

**Creating passive
detection for
Cardiovascular
Disease.**



Research.

The ways in which I collated the necessary primary data was:

- I conducted 4 interviews with professionals in the medical field.
- Reached out to the specific locations in this study and created questionnaires for the general public.
- I got in contact with multiple Doctor Surgeries and Tech Companies in those locations providing them with surveys.

Given the number of responses, and the quality of the results, I decided to base this study on my secondary research.

From this I found that running water is an essential in homes in the UK, with 99% of them having a tap.



Viability.

The total costs of the tools used to create this prototype is approximately 6 pounds. These costs could be potentially reduced if they were bought in bulk.

The cost of labour varies from between £40 - £60 per hour. Again, this price may lower if a contract between a reputable company is guaranteed.

The Problem.

Cardiovascular disease is the largest cause of deaths globally; specifically in areas which are more susceptible to deprivation.

The Solution.

To create a device that can be implemented into the home of anyone, to monitor levels CVD in a non-intrusive manner.

The Process.

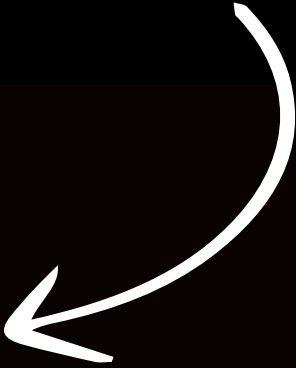
A device that has been embedded into a household tap. The majority of individuals touch a tap daily for hygiene and hydration, meaning that multiple readings can be taken passively daily.

“Heart and circulatory diseases cause a quarter of all deaths in the UK, that’s more than 160,000 deaths each year”

- The British Heart Foundation.

Embedded device development.

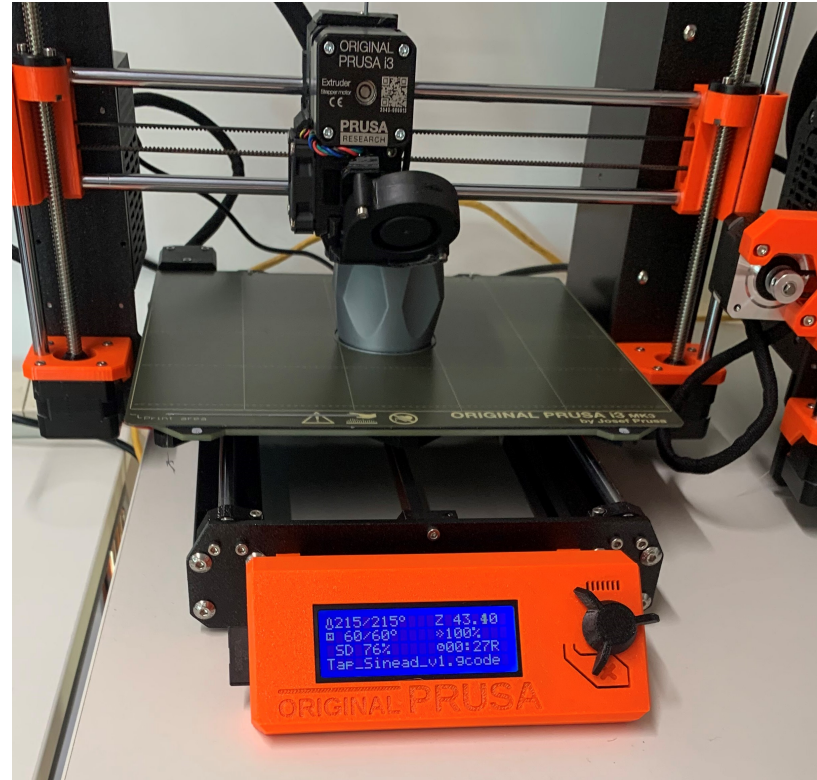
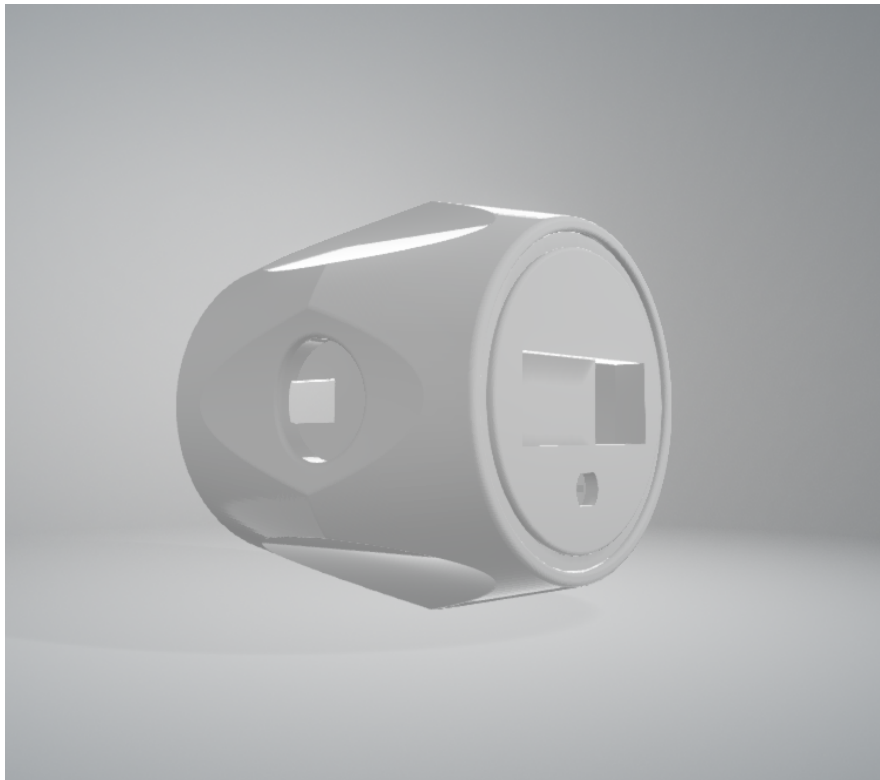
The hardware which allowed for the build of the Heartbeat Tap.co.uk was an Arduino Board, it is controlled by the coding language C++. During the testing stage a basic electrical circuit was created and from there I added more complex tasks for it to carry out, resulting in a light sensor turning the device on, showing the results on the LED screen and a pulse monitor to taking heart readings.



```
#define HEARTBEATSENSOR 11
int HTTP_PORT = 80;
String HTTP_METHOD = "GET";
char HOST_NAME[] = "heartbeattap.co.uk";
String PATH_NAME = "//hearbeat/sensor/BPM";
String queryString = "?HeartBeat";
const int PulseWire = 0;
const int LED13 = 13;
int Threshold = 550;

HeartbeatSensor pulseSensor;

void setup() {
  Serial.begin(9600);
  client.println(HTTP_METHOD + " " + PATH_NAME + queryString + " HTTP/1.1");
  client.println("Host: " + String(HOST_NAME));
  client.println("Connection: close");
}
```



The Prototype.

Once the correct instructions were set up through C++, I began thinking about the logistics of putting the device together. A student aided me by creating a 3D render of the Heartbeat Tap, with the correct measurements.

From there I printed it using a Laser Printer and adding all of the components together.