

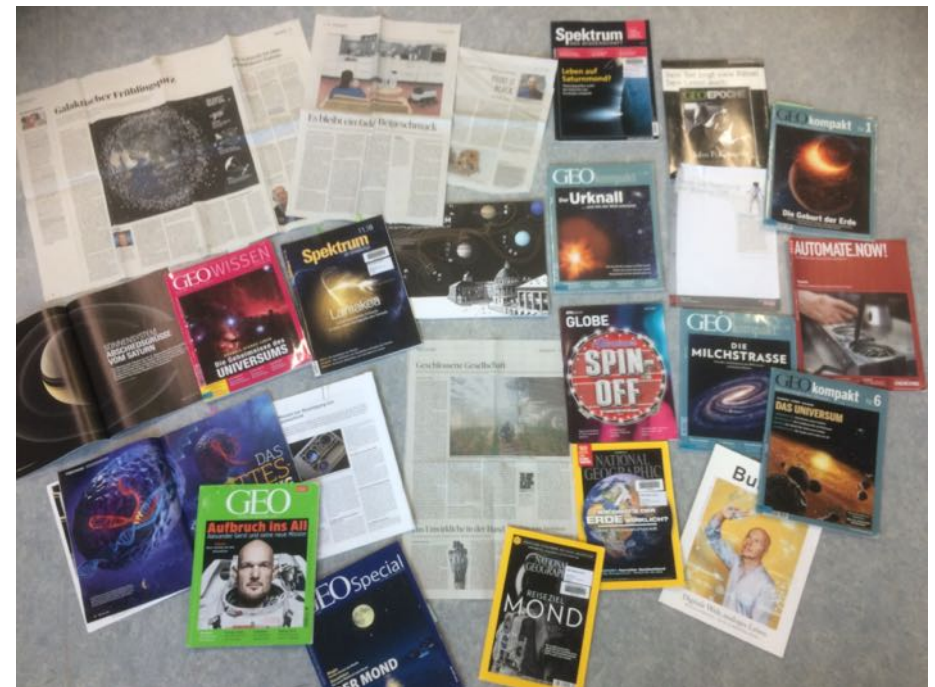
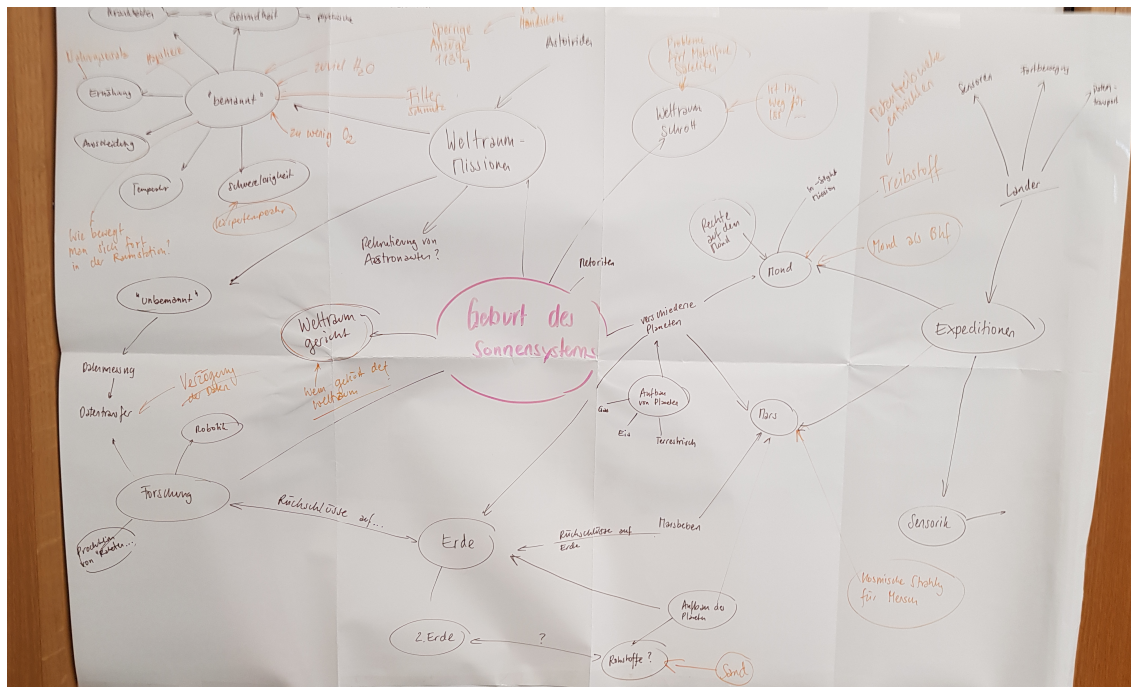


**CAPRICORNS**

**Legorobotik-Team**

**Bündner Kantonsschule  
Chur**

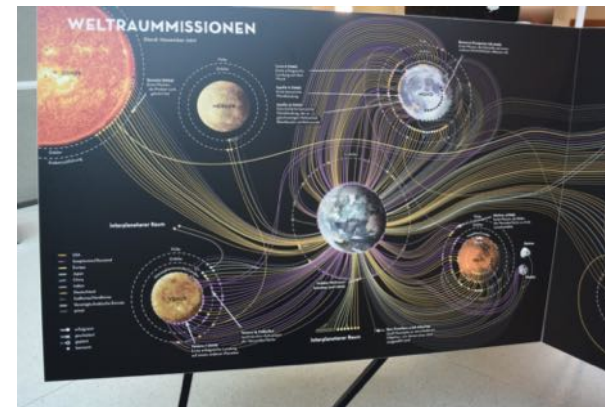
# Research and Brainstorming



# Excursion Swiss Federal Institute of Technology in Zurich 2018



- Expedition Solar System
- Robotics-Laboratory





# Our experts



**Dr. Adrian Wäckerlin**  
Intensive Care Unit  
Hospital  
Chur



**Iso Albin**  
Musical Education Teacher  
Academic High School  
Chur



**Andrea Walser**  
Electronics Engineer  
Retired  
Chur

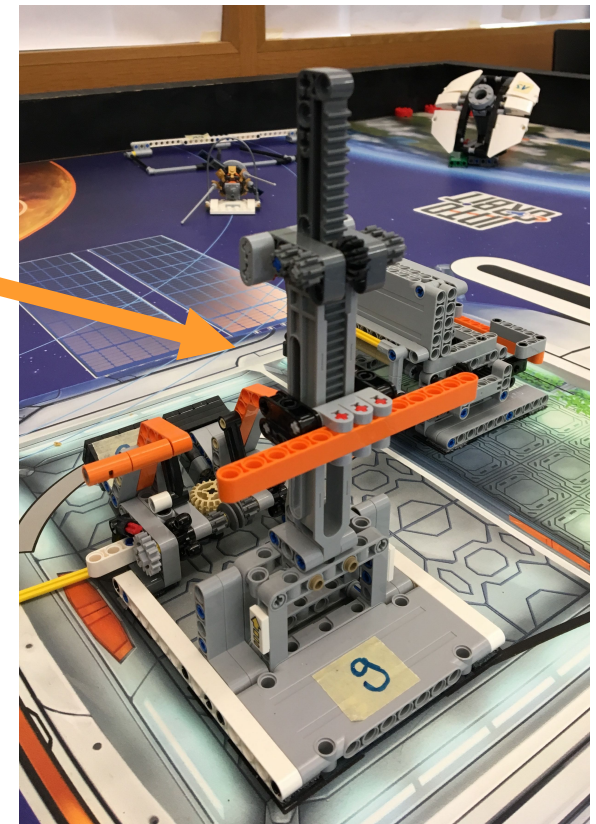


**Nia Vincenz**  
Psychologist  
Trimmis

# Analysing the occurring problems



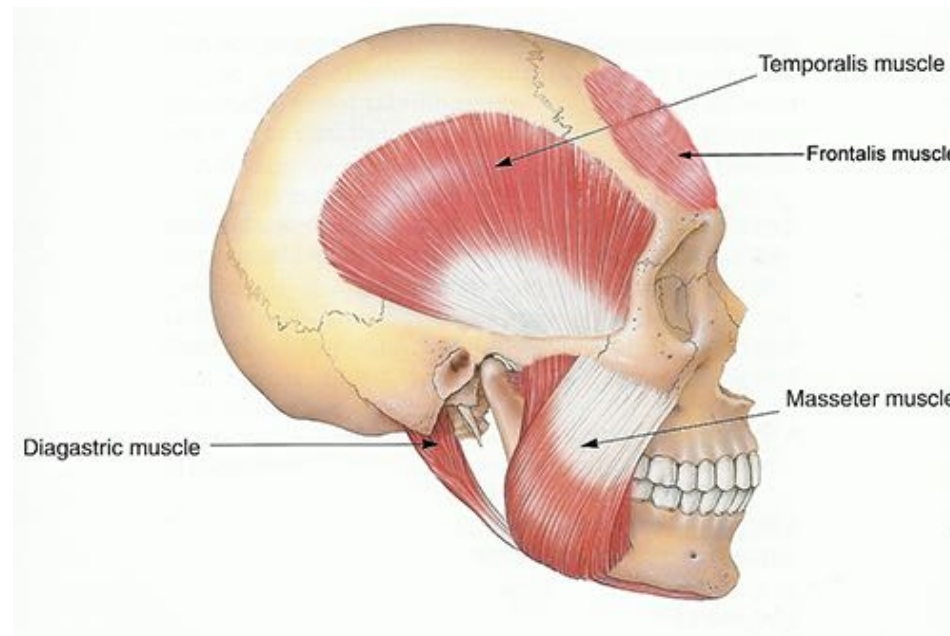
- A 500 day-long trip
- Only training the big muscles
- Nutrition and it's consequences



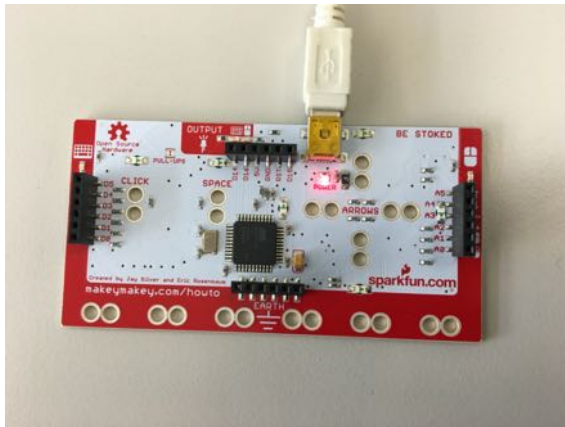
# Researchquestion „into Orbit“



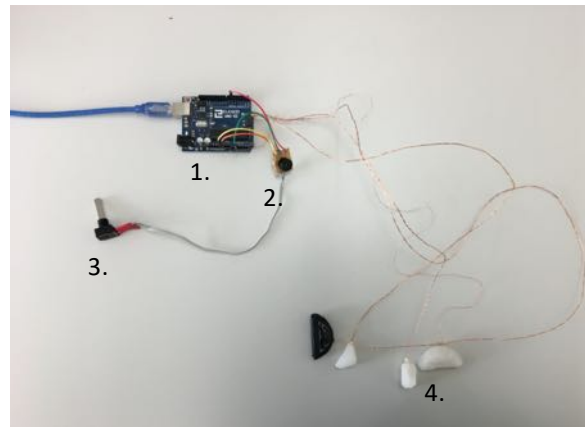
Can we counter the digestion problems, the loss of chewing muscles and the salivation/ptyalism problems all in one?



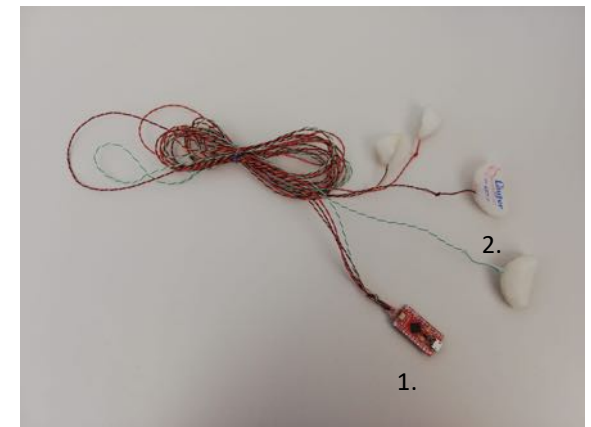
# Prototypes



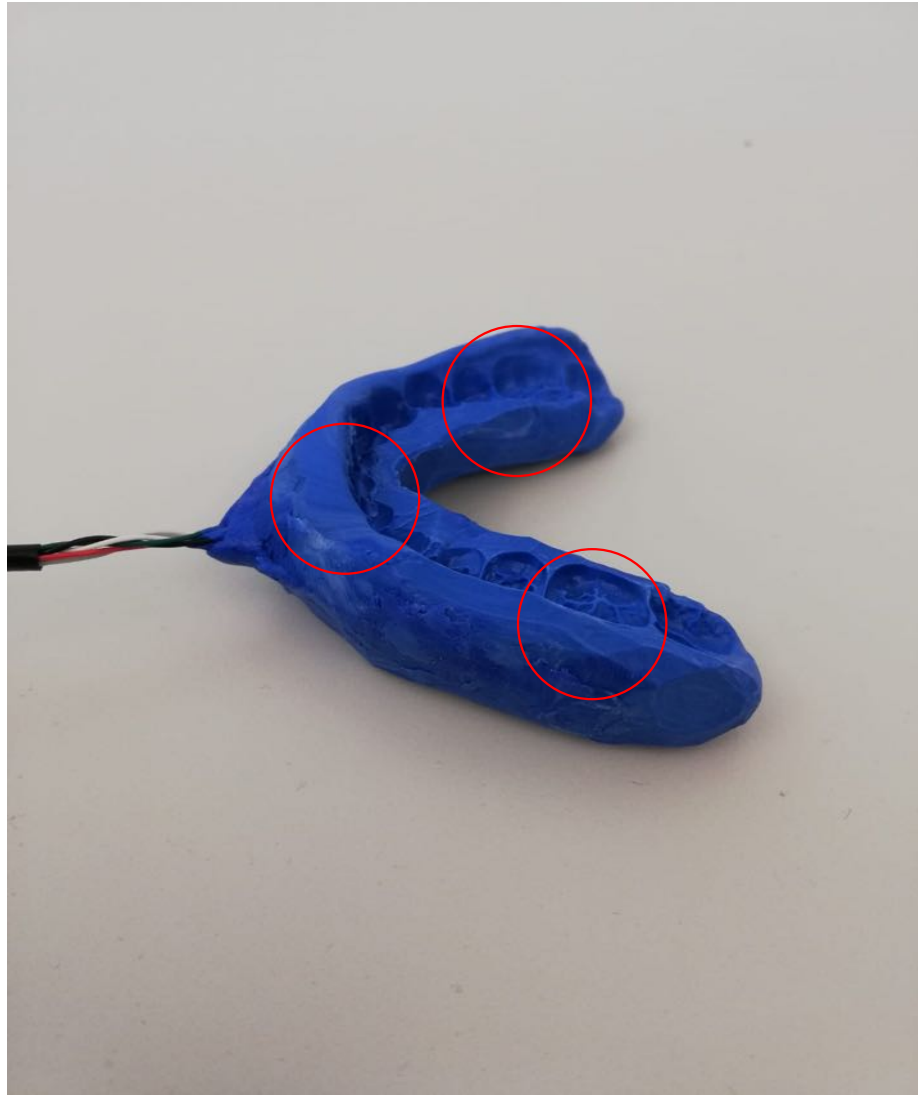
**Prototype 1.0**  
Makey Makey



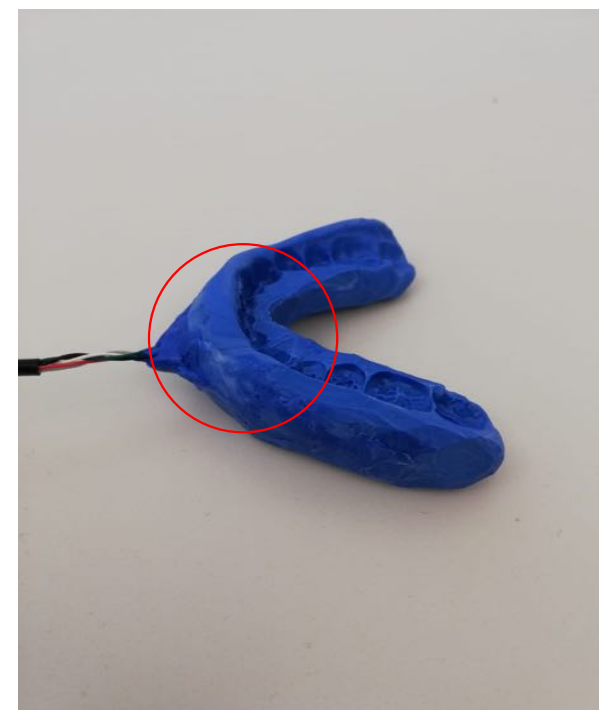
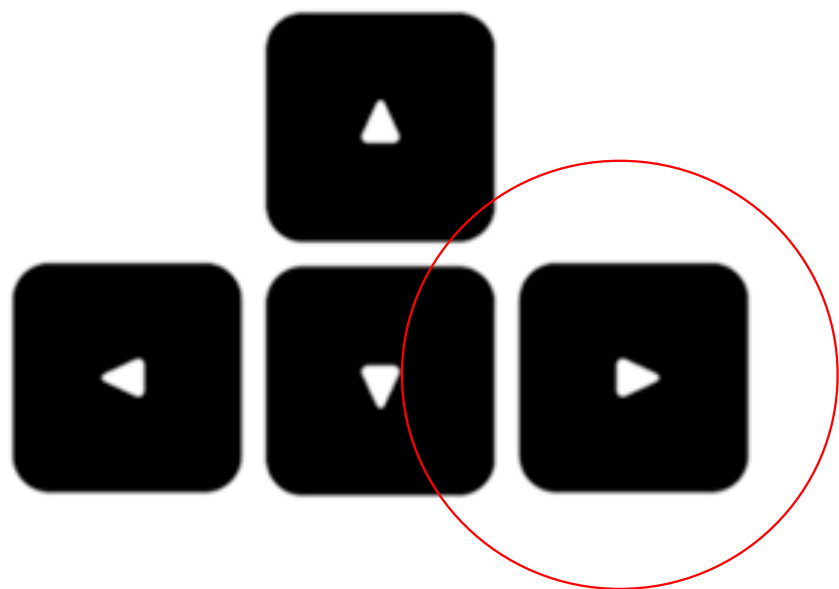
**Prototype 2.0**  
1. Arduino  
2. Buzzer  
3. Potentiometre  
4. Controller



**Prototype 3.0**  
1. Arduino Micro  
2. Controller



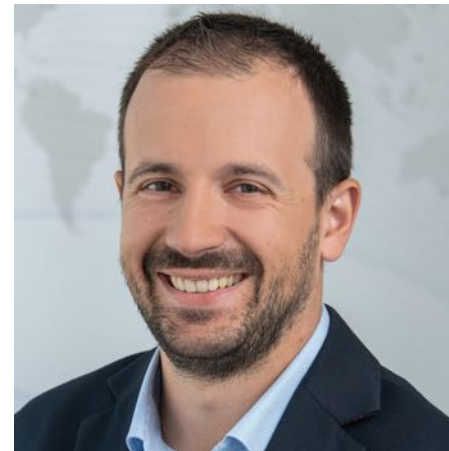






Done!

# Experts Ivoclar Vivadent

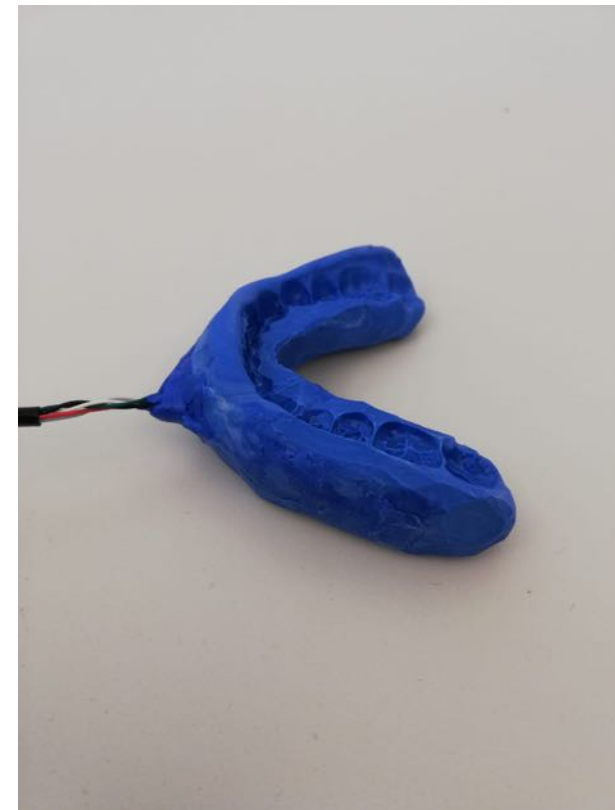


**Jonas Reinhardt**  
Technology and Systems  
Ivoclar Vivadent AG  
Schaan

**Aleksandar Tot**  
Occupational Training  
Ivoclar Vivadent AG  
Schaan

**Dr. med. dent. Lukas Enggist**  
Research and Deployment  
Ivoclar Vivadent AG  
Schaan

# Prototype Ivoclar Vivadent





# Researchpresentation published



1. Ivoclar Vivadent international Dental-Medicine, Lichtenstein
2. Vice Principal, Academic High School Chur  
Phillippe Benguerel und Andrea Walser,  
retired Electric engineer
3. Class 2Ga, Academic High School Chur

# Our Sources



## Expertknowledge

ETH Exhibition,

Dentist Dr. Pocsi, Psychologist Nia Vincenz, Electric Engineer Andrea Walser, Occupational Training, Aleksandar Tot, Dentist Dr. Lukas Enggist, Jonas Reinhardt (Research and Deployment)

## Lecture:

Watch photo

## Weblinks:

- <https://www.n-tv.de/wissen/Wie-Astronauten-fit-bleiben-sollen-article4973981.html> (Astronaut's Fitness)
- <http://www.quadstick.com/> (Mouth-controller)
- <https://www.srf.ch/play/tv/einstein/video/astronauten-im-weltall?id=e85b3368-4c37-4718-9fe0-e7182b6442a2&station=69e8ac16-4327-4af4-b873-fd5cd6e895a7> (Astronauts in Space)
- <https://www.youtube.com/watch?v=8yU33cguGaY&feature=youtu.be> (Gefahren auf der Reise zum Mars)
- [https://www.deutschlandfunk.de/raumschiff-botanika-tomaten-auf-weltraummission.740.de.html?dram:article\\_id=399385](https://www.deutschlandfunk.de/raumschiff-botanika-tomaten-auf-weltraummission.740.de.html?dram:article_id=399385) (Weltraum-Ernährung)
- <http://www.virtuix.com/> (Virtual reality)
- <https://www.youtube.com/watch?v=k-NWjTaYSuw> (Astronaut's Training)
- <https://youtu.be/MLIE2642neg> (Life on the ISS)
- <https://www.bluewin.ch/de/news/wissen-technik/laengere-ausfluege-ins-all-veraendern-menschliches-gehirn-fuer-monate-163702.html> (Impacts of space on the brain)
- <https://www.wissenschaft.de/astronomie-physik/das-schlimmste-ist-die-langeweile/> (Impacts of space on the mind's ability)
- <https://www.blick.ch/news/ausland/musik-aus-dem-all-floetenkonzert-auf-der-iss-raumstation-id69178.html> (Music in Space)



# Questions?



# Spacefood - Selftest





Musik aus dem All

# Flötenkonzert auf der ISS Raumstation

CAPE CANAVERAL - Das gabs noch nie. Astronautin Catherine Coleman schickt Flötenklänge auf die Erde – aus der internationalen Raumstation ISS. Sehen Sie selbst.



# Schwerelos

a.k.14

Kristina Bach

C C Am Am

Wir

rei-sen durch das All, oh was ist das für ein Traum weit weg von der Er-de von Zeit und Raum o-

ho o - ho. Jb., dann zu-rück auf Er-den, die Be-schwer-den sind gross Ver-

än-der-un-gen an den Mus-keln, an Ge-hirn und Haut, o - ho, o - ho. Was das nun am

Aug' auch ist, wie wirk-lich krank Du bist, Dei-ne Kno-chen

schwach, zer-stört Dein Ge-hirn ge-stört, Schwe-re-

los durch das All Ge-sund-heits-pro-ble-me ü-ber all-A-stro

nau-ten nicht mehr fit kei-ner will mehr in Or-bit Schwe-re-

los durch das All und Du wirst zum Krank-heits-fall De-pres-

sion-so ein Mist Du ein hal-ber Mensch noch bist.



# Programming Arduino



```
Prototyp | Arduino 1.8.5
File Edit Sketch Tools Help

Prototyp $
uint8_t buf[8] = { 0 };
int frontbutton = 4;
int piezo = A0;
int rightbutton = 3;
int leftbutton = 5;
int count1 = 0;
int count2 = 0;
int count3 = 0;
int count4 = 0;
int buzzer = 6;
int piezosens = A1;
void setup() {
  pinMode(frontbutton, INPUT_PULLUP);
  pinMode(rightbutton, INPUT_PULLUP);
  pinMode(leftbutton, INPUT_PULLUP);
  pinMode(buzzer, OUTPUT);
  Serial.begin(9600);
}

void loop() {
  if(digitalRead(frontbutton) == LOW){
    if(count1 == 0){
      buf[2] = 0x52;
      Serial.write(buf, 8);
      count1 = 1;
      digitalWrite(buzzer, HIGH);
    }
  }else{
    if(count1 == 1buf[0] = 0;
    buf[2] = 0;
    Serial.write(buf, 8);
    count1 = 0;
    digitalWrite(buzzer, LOW);
  }
  if(analogRead(piezo) > analogRead(piezosens)){
    if(count2 == 0){
      buf[2] = 0x51;
      Serial.write(buf, 8);
      count2 = 1;
    }
  }
}

Done uploading.

Sketch uses 2380 bytes (7%) of program storage space. Max: 32768 bytes.
Global variables use 200 bytes (9%) of dynamic memory, limit: 2048 bytes.
```

# Question to Claude Nicollier and Men Schmidt



- How big can a Space Shuttle be?
- How difficult is it to gain the lost muscle mass?
- Is the chewing muscle mass decreasing too?
- Are there problems with the fine motor skills?
- How are diseases or the like being handled?
- How does one generate energy in space?
- Is it possible to play video games?