Making Data

In this week's lecture, we looked at how systems are politicised through how and why they capture personal and sometimes intimate data about us. In this workshop, we will be looking at addressing the following ideas to explore ways in which we can physically unpick and disrupt these processes.

- How can we collect our own data about ourselves?
- What tools do we need to collect data about ourselves? Sensors?
- What do we need to understand in order to build these systems?
- What can these systems offer us?
- What can they reveal about us?
- How much do we trust this data we are collecting?

Our phone connects us with distant bodies and is within proximity to our own bodies. It collects intimate data about our movement, rituals and routines—data that we input and data that is collected through sensors and our interactions.

Our phones know how we move and where we move. Recently when I upgraded my phones operating system, I took a journey in a car. Once I had arrived at my destination, my phone suggested that turn on the 'Do Not Disturb' whilst driving setting. My phone assumed I was driving and tried to influence my behaviour from this. In this instance it was right. How do I know how this data is being processed? How does my phone 'know' me?

- To what extent do we have ownership of the data that our phone collects?
- What data is there on our phone?
- What are the assumptions within this data (n of 1 as enough)?
- How much access do you have access to this data?
- What are these algorithms and what does this mean for us?

Many processes have become very automated, most our phones have various sensors that measure our location (GPS) and motion sensors (accelerometer, gyroscope, magnetometer, barometric etc.).[1] Other data we voluntarily input into the phone

[1] Some information on the iPhone motion data: https://developer.apple.com/documentation/coremotion

ourselves… think about what Helen talked about in the lecture with quantified self. With this, think about how our interactions are captured by systems (the Google example Helen gave in the lecture?

How can we unpack, interrogate or disrupt this? Through critical thinking about power and politics and systems (like those mentioned in the lecture), and through practice and experimentation, which we will be investigating in this workshop.

Making Our Own Data

Technology is physical, it is performed it is lived. We interact with technology through inputs, processes and outputs ALL of which are just changes in electrical voltages. Often we are wanting to take information from the physical world and capture it as data to store it on our machines and analyse it. In this workshop we will be looking at how we can use (mostly) open source tools to build systems that allow us to collect our own data.

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“Heh? What’s that?”

On a very low level, all digital information is stored as binary information. ON + OFF. Zero and One. But what do we know from the series of binary data above? Does it have any meaning? We have been looking at digital technologies from what we can understand as a ‘high-level’. The notion of something being high-level, or not is born out of the amount of abstraction present in the systems. Abstraction allows us to use Graphical User Interfaces (or GUIs) to operate our machines, think of OutwitHub. It allows us to reuse codes for the same task over and over again. How is this idea similar to data and data visualisation? Think about HTML, we kind of know what it’s trying to do it uses codes and language that have some semantic meaning. To what extent is code a form of visualisation?

All our physical interactions with digital devices are measured, processed and rendered as changes in electrical voltage This means that our data on our devices is captured and stored and transmitted as electricity also. This is something that PHYSICALLY happens in the world. It happens at small levels in small chips that we can barely see

and at larger levels—projections rendering data from computers.

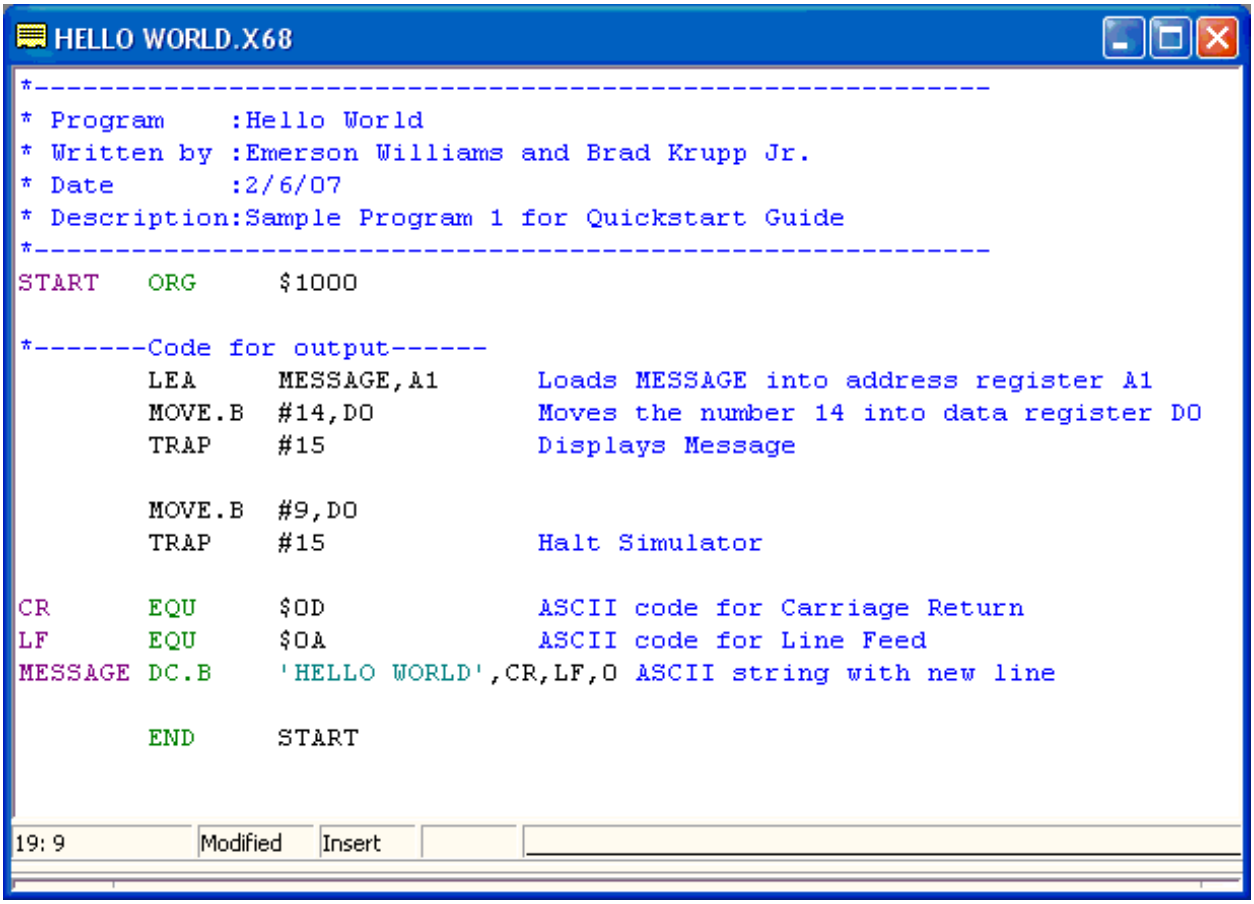
Let's take a really familiar example. Think about the computer keyboard… When we press a key on out computer keyboard, we are completing an electrical circuit—like a switch. This allows a small amount of current to flow though. When this loop is closed, the computer uses a look up table to identify what keystroke should be represented on screen. So here we have data being created through a physical interaction which is then processed by the computer to be understood. One action happens in hardware, the other in software. We can see this physical interaction rendered on screen, again through a change in electricity—as LED's change their RGB values to render a virtual representation of your keypress.

Physical Computing and Your Body

At present, all computing is physical. It requires hardware or something physical. Physical computing is an area of study that looks towards better understanding our physical relationships with computers and the digital by developing interactive systems. We are looking to build machines that can capture and then respond to our physical world. Take a look at the work of artists like Phoenix Perry, Becky Stewart and Kate Sicchio. Here is a project that Joanne developed the technology for called *Ultiverse*, that is an interactive installation that tracks a user's movement and motion in space.

“HELLO WORLD”

Today we are going to look at how we can use changes in electricity to build and programme circuits that allow us to collect our own data. Here is some low level code in a computer programming language called Assembly (don’t worry we won’t be programming with this!)



Example in Arduino—explain the different loops and Serial print to the screen.

- What happens next? When does this stop?
- What happens if we change the delay?
- What other information could we show?
- What could this be useful for? What could it tell us?

So now we have built a system that uses code (and data) to make a physical change (lighting up an LED) in the world.

However, what if we wanted to do the reverse—capture a physical change in the world and store it as data?

WE NEED SENSORS!

Plug in a sensor!

Now download and open the worksheet and codefiles on the VLE!

Task for the week

Take a look at the 'Dear Data' project. Working in pairs, collect and visualise some data about yourself, make sure that it is some data that your phone *cannot* collect about you. Think about the following.

- How did you choose what data to collect?
- How did you record the data?
- What decisions did you make about the visualisation?
- Did it reveal anything that surprised you?
- How do you know someone differently through data?

Upload a paragraph on the above and your visualisation to your webpage.