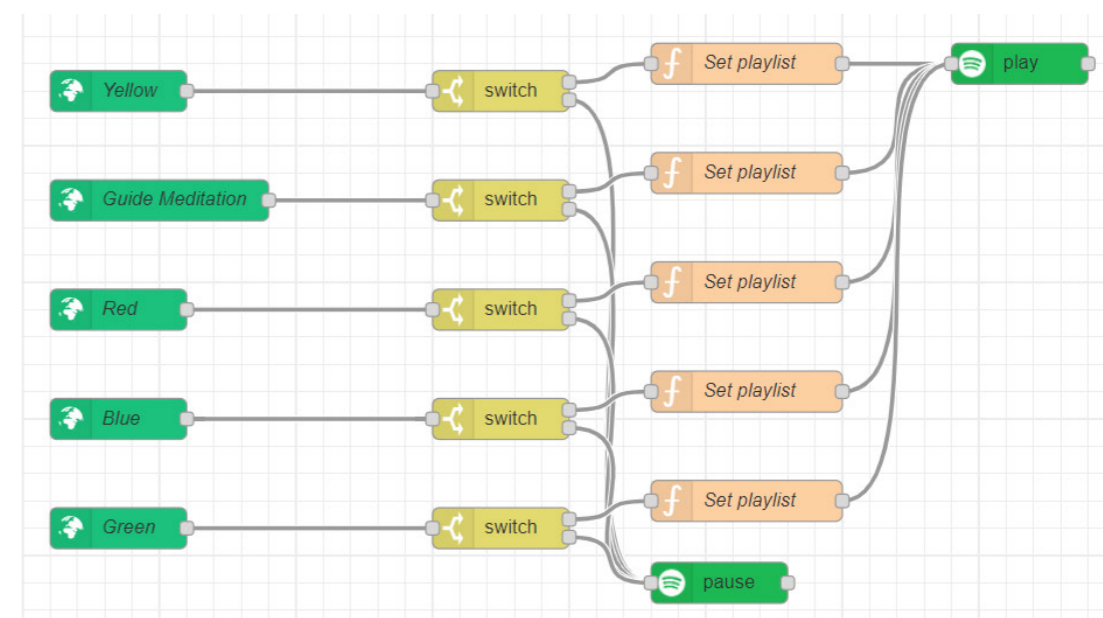
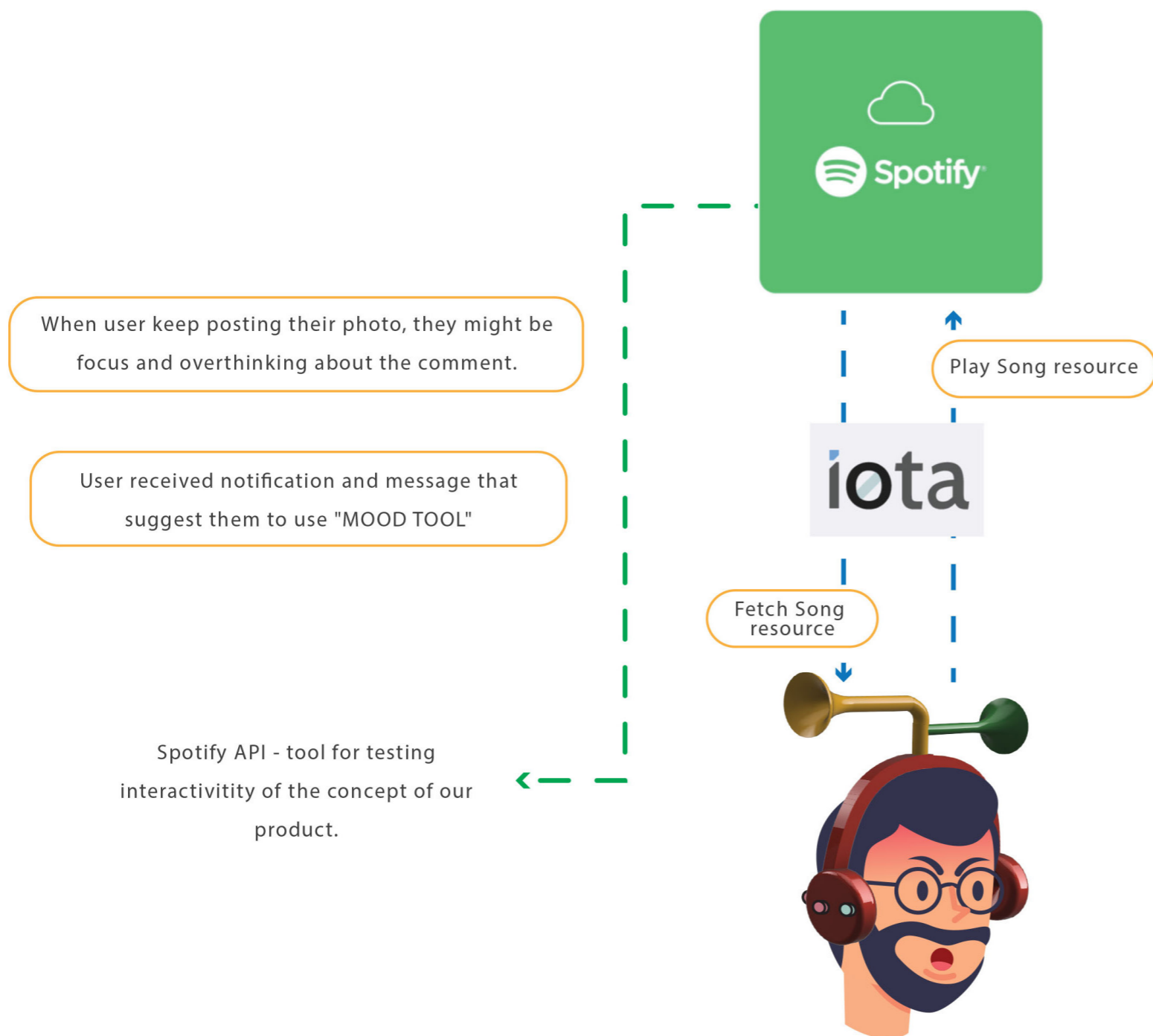
### 3.4.3 Process and outputs

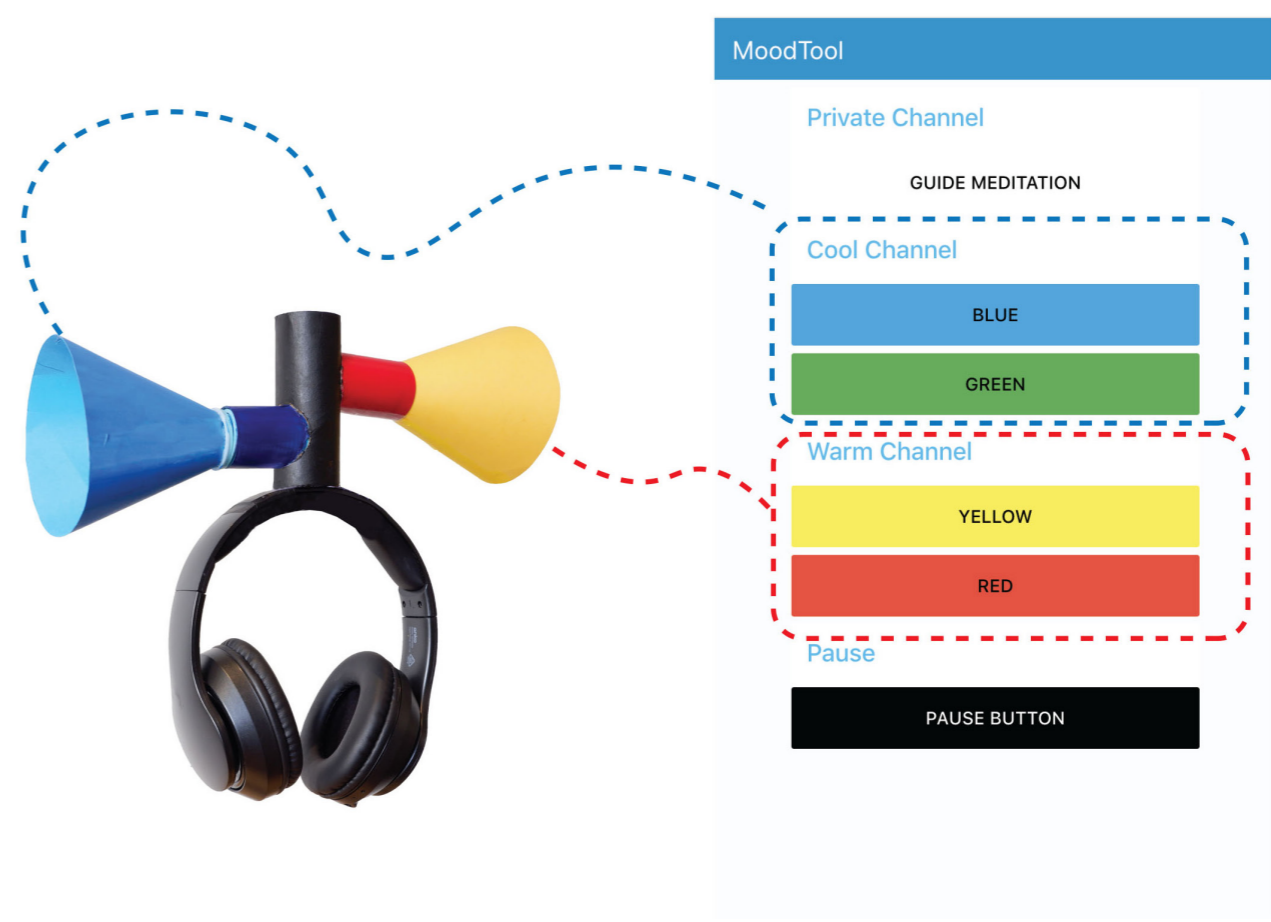
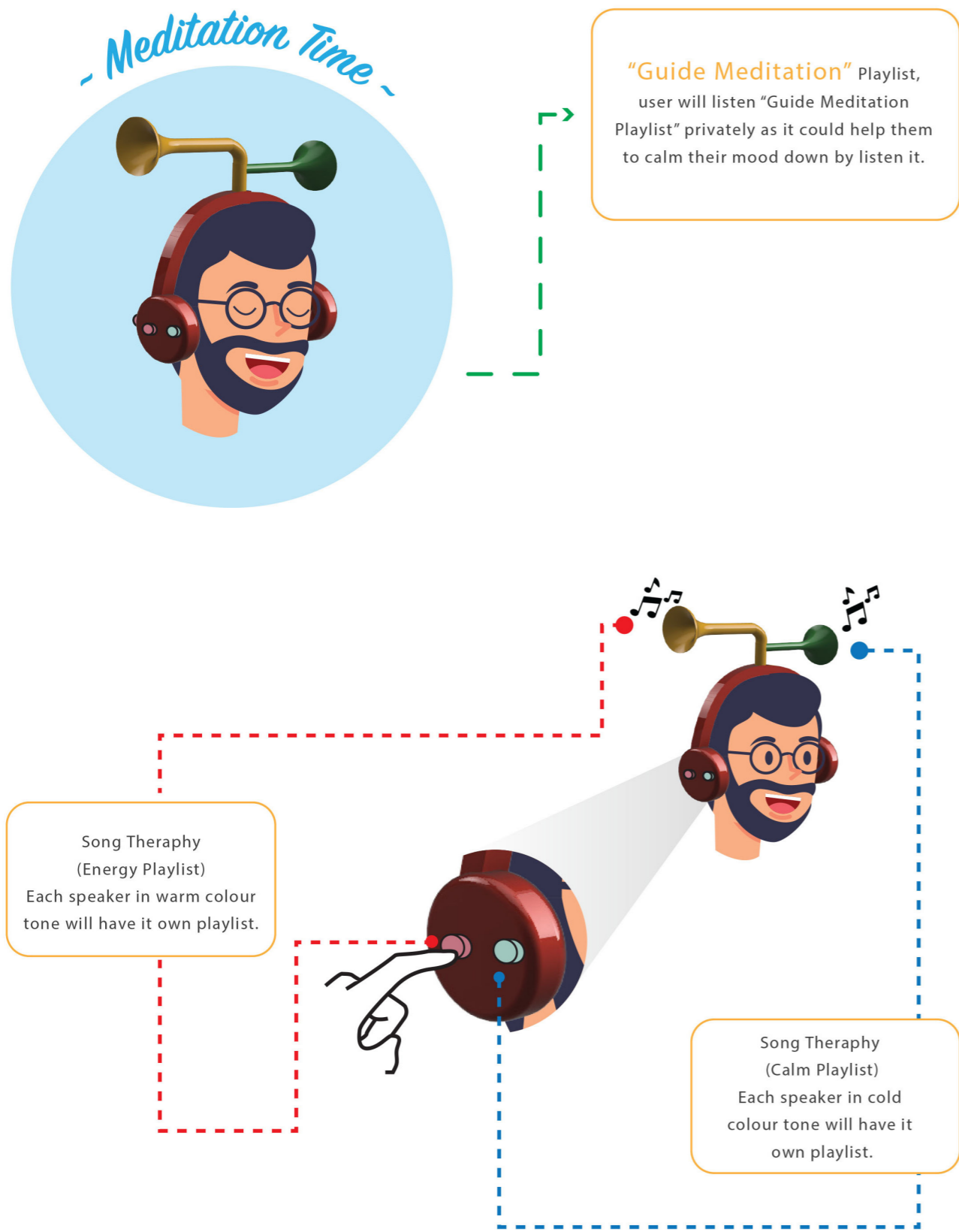


From connections between Iota, Motemini, API and IFTTT app, we tried to alert user through IFTTT notification about their addiction conditions as well as help them calm their mind through music.

### 3.5 Function of prototype

By Thanchanok Klabsong







3.6 Hero shot

# MoodTool

KEEP  
CALM  
AND  
LISTEN  
TO  
MUSIC



## 4. Contribution

- Detailed description of what I have contributed to the project

In this section, I clarify my contribution in group-project in 2 areas:

1. Conceptual design (Supporting role)
2. Technological exploration (Co-leading role)

### 4.1 Conceptual design

My work here is to create:

1. Story board explains user experience for our product.
2. "From concept to Technology" diagram illustrates the relation between conceptual design to technological design for our product.

Details in Pg. 19

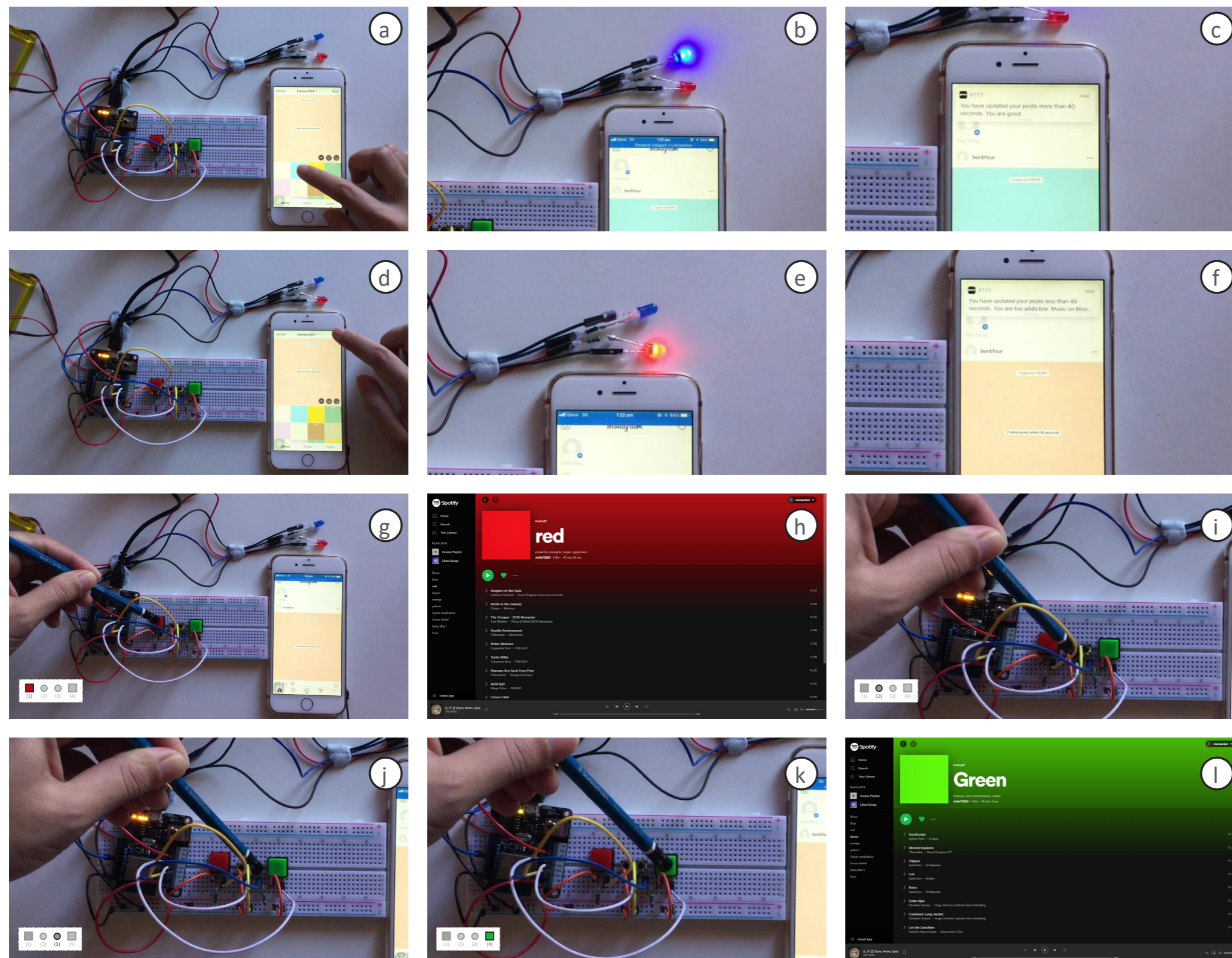
Details in Pg. 20 - Pg.21

### 4.2 Technological exploration

I am responsible for creating interactions between Iota, motemini and Instagram account, specifically:

- From Instagram account to Iota (web server) (I-1)
- From Iota to Motemini (microcontroller) (I-2)
- From Iota to IFTTT app (I-3)
- From Motemini to Iota (Spotify API) (I-4)

### 4.2.1 Sequence



Interactions:

- From Instagram account to Iota (web server) (I-1)
- From Iota to Motemini (microcontroller) (I-2)
- From Iota to IFTTT app (I-3)
- From Motemini to Iota (Spotify API) (-I4)

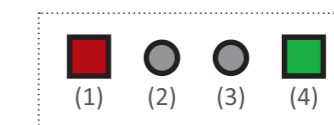
Those interactions are integrated and explained in the sequence of technological user experience from Figure 8:

- a. User posts an image. (I-1)
- b. Blue light turns on (I-2)
- c. Notification pops up on mobile phone (I-3)
- d. User post another image ( within a specific time) (I-1)
- e. Red light turns on (I-2)
- f. Notification pops up on mobile phone (I-3)
- g. User push "Play" button for "Warm" playlist (-I4)
- h. Music turns on from website(- I4)
- i. User push "Pause" button (-I4)
- j. User push "skip to next" button (-I4)
- k. User push "Play" button for "Cool" playlist (-I4)
- l. Music turns on from website (-I4)

Please review link video for further explanation:

<https://vimeo.com/427281360>

#### LEGEND



- (1) - Play button for "Warm" playlist
- (2) Pause button for both playlists
- (3) Skip-to-next-song button for both playlists
- (4) - Play button for "Cool" playlist

Figure. 8 Technological user experience

## 4.2.2 From Instagram to Iota

### 4.2.2.1 Creating Instagram credential on Iota

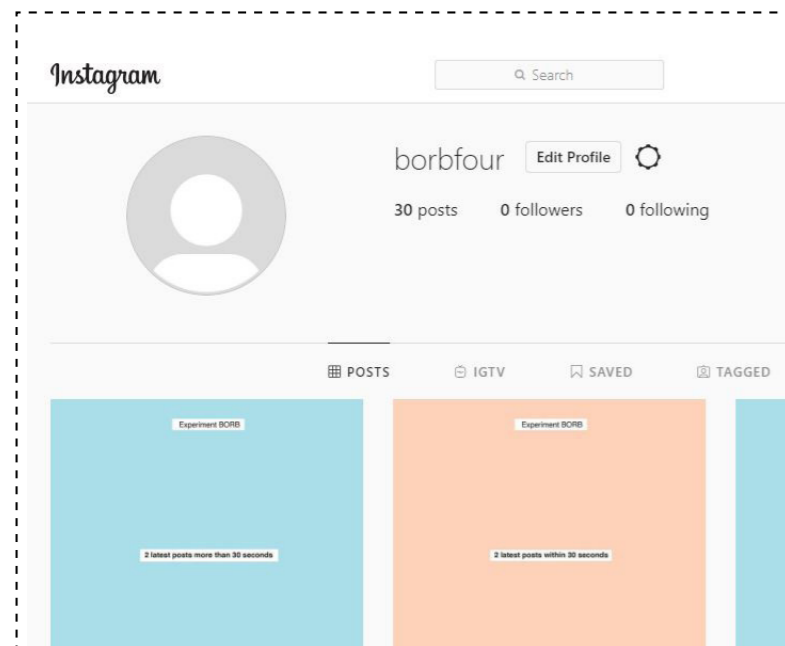


Figure. 9 Create Instagram tester account

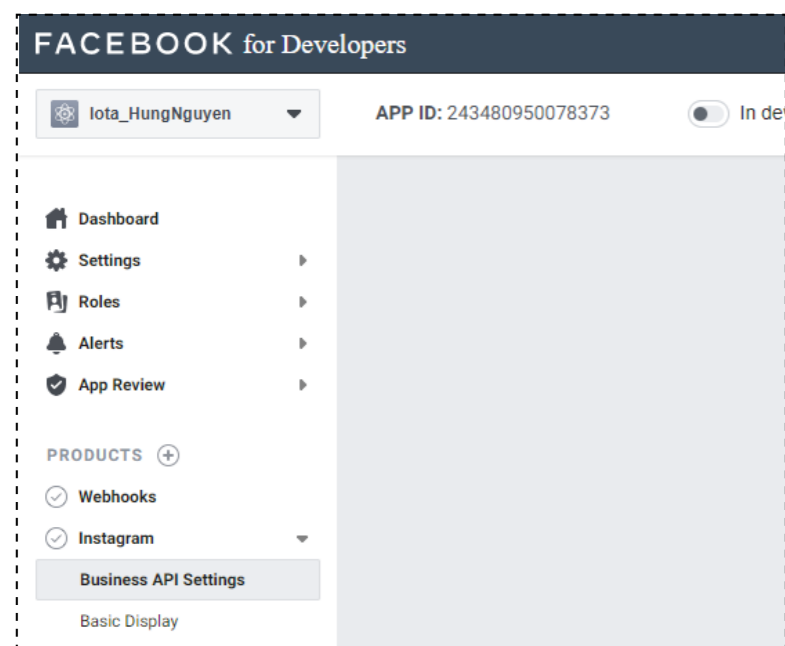


Figure. 10 Create Instagram API

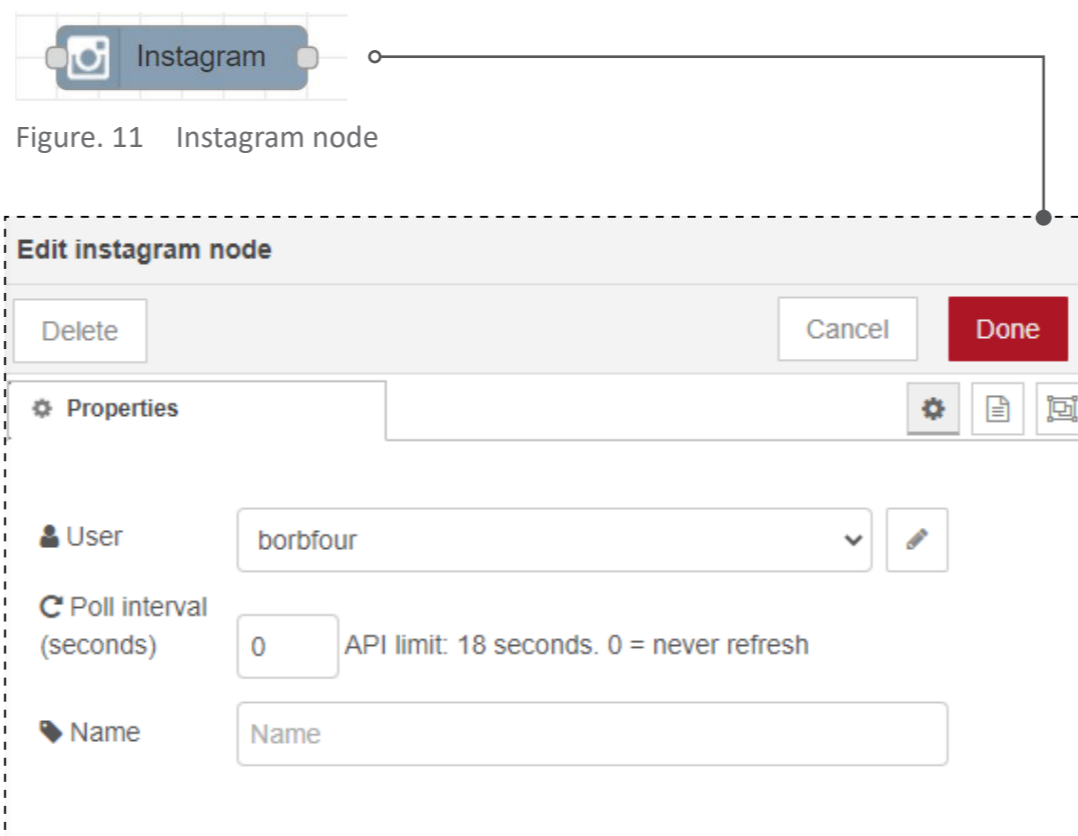


Figure. 12 Add Instagram credential onto Iota

ATTEMPT: Create Instagram credential

I have set up insagram credential for using Insagram node on Iota [11]

From then, I can retrieve data from social media for my own purposes.

[x] This number refers to the reference link located at the end of this DRC.



### 4.2.2.2 Time calculation experiment



Figure. 13 Try using timestamp from instagram API

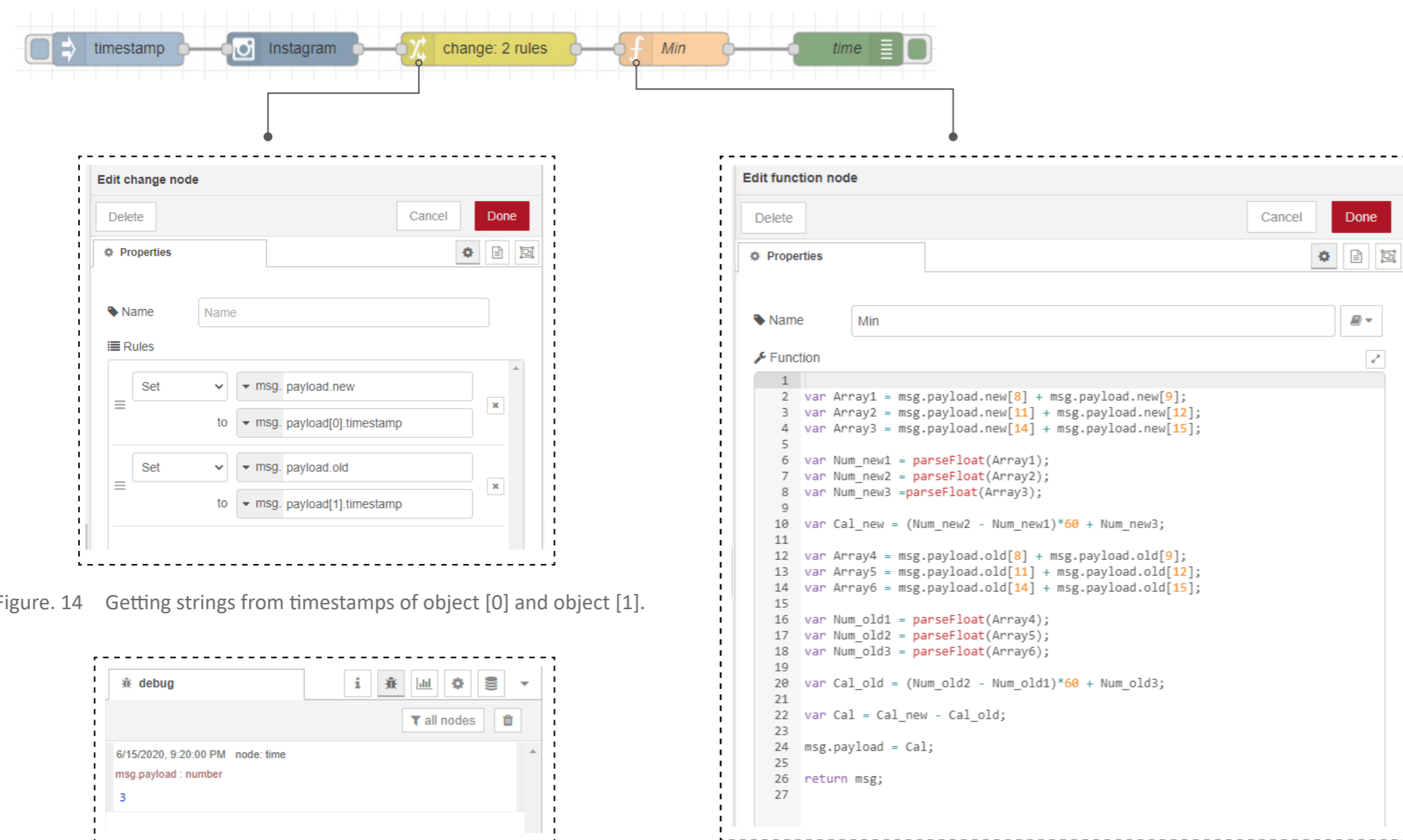


Figure. 14 Getting strings from timestamps of object [0] and object [1].

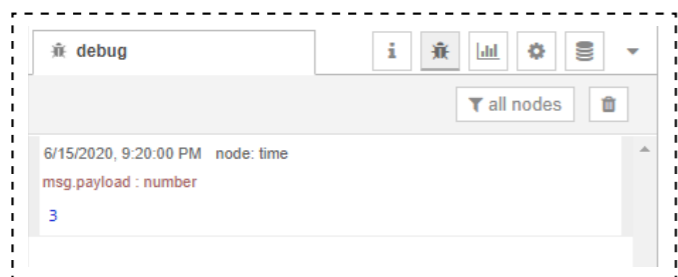


Figure. 16 Result: "3 minutes" is time between the latest 2 posts

Figure. 15 Getting strings from timestamps, parsing strings into numbers and using simple subtraction to get the result.

ATTEMPT 1:

I want to calculate time between the latest 2 posts on user instagram account.

So I used "change" node for getting timestamp strings from the 2 posts, in this case: object "0" and object "1" from instagram's array.

Then, I used the "function" node to parse strings into numbers [12] and calculate them.

The result from that process, in this case, was 3 minutes which was defined as the time between 2 latest images that user posted on instagram.

PROBLEM 1:

It was getting more difficult for me to use strings from timestamp to calculate time in seconds.

I was confused about "second" position in strings of timestamp, also did not know how to calculate time correctly in function node.

PROBLEM 2:

I figured out that, from this calculation, I was unable to know whether or not user posts any image on instagram at the current state. If the last time user posted an image was 1 month ago, so the calculation of 2 latest posts has no meaning of judging user being addictive to social media.

Furthermore, if I connect this flow to IFTTT app to trigger notification on mobile phone, then user will be warned by virtual notification every 18 seconds (the time for Iota updating input datas). That's not what this experiment meant for.

This leads me to the attempt 2.

[x] This number refers to the reference link located at the end of this DRC.



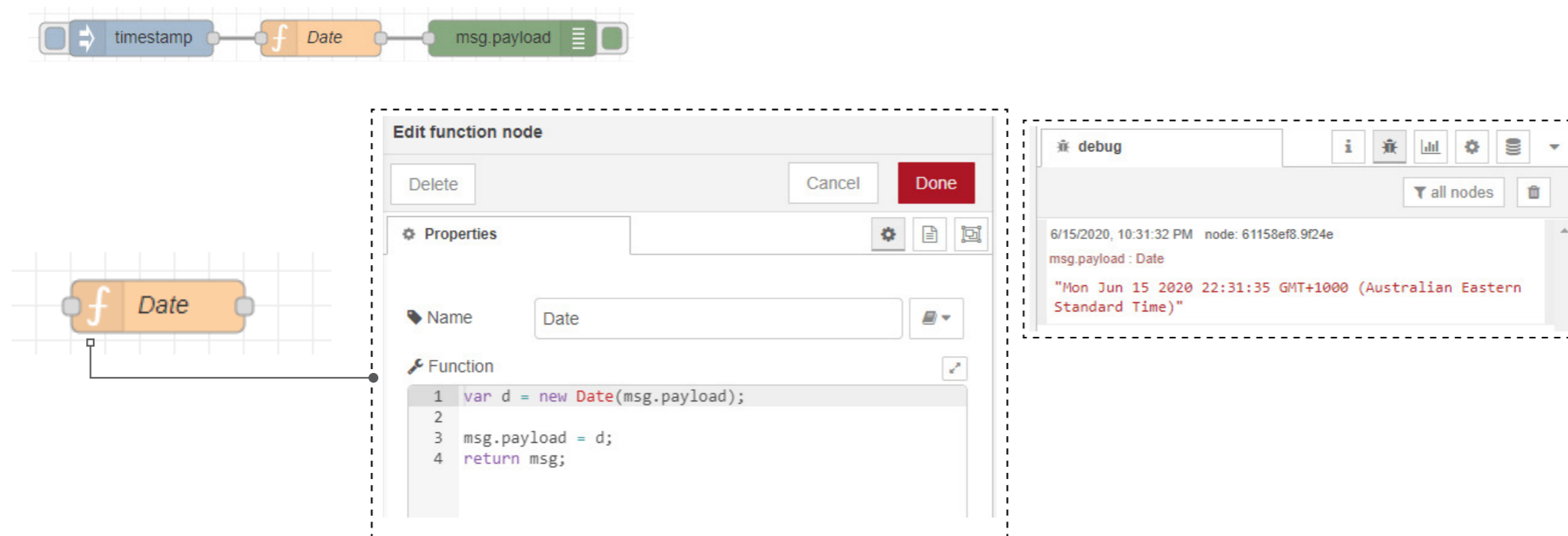


Figure. 17 Using "new Date()" for getting current time.

ATTEMPT 2:

I focused on changing code in function node.

I figured out that I can use "JavaScript Date Reference" [13] to calculate time, instead of picking up strings from timestamp as previous experiment. (Figure 17)

Now, I can retrieve the current time in date, hour and second. (Figure 18)

The results can be explained further from the codes showed in Figure 19 (next page).

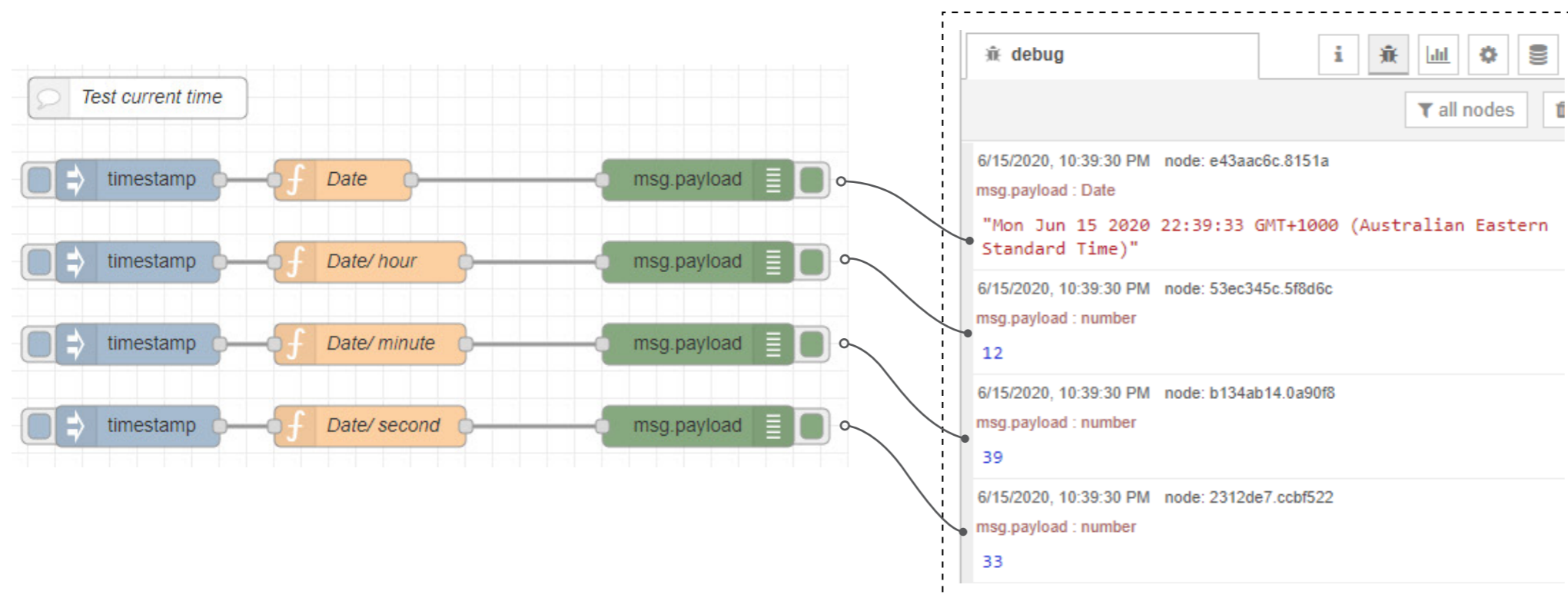


Figure. 18 Results of current time in date, hour, minute and second.

[x] This number refers to the reference link located at the end of this DRC.

**f** Date

```
Function
1 var d = new Date(msg.payload);
2
3 msg.payload = d;
4 return msg;
```

**f** Date/ hour

```
Function
1 var d = new Date(msg.payload);
2
3 msg.payload = d.getUTCHours();
4 return msg;
```

**f** Date/ minute

```
Function
1 var d = new Date(msg.payload);
2
3 msg.payload = d.getUTCMinutes();
4 return msg;
```

**f** Date/ second

```
Function
1 var d = new Date(msg.payload);
2
3 msg.payload = d.getUTCSeconds();
4 return msg;
```

ATTEMPT 2:  
After retrieving current time data, I can retrieve time of 2 latest post on insagram by using the same function nodes (Figure 20).

Figure. 19 JavaScript functions

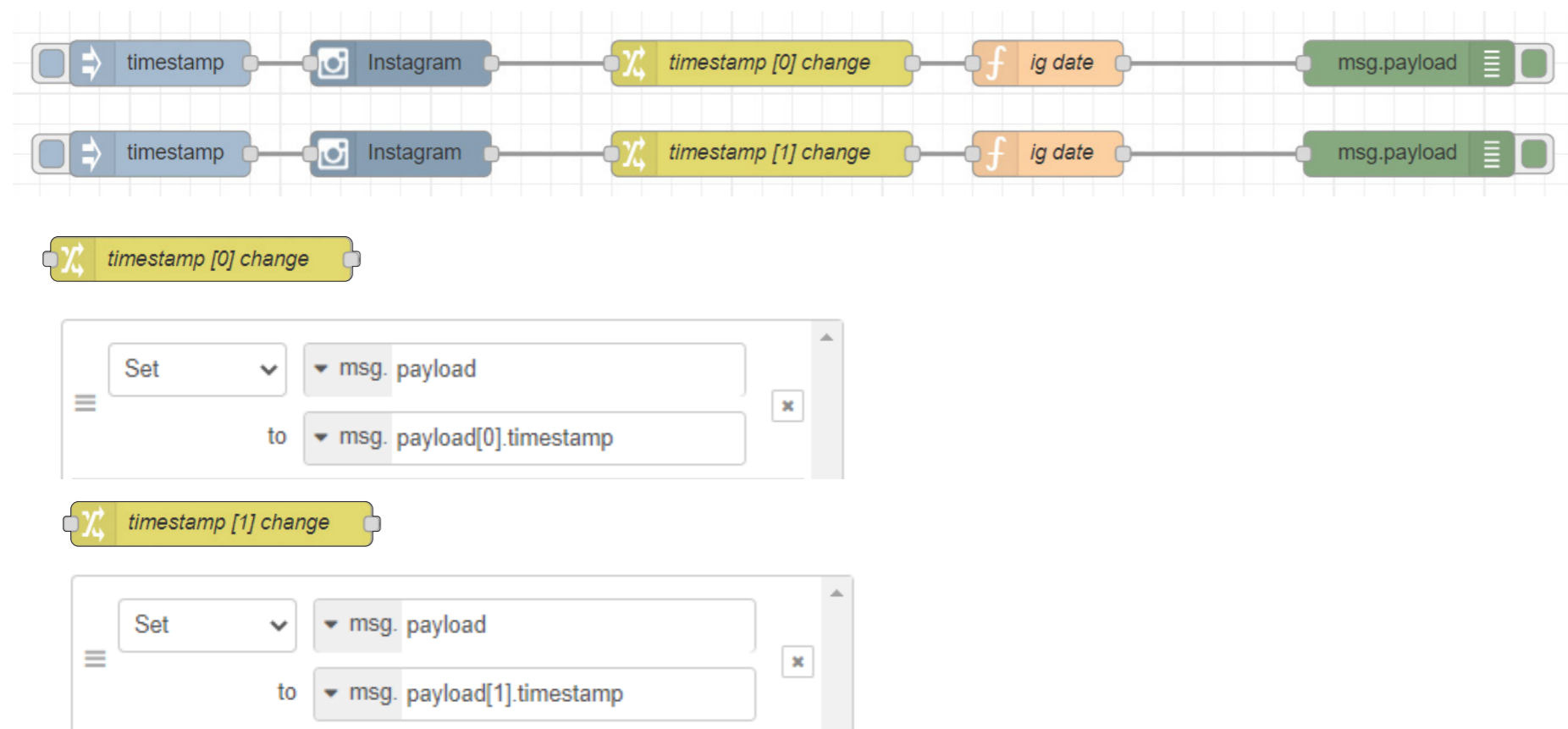


Figure. 20 Same logic is applied to Instagram node

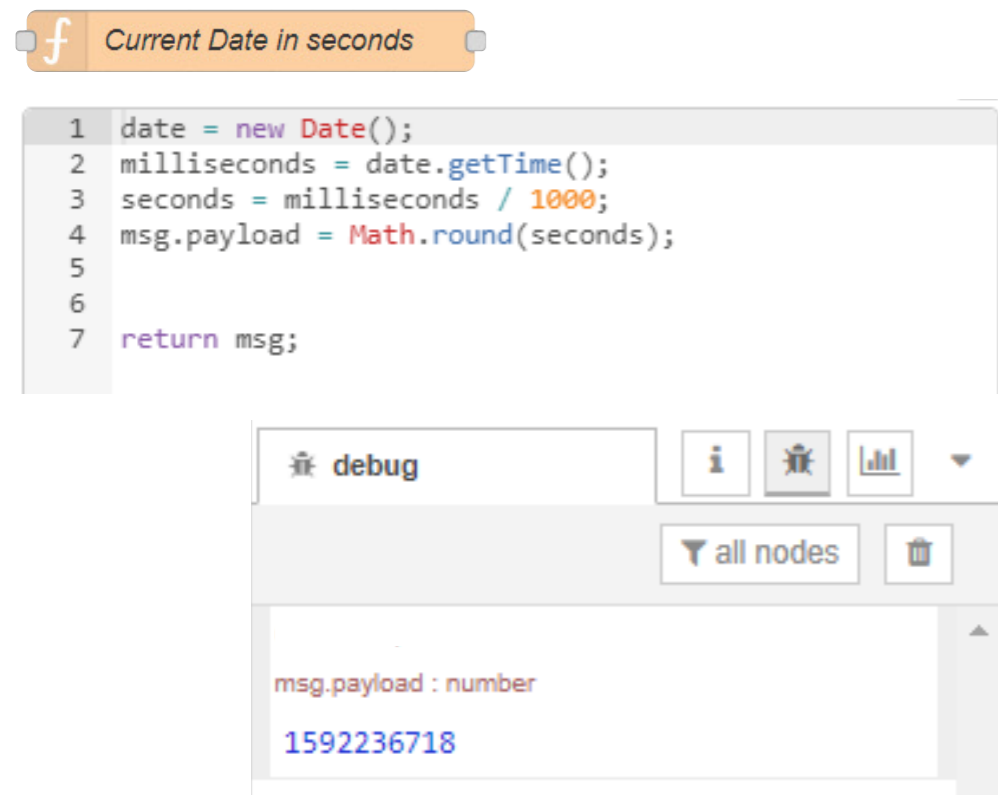


Figure. 21 Function node and result of current time in seconds.

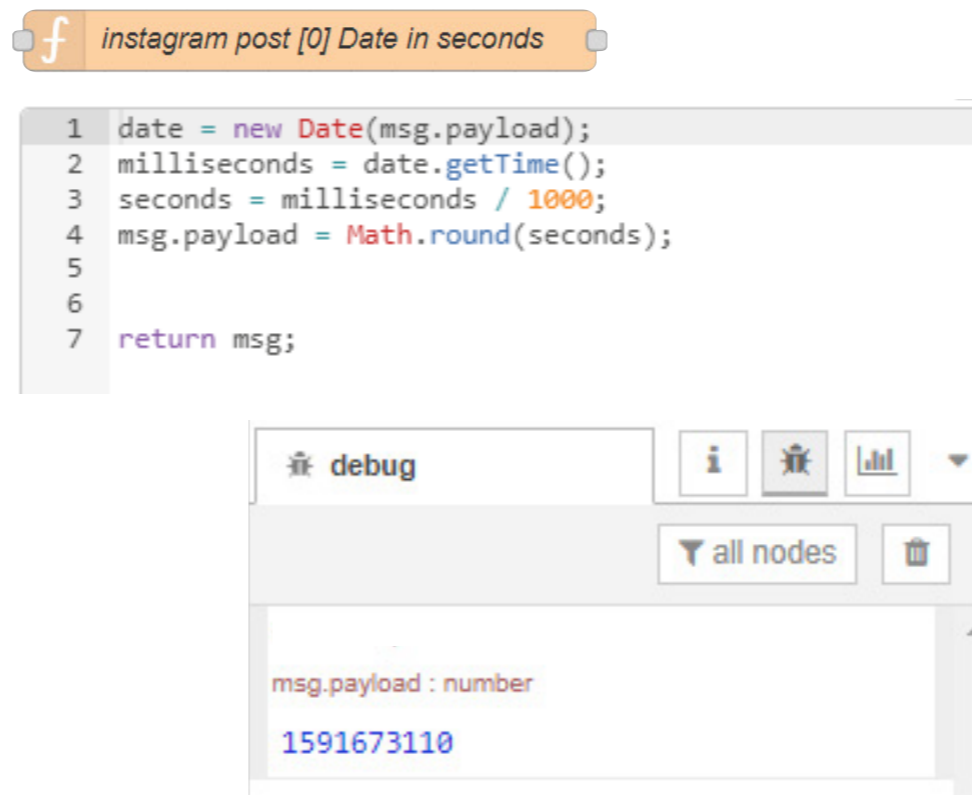


Figure. 22 Function node and result of the last time, when user posted an image on instagram, in seconds.

ATTEMPT 3:

My work now is to get current time and time of intagram-post in seconds which will then help us easily do experiment and record video in a short period of time.

Combined those 2 codes, I can solve my previous problem about knowing how long it has been since the last time user posted an image and knowing the time between posts.

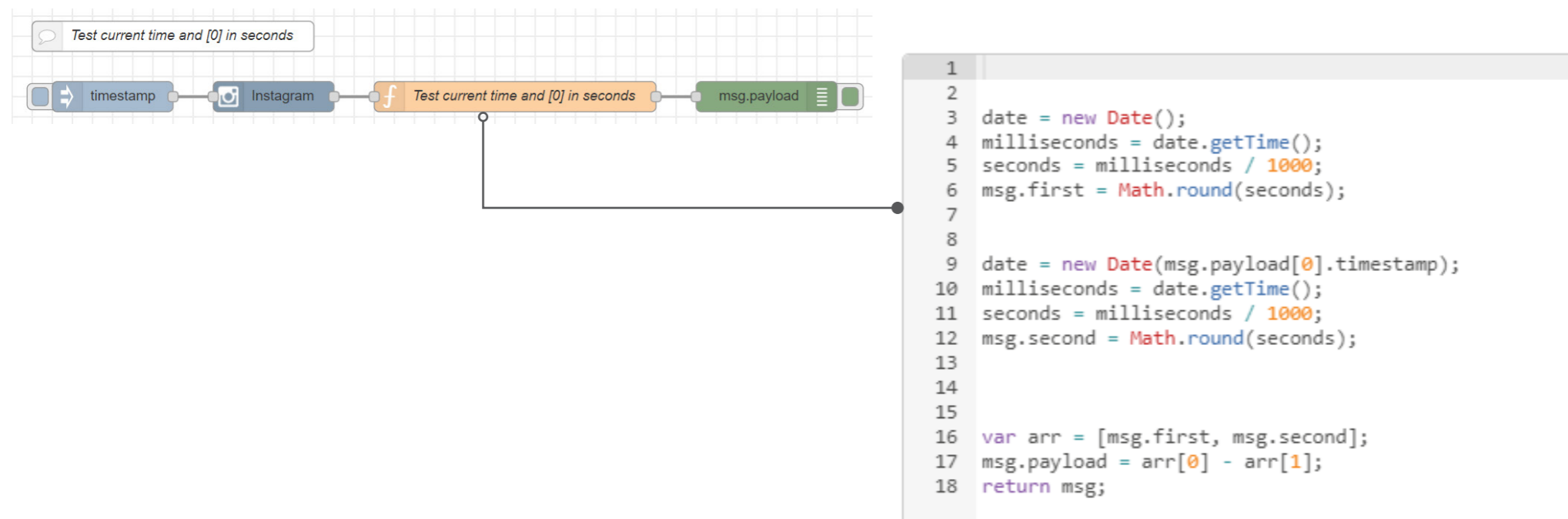
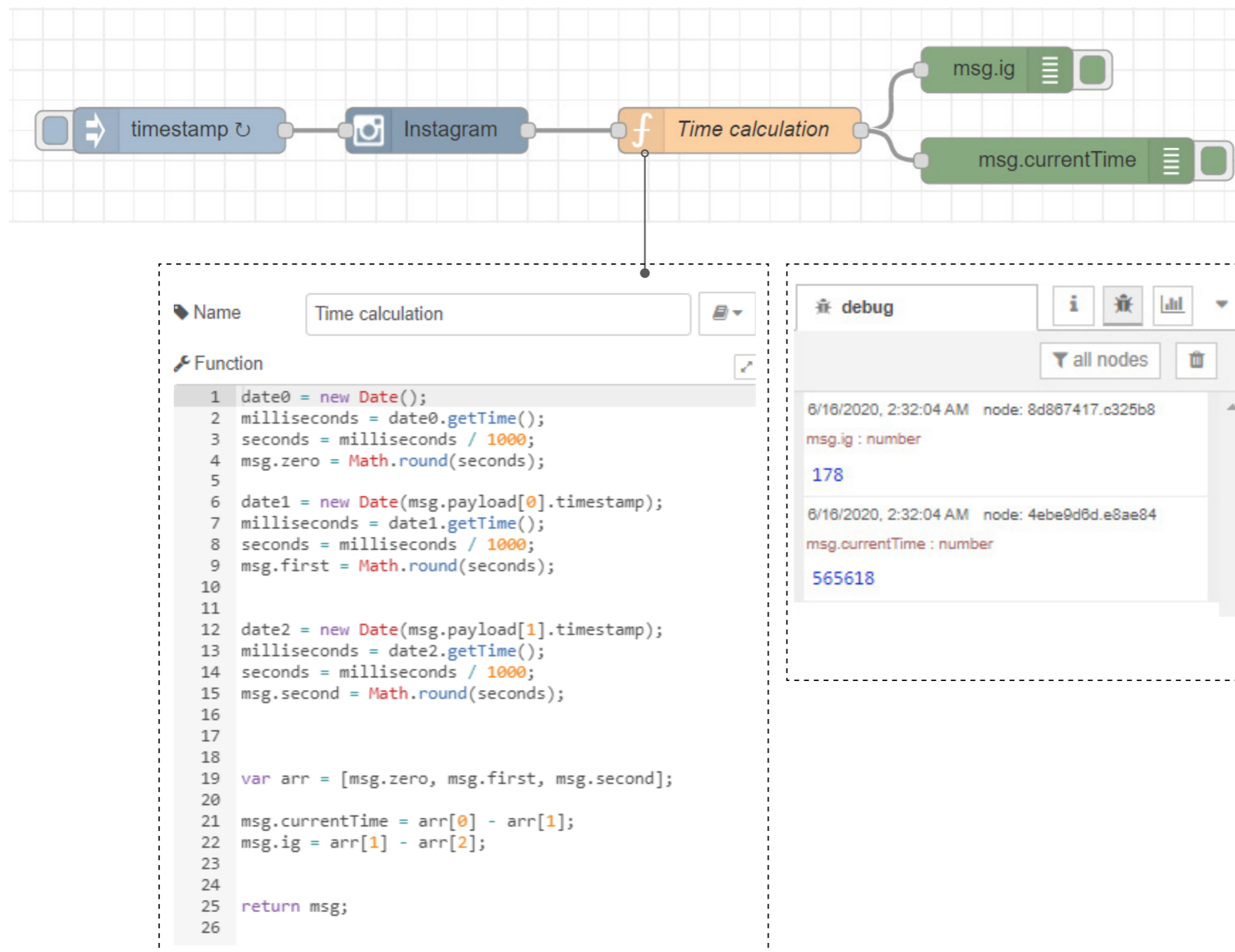


Figure. 23 This node calculates how many seconds has passed from the last time user posted an image.

### 4.2.2.3 Final flow for this stage



In figure 24,

- "ms.ig" represents time in seconds between the 2 latest posts on instagram.
- "msg.currentTime" represents time in seconds for how long from the current state to the moment posting the latest Instagram-image.
- These 2 quests of times have been set off which then finalize our logical conditions to trigger notification on mobile phone, music from Spotify and lights from Motemini.

Figure. 24 The flow results 2 time calculations: mg.ig and ms.currentTime

### 4.2.3 From Iota to IFTTT & to Motemini

#### 4.2.3.1 The flow

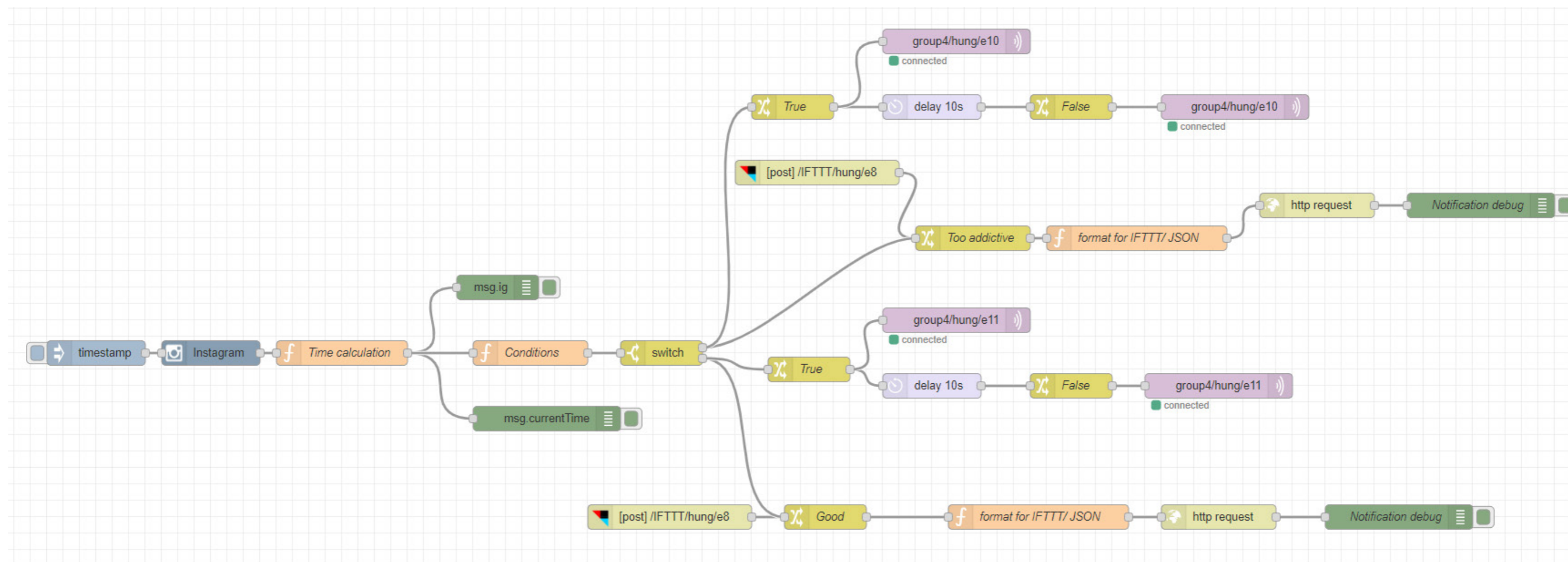


Figure. 25 Final flow for triggering notification on mobile phone and for LED lights representing user addiction levels



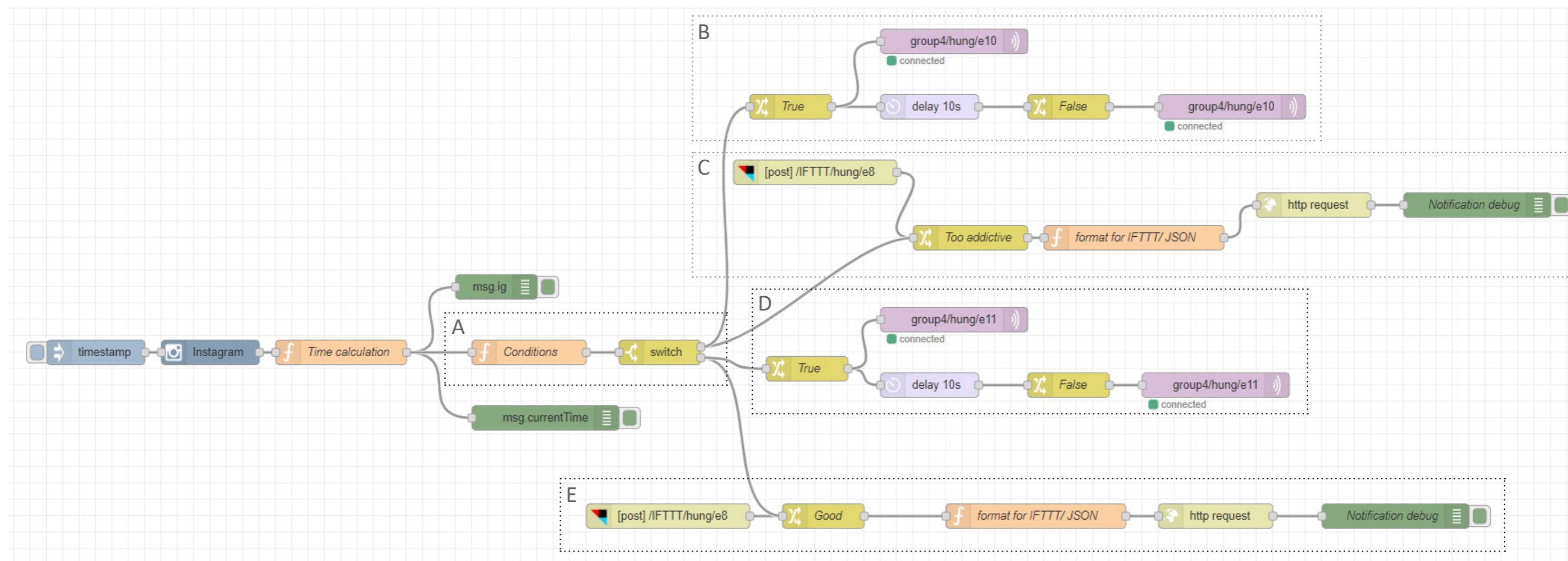


Figure. 26 Flow tissues mapping

For easy to understand, I divide the flow into 5 types of tissues and explain them in the following order of alphabet.

### 4.2.3.2 The flow's tissues explanation

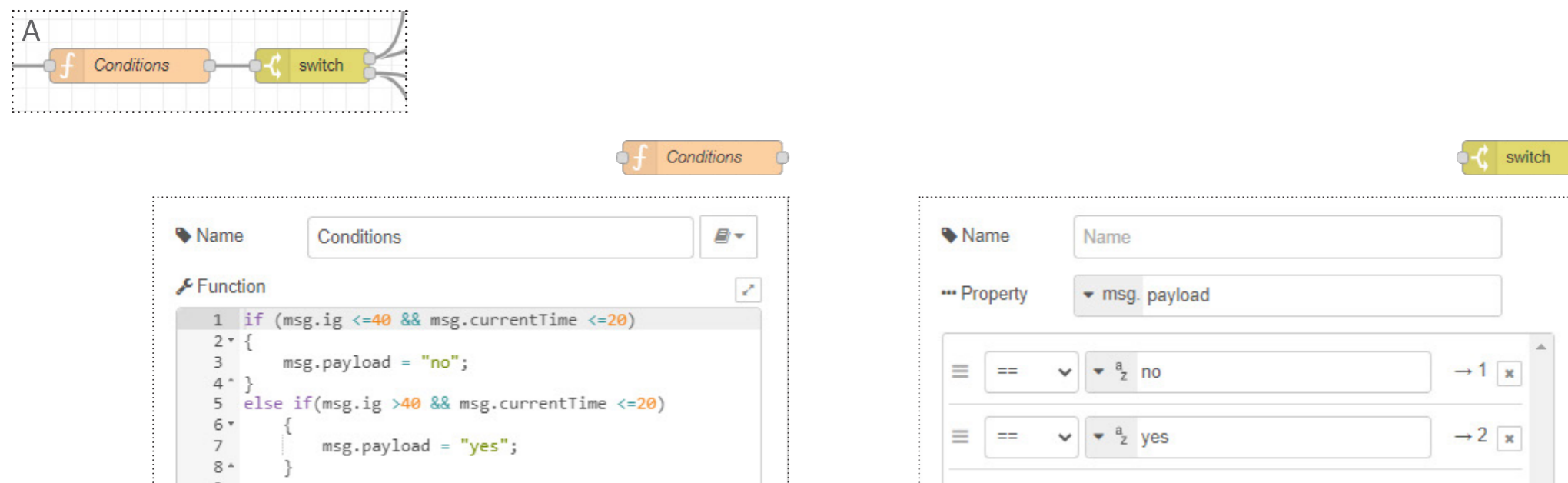


Figure. 27 2 state- condition

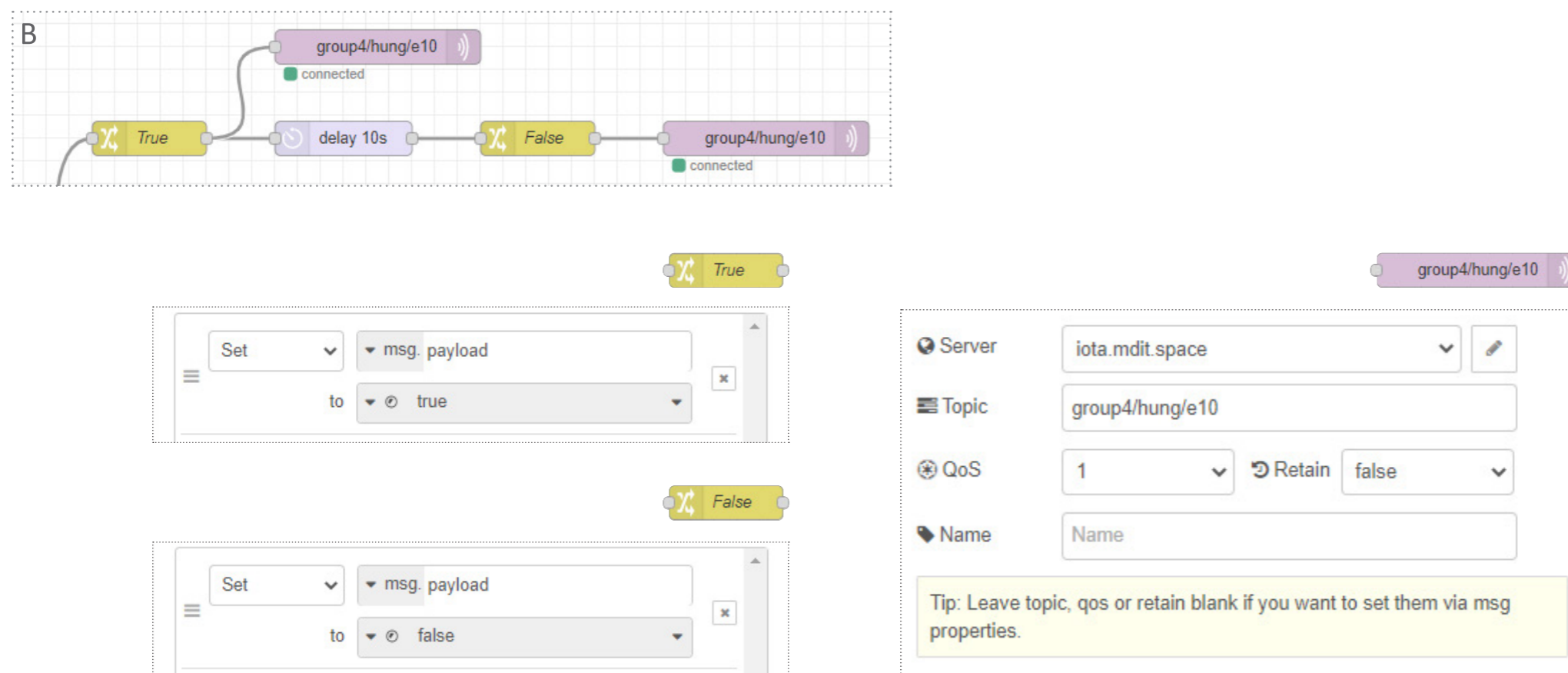


Figure. 28 Setup nodes to turn on LED light from Motemini

Note: this is the set-up of Iota for prototype experiment. Therefore, I simplified the concept of user's addiction levels into 2 states: addictive and non-addictive. Also, I used time unit of "second" for a whole sequence.

In "Conditions" function node (Figure 27), the code illustrated that if user post an image on Instagram within 40 seconds, compared to their previous post, and, the uploading moment is no longer than the time Iota updating input, then, message will be sent as "no" - representing "addictive".

After that, the node (figure 28) will trigger red light from motemini (through "group4/hung/e10" topic mqtt out) to turn on, maintain in 10 seconds, and turn off.

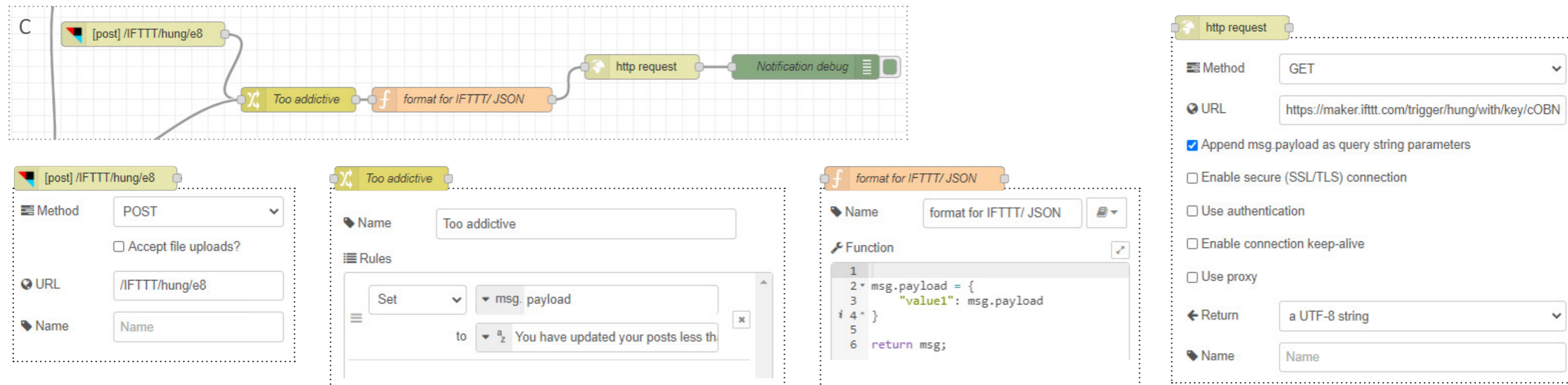


Figure. 29 Setup nodes to trigger IFTTT notification

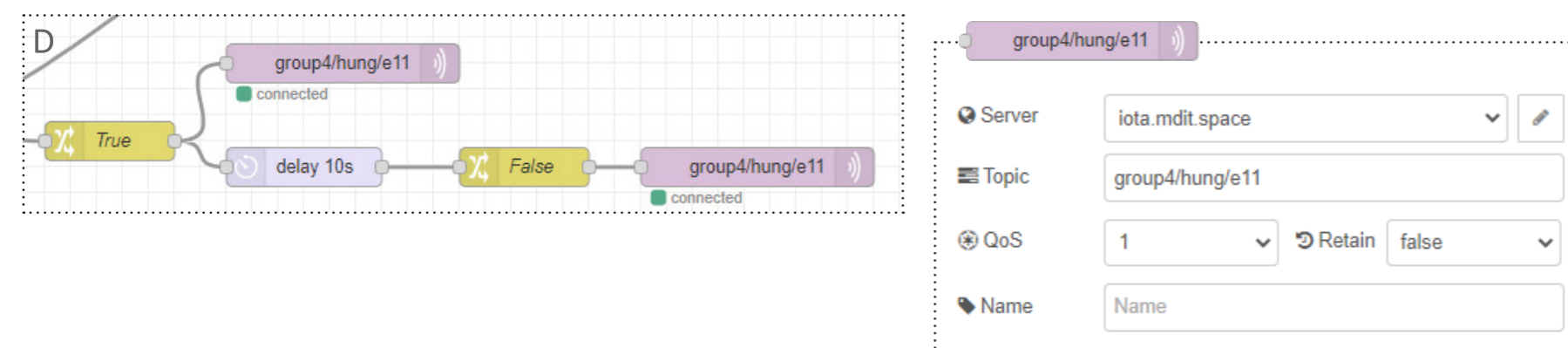


Figure. 30 Setup nodes to turn on LED light from Motemini

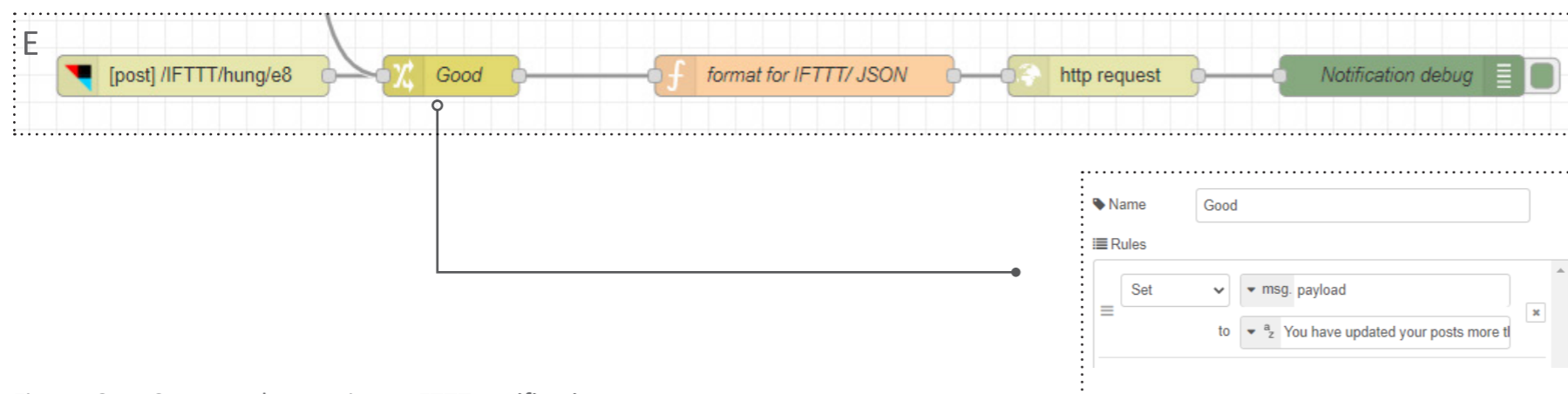


Figure. 31 Setup nodes to trigger IFTTT notification

Next, a notification from IFTTT will be showed on user's phone. (Figure 29).

In the opposite, if user post an image on Instagram over 40 seconds, compared to their previous post, and, the uploading moment is no longer than the time Iota updating input, then, message will be sent as "yes" - representing "non-addictive".

Blue light will be turned on (figure 30) as well as a IFTTT notification will pop up on their phone. (figure 31).



## 4.2.4 From Motemini to Iota

### 4.2.4.1 The flow

My work here is to connect Motemini to Iota through "MQTT-in" node in order to trigger web-songs from Spotify.

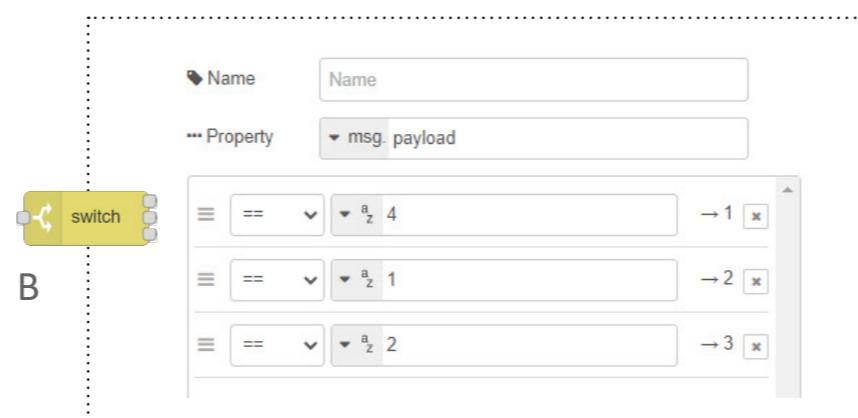
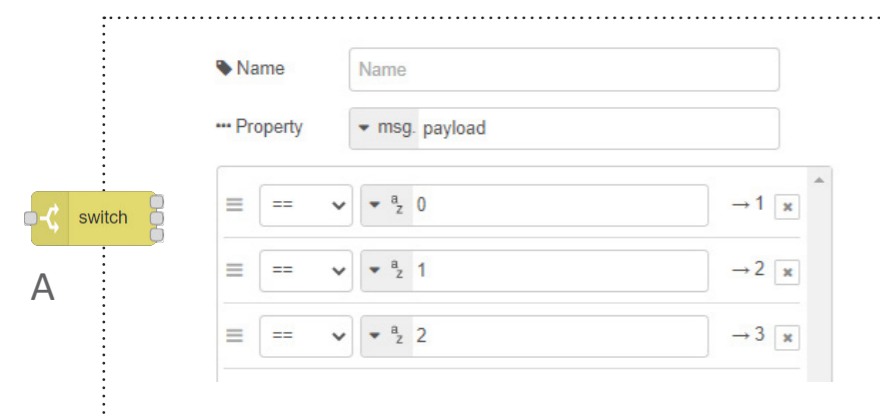
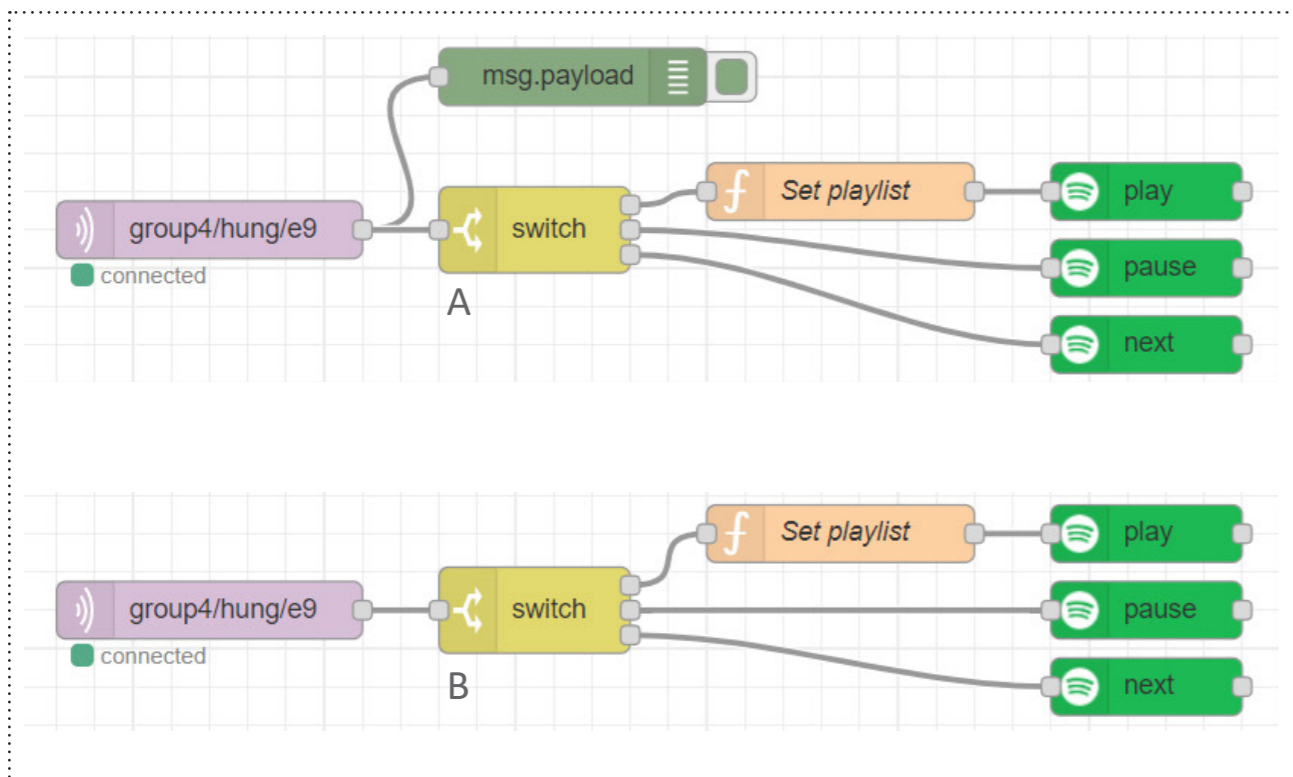


Figure. 32 MQTT in node triggers web-songs from Spotify

### 4.2.4.2 Motemini function explanation

I tried to use motemini to turn on different color LED lights when user posts an image on Instagram in different amount of time. The aim here is to understand how "mqtt-in" works with motemini.

For sending a command to Iota, physical push-buttons will be functioned for "play" and "pause" buttons for web-based songs on Spotify.

The diagram from Figure 33 shows how to connect LED lights to motemini's pins.

- (1) Motemini (Microcontroller)
- (2), (3): red and blue LED lights which are only turned on and off when getting signals from Iota.

There are 4 push-buttons to trigger web-based songs.

- Red Button (4) is used for playing "Warm" playlist.
- Green button (5) is used for playing "Cool" playlist.
- (6) and (7) buttons are for "pause" and "skip" all playlists.

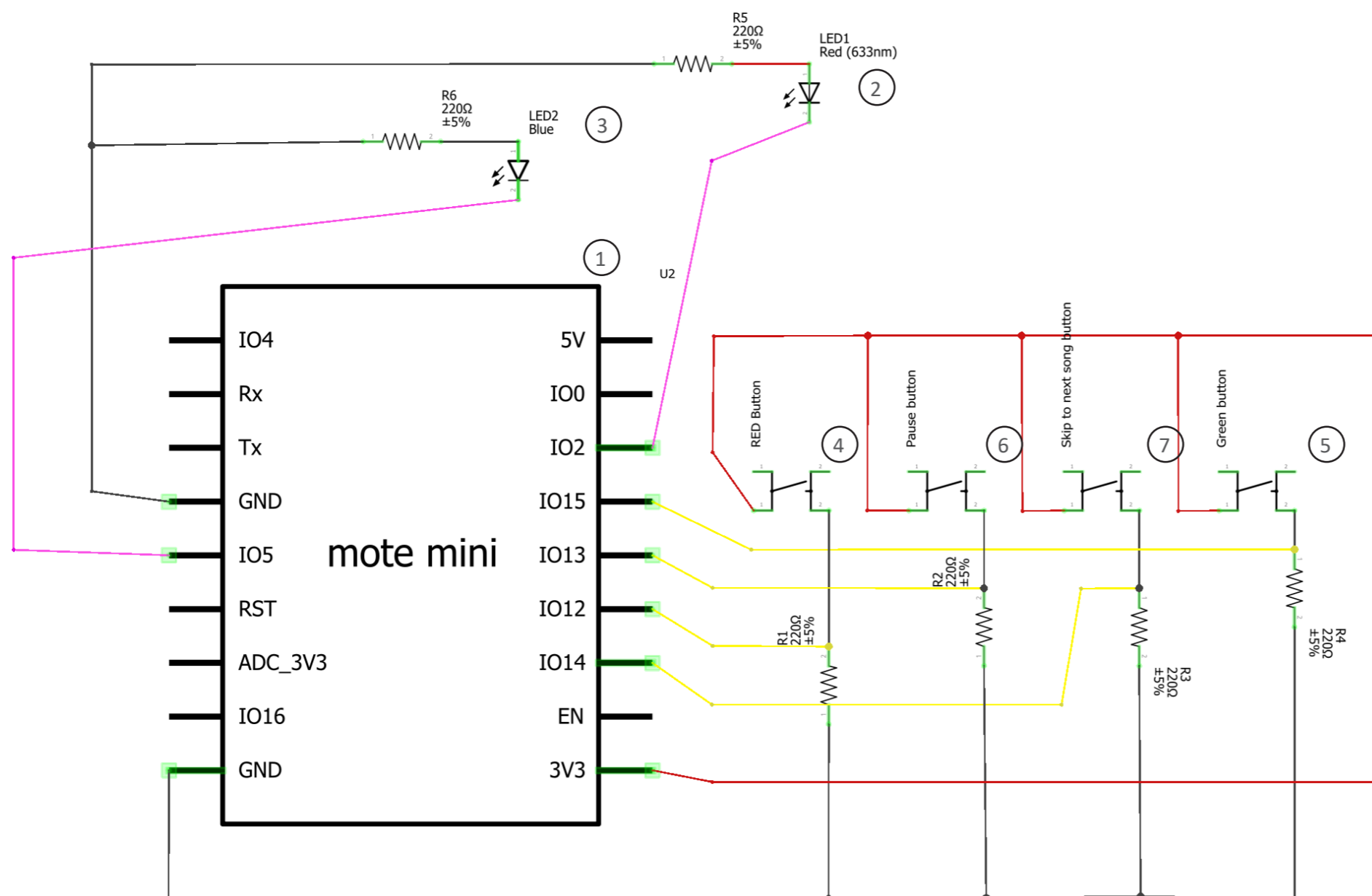


Figure. 33 Schematic diagram for Motemini

```

1  #include <ESP8266WiFi.h>           // include the WiFi connection library
2  #include <PubSubClient.h>         // include imroy's MQTT library (make sure you install imroy's version! Refer to TfI for details)
3
4  /* WiFi credentials should be kept secure and safe. Advanced students can
5     use the WiFiManager library to automate this as a captive portal UI
6     (https://randomnerdtutorials.com/wifimanager-with-esp8266-autoconnect-custom-parameter-and-manage-your-ssid-and-password/)
7
8     At the rudimentary level, setting the defines below allows you to connect
9     easily to the Internet, but it does expose your credentials here in plain text
10    Also, refer to line 69 below (WiFi.begin())
11 */
12 #ifndef STASSID
13 #define STASSID "boring"           // enter your WiFi SSID here
14 #define STAPSK "password"         // and your WiFi password
15 #endif
16
17 #define MQTT_USER "borb"          // refer to #motemini Slack channel for credentials
18 #define MQTT_PWD "blandradiantbinge" // refer to #motemini Slack channel for credentials
19 #define MQTT_PORT 1888
20
21 const char* ssid = STASSID;
22 const char* password = STAPSK;
23
24 String chipID;
25 String devID;
26
27 const int ledPin = 2;
28 const int ledPin2 = 5;
29 const int pushButton_1 = 12;
30 const int pushButton_2 = 13;
31 const int pushButton_3 = 14;
32 const int pushButton_4 = 15;
33 // WiFi and MQTT setup
34
35 IPAddress mqtt_server( 110, 173, 135, 161 ); // refer to #motemini Slack channel for credentials
36 WiFiClient wclient;
37 PubSubClient mqtt_client(wclient, mqtt_server, MQTT_PORT);
38
39 // mqtt_callback is what is called whenever a message arrives from IoTa that the mote is subscribed to
40
41 void mqtt_callback(const MQTT::Publish& pub) {
42     // expects non-stream data from node-RED mqtt node
43     Serial.print(pub.topic());
44     Serial.print(F(" => "));
45     Serial.println(pub.payload_string());
46     // the way we check for Strings in C is to use the .equals command -
47     // not quite the same as using ==, but it's rather self-explanatory:

```

Code reference: [14]

declare input and output pins

Figure. 34 Code

[x] This number refers to the reference link located at the end of this DRC.



```
48   if (pub.topic().equals("group4/hung/e10")) {
49       if (pub.payload_string().equals("true")) {
50           digitalWrite(ledPin, HIGH);
51       } else if (pub.payload_string().equals("false")) {
52           digitalWrite(ledPin, LOW);
53       }
54   }
55
56
57   if (pub.topic().equals("group4/hung/e11")) {
58       if (pub.payload_string().equals("true")) {
59           digitalWrite(ledPin2, HIGH);
60       } else if (pub.payload_string().equals("false")) {
61           digitalWrite(ledPin2, LOW);
62       }
63   }
64 }
65
66 void setup() {
67     pinMode(ledPin, OUTPUT);
68     pinMode(ledPin2, OUTPUT);
69
70     pinMode(pushButton_1, INPUT_PULLUP);
71     pinMode(pushButton_2, INPUT_PULLUP);
72     pinMode(pushButton_3, INPUT_PULLUP);
73     pinMode(pushButton_4, INPUT_PULLUP);
74
75     Serial.begin(115200);
76     delay(10);
77     Serial.println();
78     Serial.println();
79
80     chipID = parseChipID(ESP.getChipId());
81     devID = "ESP" + chipID;
82
83     mqtt_client.set_callback(mqtt_callback);
84 }
85
86 void loop() {
87     // moved the WiFi checking into loop since we need to constantly
88     // check if we are connected!
89
90     if (WiFi.status() != WL_CONNECTED) { // if WiFi isn't connected...
91         Serial.print("Connecting to ");
92         Serial.print(ssid);
93         Serial.println("...");
94
95         // After you have successfully connected to WiFi once, the credentials
96         // are actually saved in a special memory region which means you can
97         // use just WiFi.begin() after your first upload. This allows you to
98         // avoid exposing your WiFi credentials at the top of this sketch
99         // WiFi.begin();
```

set conditions for LED lights

set pinModes

Figure. 35 Code

```

100   WiFi.begin(ssid, password);
101
102   if (WiFi.waitForConnectResult() != WL_CONNECTED)
103     return;
104   Serial.println("WiFi connected");
105
106   } else {          // WiFi is connected
107
108     // maintain MQTT connection by calling its loop function as often as possible
109     if (mqtt_client.connected()) {
110       mqtt_client.loop();
111     } else {
112       Serial.println("mqtt reconnecting...");
113       // if MQTT client has disconnected in any way, reconnect
114       if (mqtt_client.connect(MQTT::Connect(devID)
115                               .set_auth(MQTT_USER, MQTT_PWD)
116                               .set_keepalive(10)
117                               .set_clean_session(false) // false = durable connection; subscriptions and queued messages will remain when we rec
118                               )) {
119         Serial.println("mqtt publishing...");
120
121         // notice the first level of the topic (before the / )
122         // points to a specific group - you MUST do this to prevent
123         // receiving messages from other groups
124         String connectionMsg = "Connected: " + chipID; // set up a message to send with the unique ID of the mote mini
125         mqtt_client.publish("group4/hung/e9", connectionMsg); // sends to a MQTT receive node set up with a topic name of "group0/status"
126         mqtt_client.subscribe("group4/hung/e9");
127         String connectionMsg2 = "Connected: " + chipID; // listens from a MQTT send node set up with a topic name of "group0/ex9-LED"
128         mqtt_client.publish("group4/hung/e10", connectionMsg2); // sends to a MQTT receive node set up with a topic name of "group0/status"
129         mqtt_client.subscribe("group4/hung/e10");
130         String connectionMsg3 = "Connected: " + chipID; // listens from a MQTT send node set up with a topic name of "group0/ex9-LED"
131         mqtt_client.publish("group4/hung/e11", connectionMsg3); // sends to a MQTT receive node set up with a topic name of "group0/status"
132         mqtt_client.subscribe("group4/hung/e11");
133       }
134     }
135   }
136

```

set string connections to mqtt messages.

Figure. 36 Code

```
137 // TEST PUSHBUTTON
138
139
140 // Attempt to publish a value to the topic "MakerIOTopic"
141 if (digitalRead(pushButton_1) == HIGH)
142 {
143     // set up a message to send with the unique ID of the mote mini
144     mqtt_client.publish("group4/hung/e9", "0");
145
146     Serial.println("Publish message success");
147     delay(500);
148 }
149 }
150 else
151 {
152     Serial.println("Could not send message :(");
153 }
154 // PAUSE
155 if (digitalRead(pushButton_2) == HIGH)
156 {
157     // set up a message to send with the unique ID of the mote mini
158     mqtt_client.publish("group4/hung/e9", "1");
159
160     Serial.println("Publish message success");
161     delay(500);
162 }
163 }
164 else
165 {
166     Serial.println("Could not send message :(");
167 }
168
169 // Dont overload the server!
170 delay(1000);
171
172 // NEXT
173
174 if (digitalRead(pushButton_3) == HIGH)
175 {
176     // set up a message to send with the unique ID of the mote mini
177     mqtt_client.publish("group4/hung/e9", "2");
178
179     Serial.println("Publish message success");
180     delay(500);
181 }
182 }
183 else
184 {
185     Serial.println("Could not send message :(");
186 }
187
188 // Dont overload the server!
189 delay(1000);
```

Code for push-buttons.[15]

[x] This number refers to the reference link located at the end of this DRC.

Figure. 37 Code



```
190
191 // GREEN
192
193 if (digitalRead(pushButton_4) == HIGH)
194 {
195     // set up a message to send with the unique ID of the mote mini
196     mqtt_client.publish("group4/hung/e9", "4");
197
198     Serial.println("Publish message success");
199     delay(500);
200 }
201
202 else
203 {
204     Serial.println("Could not send message :(");
205 }
206
207 // Dont overload the server!
208 delay(1000);
209 }
210
211 // a custom function to process the unique chip ID of a mote/mote mini
212 String parseChipID(uint32_t cid) {
213     // takes the last 6 chars of the chip ID
214     String c = String(cid, HEX);
215     String retStr;
216     uint8_t l = 6 - c.length();
217     for (uint8_t i = 0; i < l; i++) {
218         retStr += "0";
219     }
220     retStr += c;
221     return (retStr);
222 }
223
```

Code for push-buttons.

Figure. 38 Code

## 4.2.5 Dashboard on Iota

### 4.2.5.1 Result

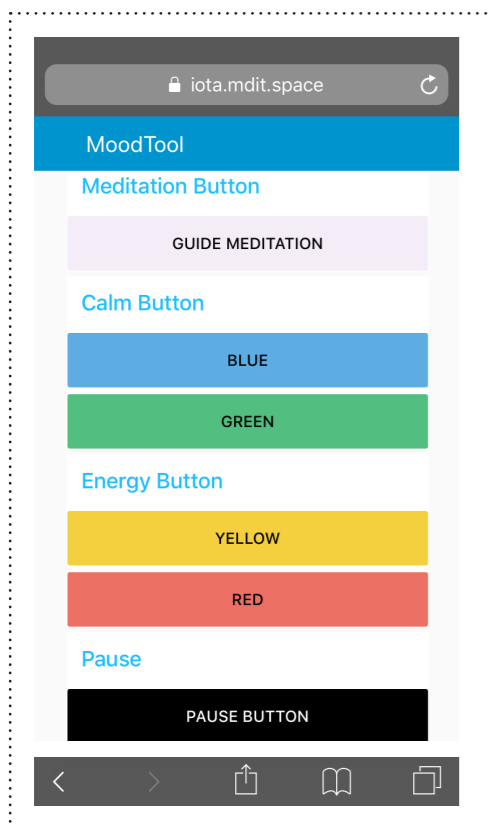


Figure. 39 Screen from mobile phone

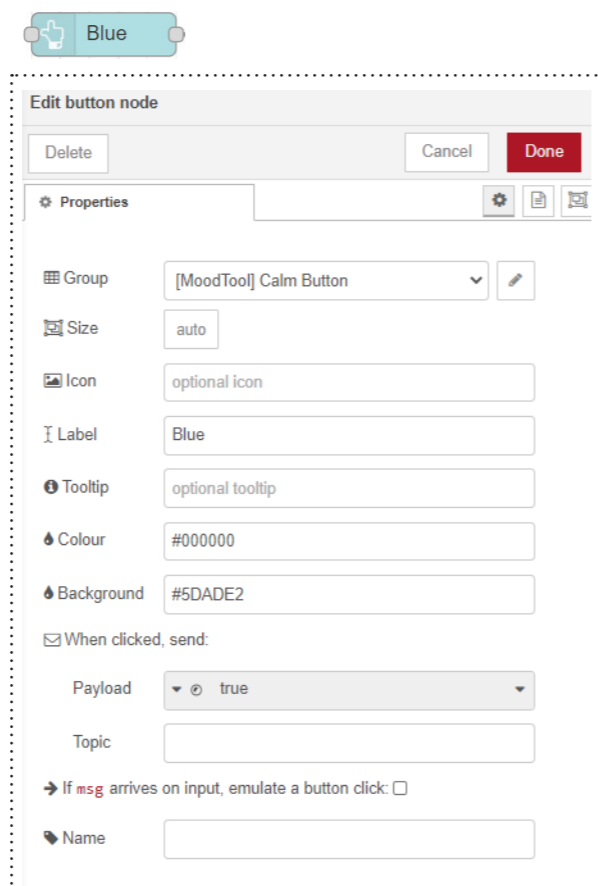


Figure. 41 Edit node tab

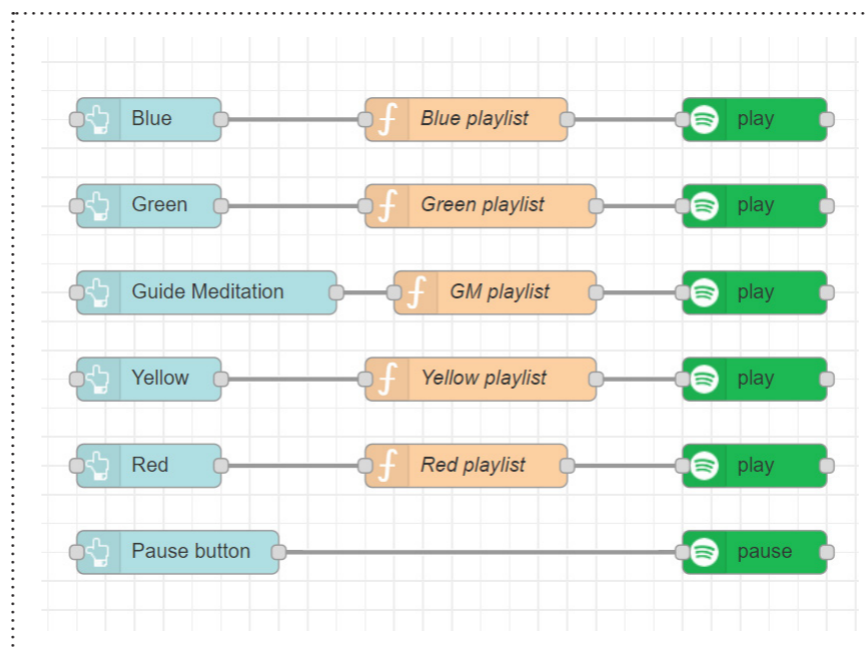


Figure. 42 Final flows

#### ATTEMPT:

The context here is that Blynk was not easy for publishing our experiments virtually. I have researched about another way that our group can publish "push buttons" to the internet. Through some instruction from youtube [16], I came to conclusion that we might want to use dashboard from Iota.

Fern (my teammate) and I have developed the dashboard which is used for our virtual presentation.

This Dashboard is at a very basic level, though I want to put in here for later review and improvement.

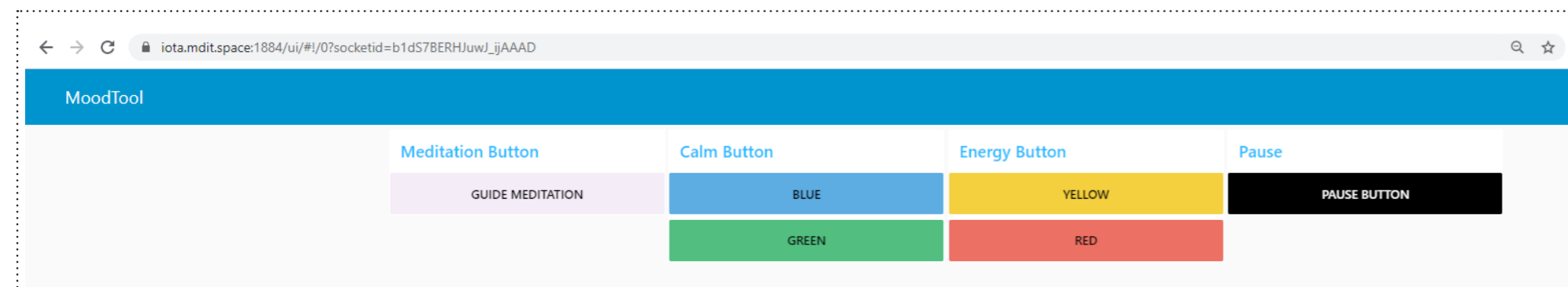


Figure. 40 Screen from web server

[x] This number refers to the reference link located at the end of this DRC.

## 5. Reflection

As through this documentation, from the beginning to the end of studio, there were some changes in my goals. At the beginning, I aimed to create a device for public realm, my lens through this studio intended to be more focused on research and design. Though, for the scope of studio and the limitation in the special context, my aim in group work was changed into focusing on solving mental illness by personal devices, specifically, solving addiction phenomenon, caused by social media mobile applications.

For being experienced in MTI elective, I have earned some basic concepts about electronic mechanism, I decided to put on "technology lens" and shifted my goal to complete technological part for group work.

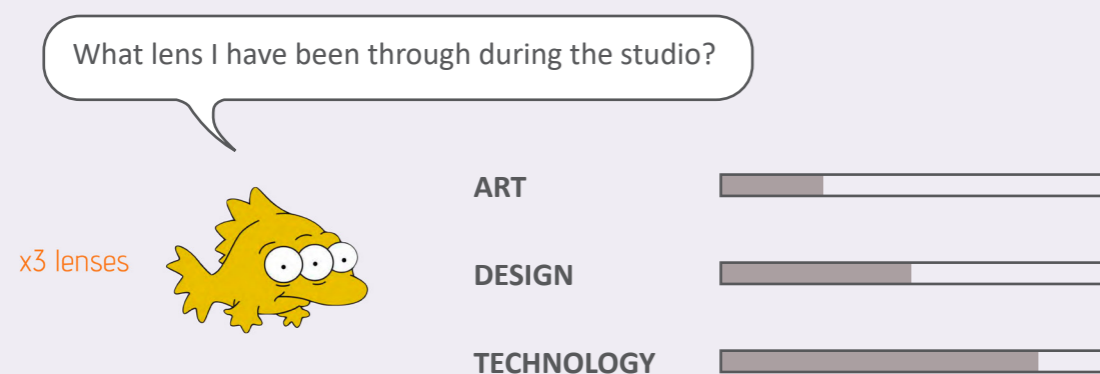
Through the the exploration in technology, there were certain new knowledge that I have gained:

- Learning new computing language, Java-script; using it to control nodes on Iota
- Setting up micro-controller to connect with the Internet
- Using MQTT for, sending in and out messages
- Using social media API to retrieve data on Iota
- Creating live-interaction on virtual network

Throughout group work, I have learned new way to cooperate, communicate and exchange information, ideas virtually through Microsoft Team and Miro with other teammates.

For further future self-improvement, I aim to implicate this knowledge for my future IoT projects as well as to apply speculative thinking in my design practice.

Finally, I would like to thank Chuan and Dani for their great support, instruction and encouragement during this hard time. Julie, Fern and Shrusti, for their hard work to complete our project. Aslo, other classmates, for their advices and shares of good works to help us improve our design process.





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## 7. Video

**Technological user experiment video**

by Hung Nguyen

<https://vimeo.com/427281360>



