BUILD A PC FINAL REPORT

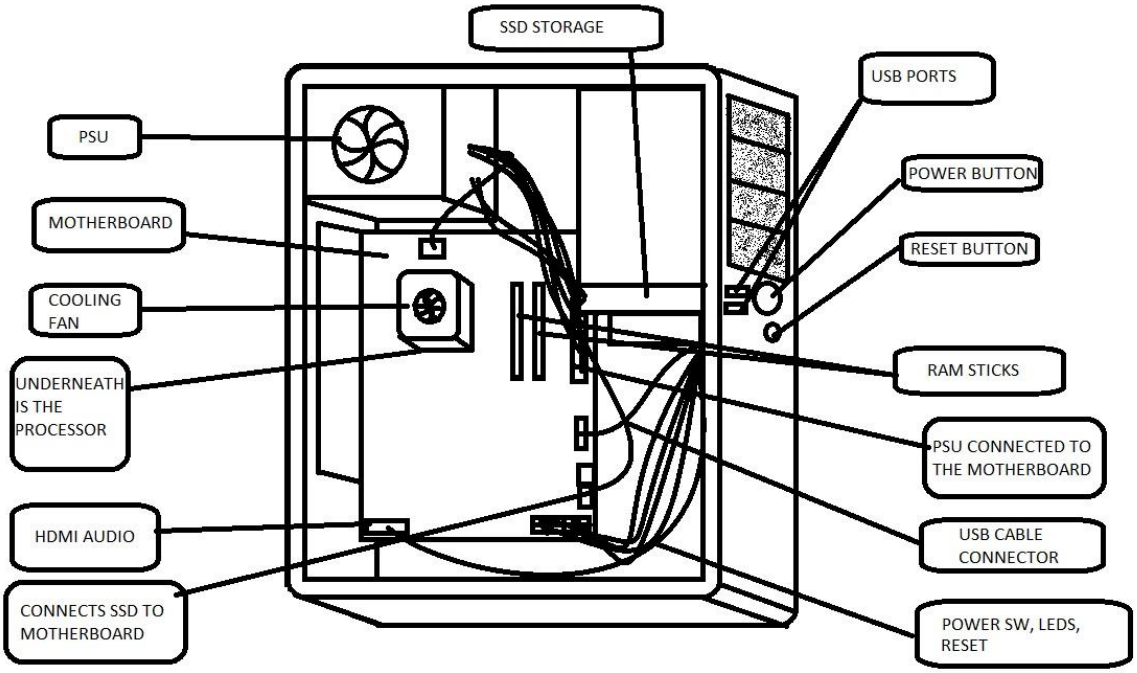
By Aaron Burton

The Experience of building a pc, understanding the parts and their locations and roles within the pc. Then learning the installation of operating systems. Along with a glimpse of how a raspberry pi works.

Table of Contents

Introduction

This report will focus on the process of learning the ins and outs of building and setting up a personal desktop computer or better known as a pc. The report will cover the description of each part used to assemble the computer along with their purpose for the computer. The parts covered will be listed in the appendix alongside with additional information. The report will also look at the assembly of the parts with the personal computer, displaying with photos the correct installation of each part. Once the assembly is covered the focus will shift over to the installation of the operating system, each step took to install it and the purpose of installing the operating system. Finally, the report will end with a quick look into the assembly and set up of the raspberry Pi. All of the topics discussed were covered in class and this report will be based on the experience I the student had within this module throughout the semester. Below is a diagram of the parts of a desktop computer.



This imagine outlines all the main parts and the connections between each part and the cables that connect the communication of each component.

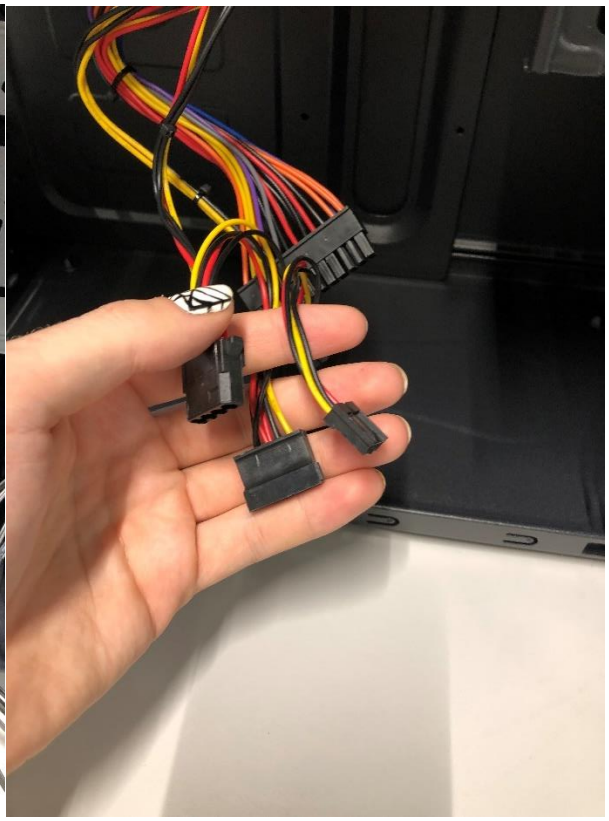
Description

The description of each component of the computer is important to knowing the use of each part. The connections it has to other components and the different specs each component can have.

To start off with the basics of the computer, the first part will be the case. The case is the structure of the computer. It holds all the parts in place and each case is different. Cases can come in all shapes and sizes with different structures for more or less components that can fit inside of it. Some cases are specifically designed to have more space for more graphic cards and more input and output devices that can be connected to the pc. The case used in the module to construct the pc is a fairly simple case.

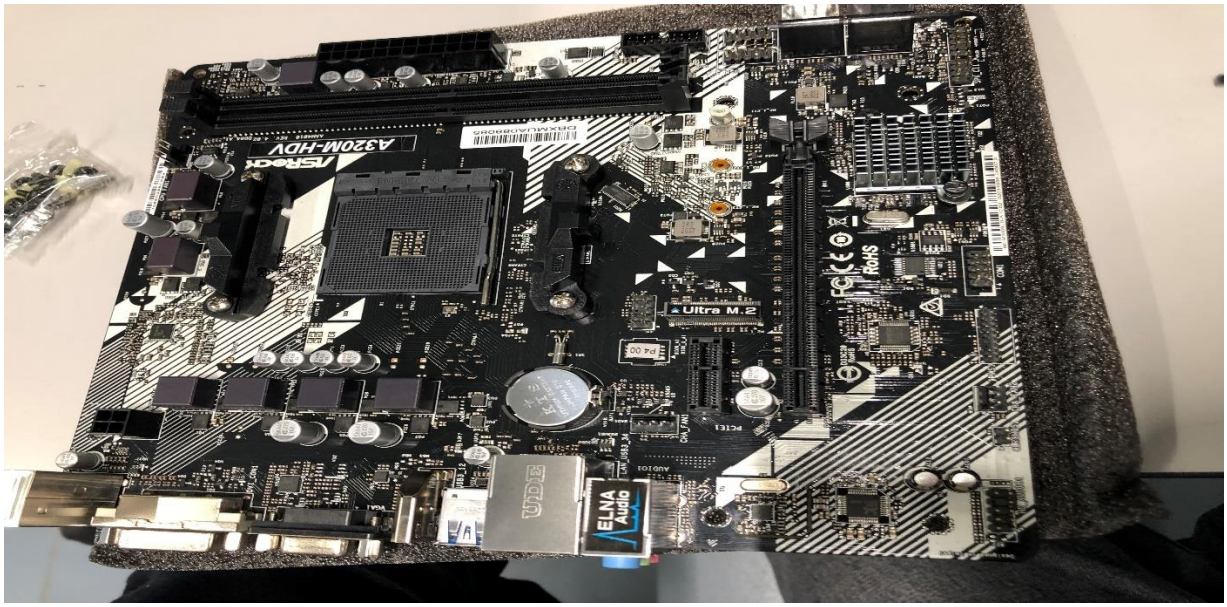
As seen in this picture, the power supply unit or PSU has already been fitted in the top left corner. All the cables hanging out of the computer in the bottom right are the, USB, HDMI Audio, Power, LED, and Reset Cables.

Since the PSU is already in the photo above, that would be a good next component to be covered. The PSU provides power throughout the system, it connects to the motherboard with the cables as seen in the pictures below.

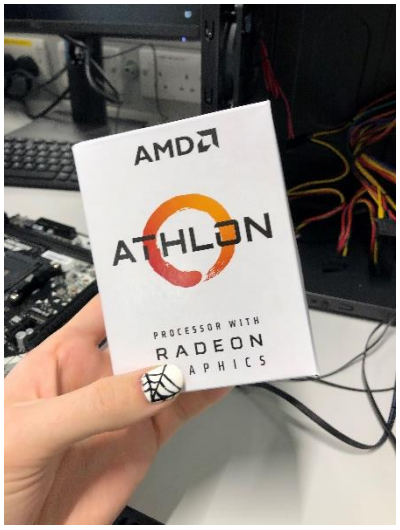


The cable on the left image provides the main power to the mother board. The cables on the left connect to the fan of the CPU and the main storage device, in this case the SSD card. These connect the parts to the power supply unit and provide the necessary power for each component.

Next part to discuss would have to be the motherboard. The motherboard is a very crucial part of the computer as it connects everything together, all communications are connected via the motherboard. The motherboard has built in microchips to provide a fixed function within the system. Below is an image of the motherboard used in our construction of the PC for this module.



The processor is one, if not the most important component of any computer. It determines its potential processing of processes that can be done at once. A good processor can make your computer do a lot more than a cheap processor. The processor used for the construction of our pc was AMD ATHLON.

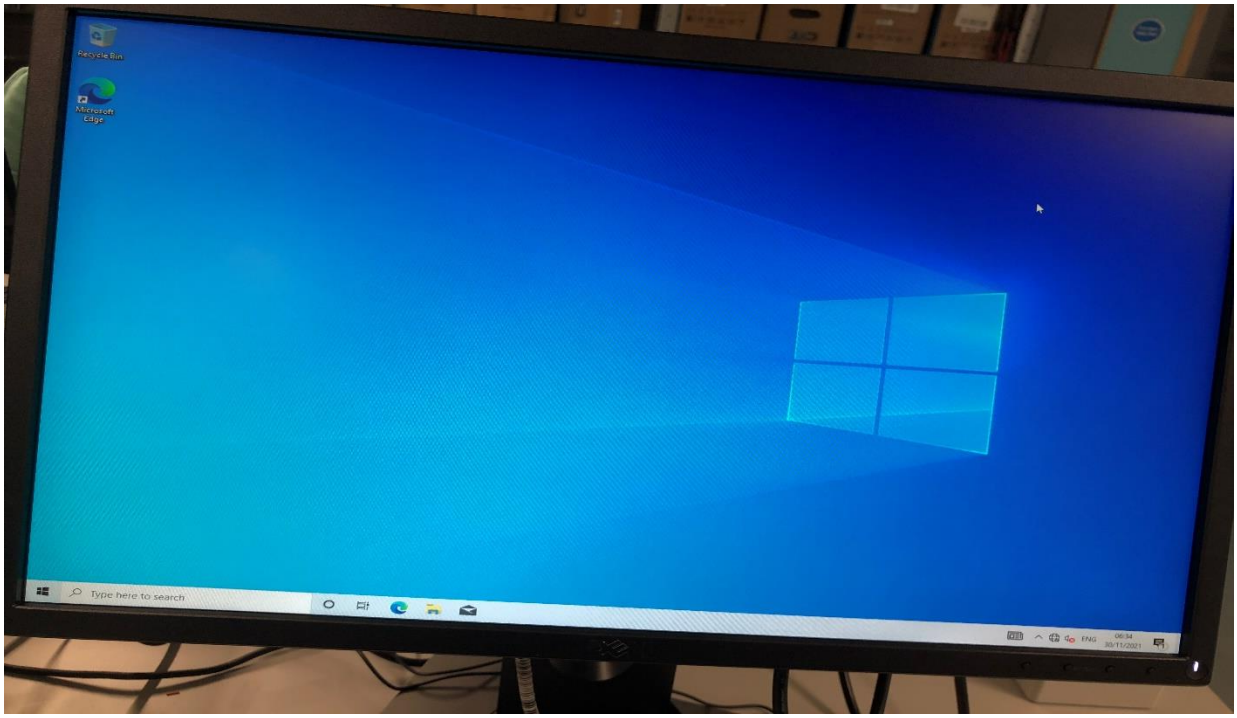


RAM stands for Random Access Memory; this means it is temporary memory held while power is being supplied to the system. The second the power is no longer accessible to the ram sticks it loses any memory that is held within it. For the construction of the pc, we used 2 8GB RAM sticks.

The main storage of a computer is essential in having permanent memory within the system. There are several types of storage such as HDD, SSD, etc. These types of memory can hold information while the system has no power. This pc would contain SSD SATA card for its main memory. With 128GB of memory.

CPU Cooling fan regulates the heat of the processor, so it does not overheat. The processor emits a lot of heat, so the CPU fan is required to prevent the processor from overheating and shortening the lifespan of the processor.

Then there are the inputs and outputs for the PC. The output for the PC is the monitor. The monitor displays the results from each process from the PC on screen.

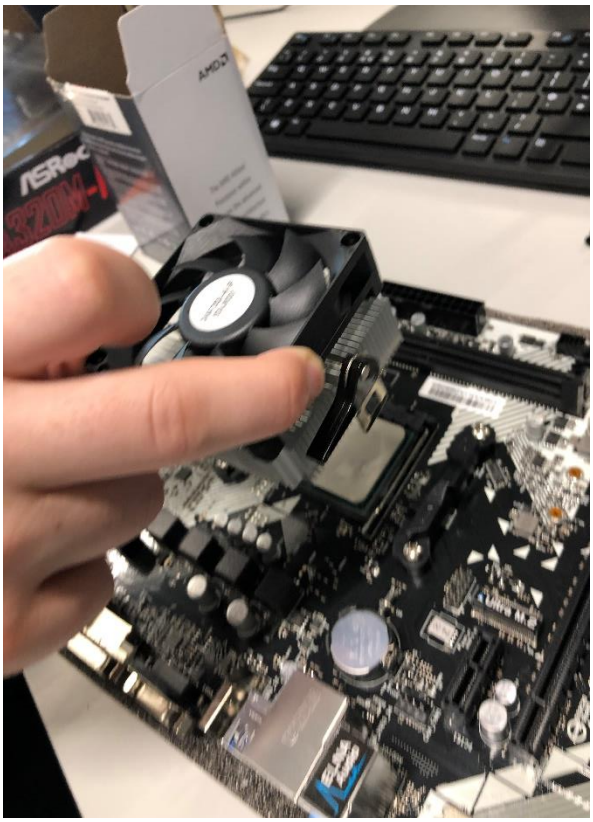


Then the inputs for the PC are the mouse and keyboard. There could be more inputs such as a mic or a USB stick, etc. The main two inputs used in this module were the mouse and keyboard. The keyboard takes in the keys inputted and the mouse takes in the movement from the hand to move the coursers.

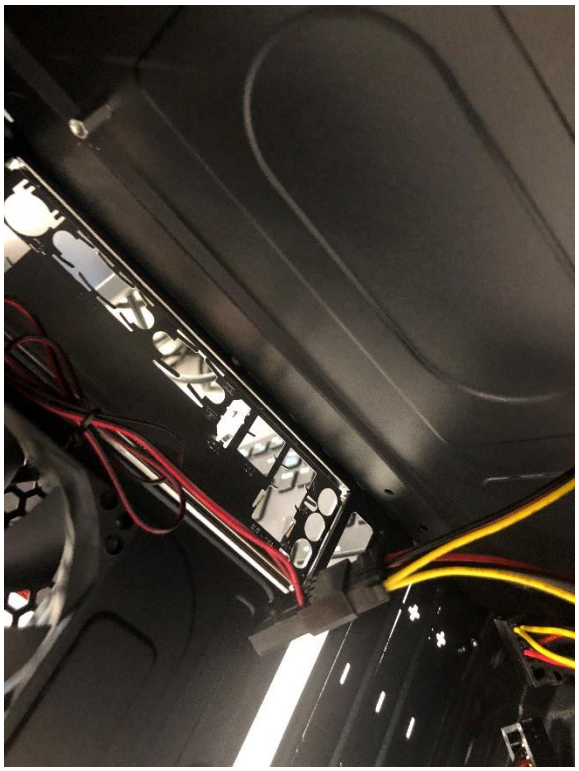
Assembly

The Assembly of the pc began with the case and PSU. The PSU was screwed into the case.

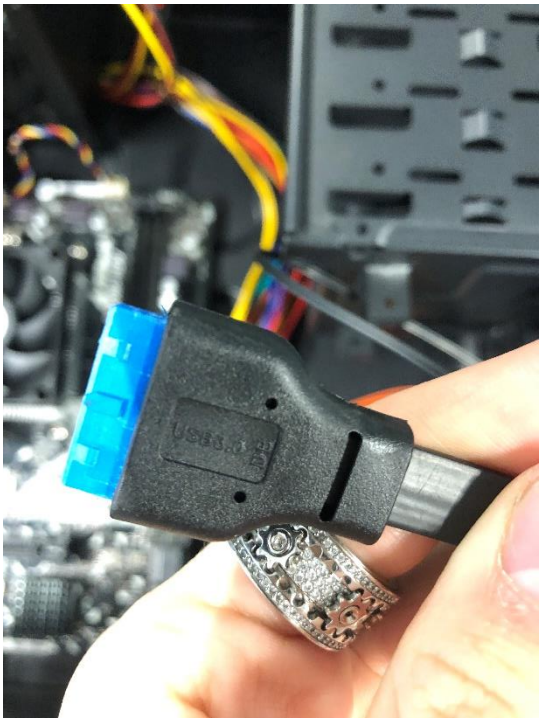
Next was the fitting of the processor onto the motherboard, along with the CPU cooling fan onto of the fan with thermal paste between the processor and fan.



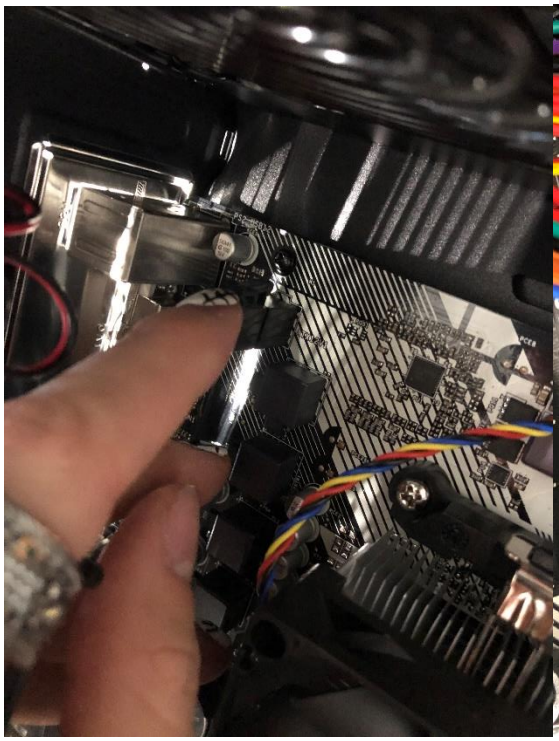
Then the metal slots for the motherboard is slotted into the case.

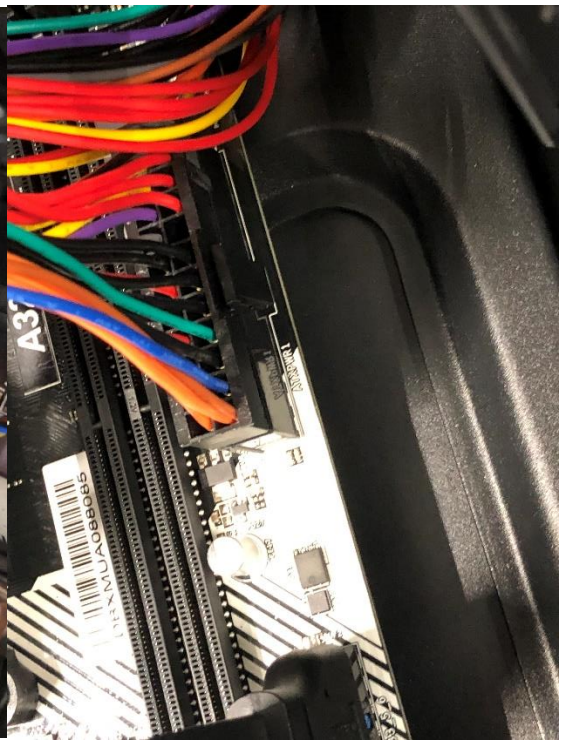



Next the motherboard is screwed into the case.
The USB3.0 cable from the case was then plugged into the motherboard.

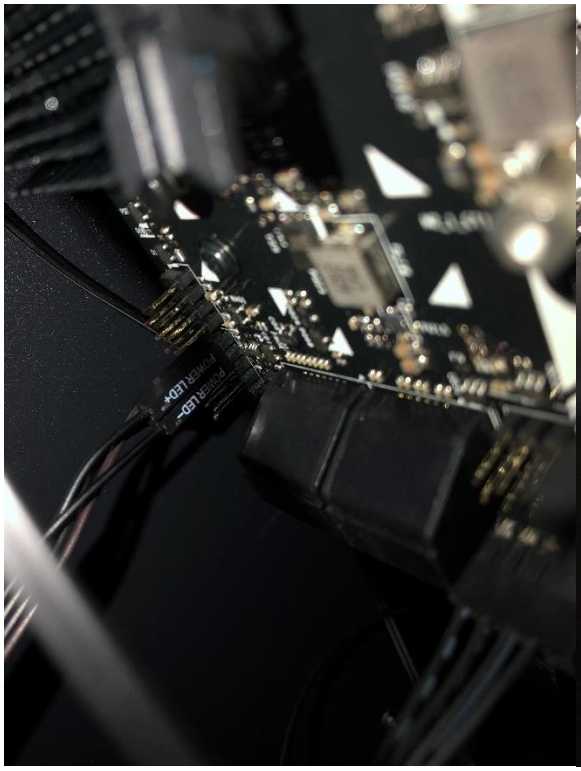


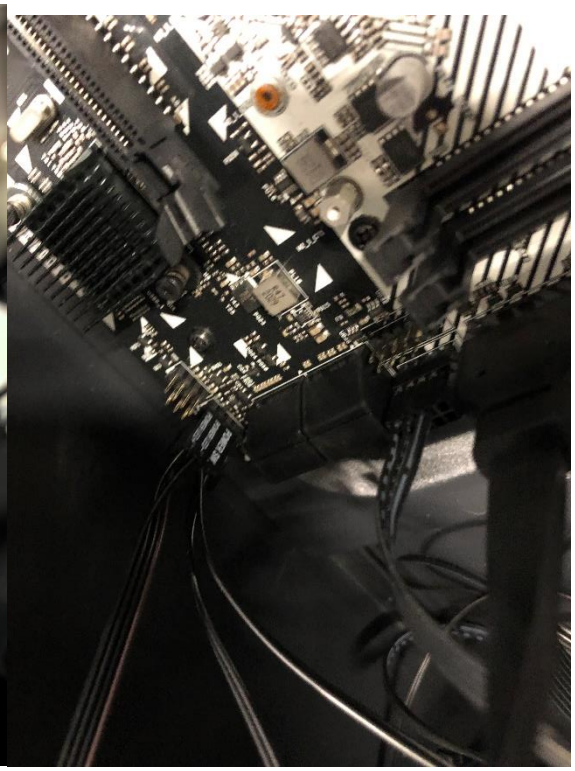

Then the PSU was plugged into the motherboard via two different cables.



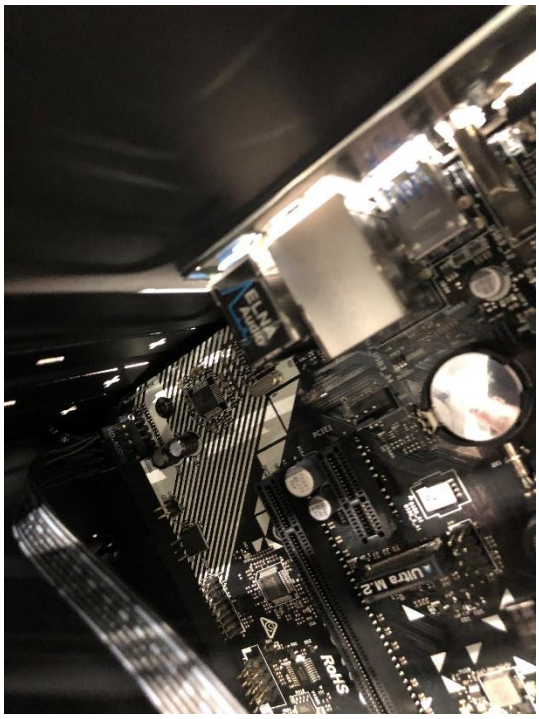


Then the other cables connected to the case are connected to the motherboard. This involves the Power LED, Reset, and Power SW.

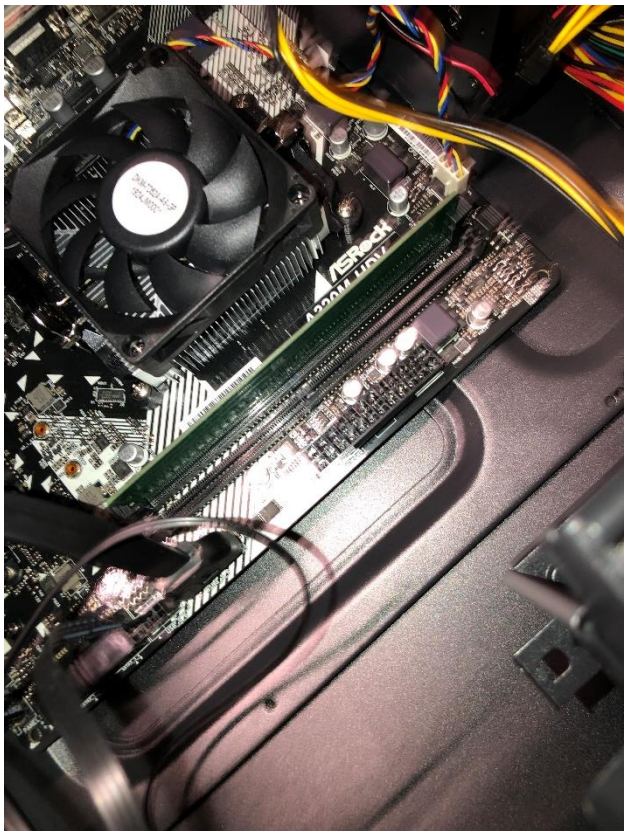




Next the HD Audio Cable was connected to the motherboard.

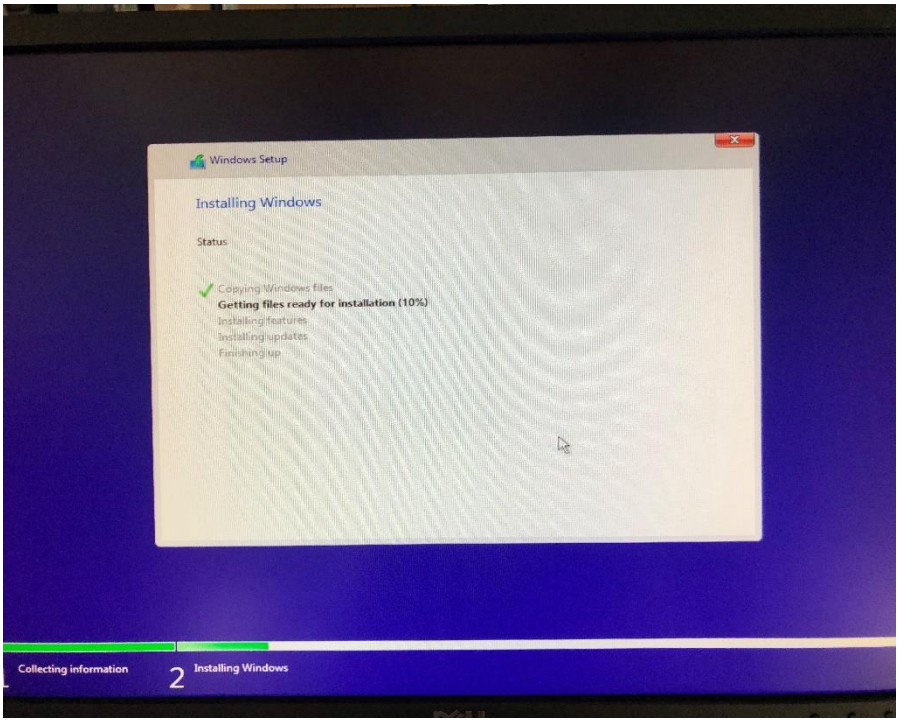


Next we connected the PSU to the CPU FAN and installed the RAM sticks into the slots.



Then we had to install the Storage for the PC which was an SSD card. This was connected to the PSU and motherboard. Then connected to the case via screws.

Then the case cover is screwed back on, and the PSU is plugged into the power socket and the keyboard and monitor, and mouse are then connected via the VGA for the monitor, and USB for the Keyboard and Mouse.

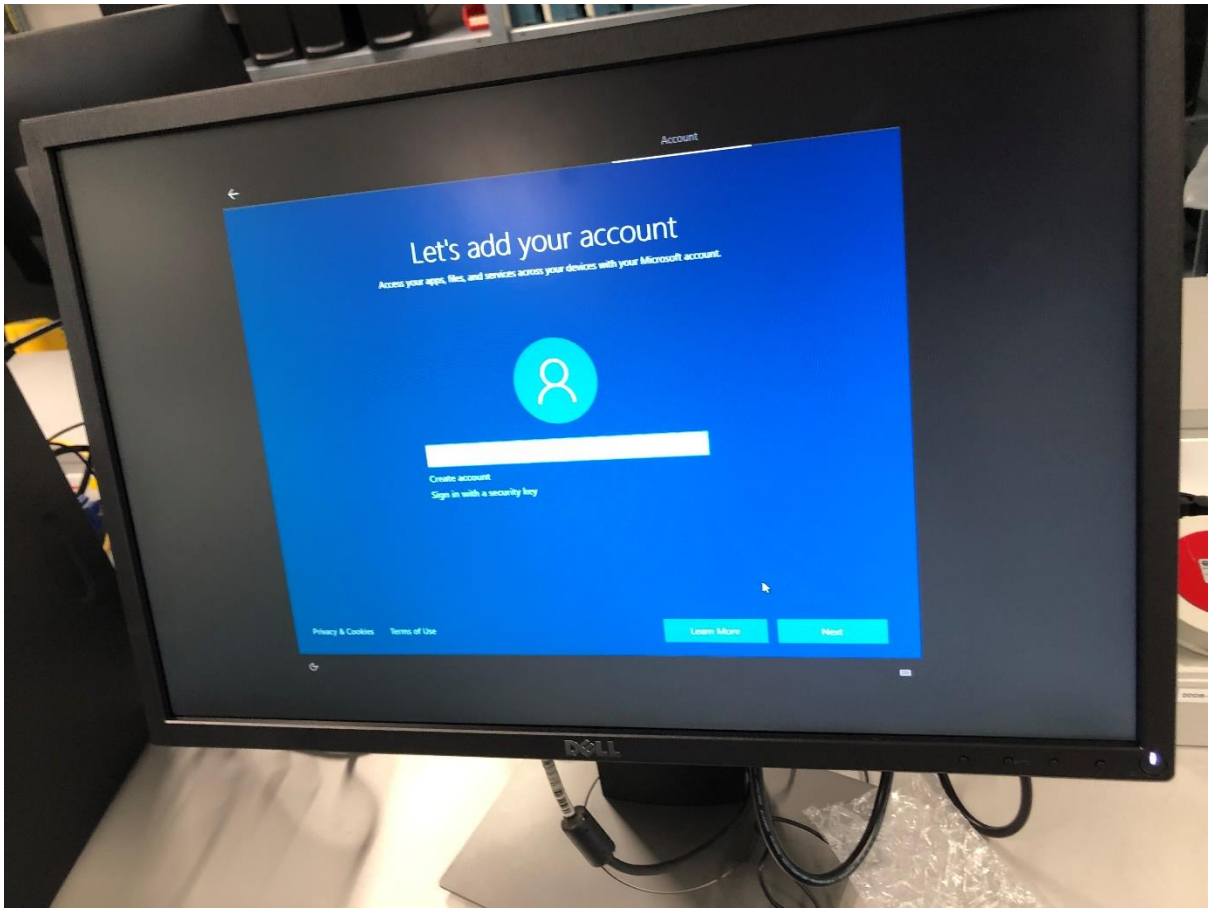


Operating System

Now onto the installation of the Operating System. We were given a USB stick with the download of the windows operating system on it. When the system booted up we clicked f2 and clicked the installation of the windows operating system. Then we waited for the installation to go through. When installing the operating system before installing it we allocated the

amount of memory to be used to store the operating system which was half of the storage we had.

Next we had to make an account and we made the answers to the security questions all TUD. Then typed in the username and password for the account for the operating system.



Raspberry Pi

Unboxing

The first step in the process was unboxing the equipment for the system. As we unboxed the system, the boxes were stored outside the class so that they would not clutter the classroom. I unboxed the monitor, keyboard, mouse, and cables with the respective equipment. Opening the monitor box, displayed a stand, which was separated into two parts a base to keep stability and a stand which slotted into the base with a twist screw at the bottom, to secure it to the base. The monitor was then lifted from the box and carefully slotted into the stand; this did not require any screws just a slot that fitted perfectly into the back of the display screen of the monitor. In the box for the monitor there were a few cables. The first being **power supply cable** to the monitor the second and third being a display port cable and a HDMI cable. Both of these cables not required for the billed as the raspberry pi came with a personal **graphics cable** which slotted into the raspberry pi port for graphics and then into the monitor HDMI port.

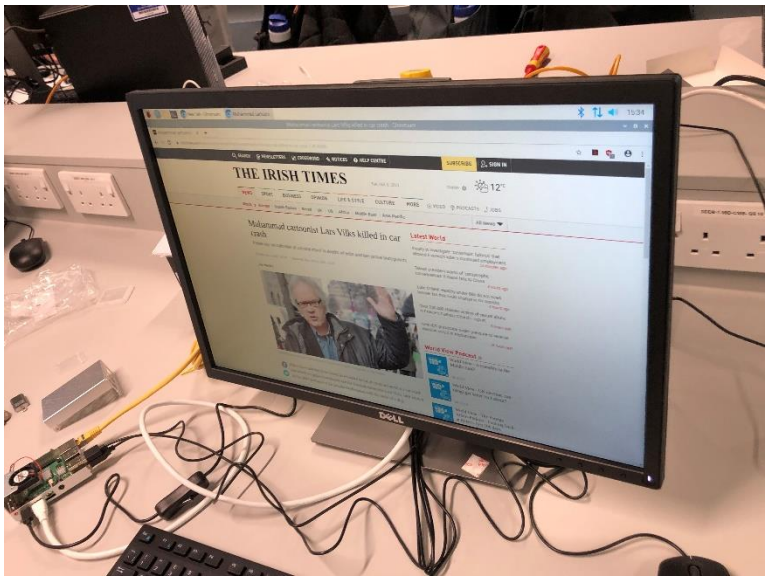
Next was unboxing the **keyboard** and **mouse**. Both came in separate boxes with cables attached to their respective equipment. Each cable had a **USB cable** end which will communicate the inputs to the raspberry pi.

Finally comes to the main event unboxing the **raspberry pi**. The 4th generation came with a **power supply cable, graphics cable**, the raspberry pi **circuits, a steel case**, **SSD memory chip, screws, fan, heat sinks** and little **gel heels** for the bottom of the raspberry case.

Installation

Setting up the monitor was straight forward, slotting the pieces into each other and screwing in the bottom screw to secure the stand to the base. Then came connecting the power supply cable to the monitor to supply power to the monitor when turned on.

The raspberry pi in comparison was a lot more complicated setup but still manageable. First the pi circuit board was screwed into the steel case. Then the **heat sinks** were placed over the processor, and other microchips that produced heat. Then came the installation of the **fan**. With help from a system diagram of the raspberry pi, we were able to identify the two pins in which the fan had to be connected to supply power from the raspberry pi to the fan. One of the wires from the fan would be connected to a pin that would output 5V of power to the fan as specified on the fan, the required voltage was 5V. The other wire was connected to a grounded pin to allow the electricity to pass through the fan and power it. With the system having its cooling features connected to prevent the system from overheating, the next part was screwing the top of the steel case onto the raspberry pi. Then we connected the **graphics cable** that came with the raspberry pi box, to the output port next to the power supply port, then connected it to the HDMI port at the back of the monitor. We then connected the **mouse and keyboard** USB cable to the USB port that provides inputs to the system. Then the **SSD card** was inputted into its slot on the back of the raspberry pi. Then finally we connected the power supply cable to the raspberry pi and plugged it in.


THE IRISH TIMES
Mukurumudzi cartoonist Lars Vilks killed in car crash
Latest World
DELL

Appendix

Appendix A Bill of Components:

Case:

Cooler Master N300

✔ Expected delivery: 4 - 5 working days

- Midi Tower
- ATX - Micro-ATX
- Frontpanel: 1x USB 3.0, 2x USB 2.0, Audio
- Internal bays: 1 x 2.5", 7 x 3.5"

20204454 | NSE-300-KKN1

55.-

44.72 excl. VAT

Add to basket

PSU:

Corsair TX550M - 550W

✔ Expected delivery: 4 - 5 working days

- 550 Watt
- Semi Modular
- 120 mm fan

20825169 | CP-9020133-EU

~~99.-~~

85.-

69.11 excl. VAT

Add to basket

Compare

Motherboard:

MSI A320M-A PRO MAX

✔ Expected delivery: 4 - 5 working days

- Socket AM4
- AMD A320 chipset
- Micro-ATX format
- 2x DDR4 RAM slots
- 1x M.2

20972803 | A320M-A PRO MAX

54.99

44.71 excl. VAT

Add to basket

Processor:

AMD Ryzen 7 3700X

✔ Expected delivery: 4 - 5 working days

- Socket AM4
- 8 cores / 16 threads
- 3,6 GHz (4,5 GHz Turbo) clock speed
- No onboard graphics
- 32 MB Cache

80054739 | 100-100000071BOX

329.-

267.48 excl. VAT

Add to basket

CPU Fan:

Cooler Master Hyper 212 RGB Black Edition

✔ Expected delivery: 4 - 5 working days

- 1 x 120 mm Fan
- Height: 158,8 mm
- 30 dB

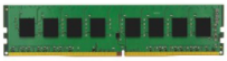
20907149 | RR-212S-20PC-R1

44.95

36.54 excl. VAT

Add to basket

RAM:



Kingston ValueRAM 8 GB - PC4-21300 - DIMM

✔ Expected delivery: 4 - 5 working days

- DIMM module
- 1 x 8 GB RAM
- Cas Latency 19
- DDR4
- 2666 MHz clock speed

20849535 | KVR26N19S8/8

~~69.-~~

49.-

39.84 excl. VAT

Add to basket

SSD:

Crucial BX500 - 120 GB

✔ Expected delivery: 4 - 5 working days

- Read speed: 540 MB/s
- Read speed: 500 MB/s
- Heigte: 7 mm

20902963 | CT120BX500SSD1

~~39.99~~

34.99

28.45 excl. VAT

Add to basket

Mouse:

CHERRY MW 2400 Wireless Mouse

✔ Expected delivery: 4 - 5 working days

- Wireless 2,4 GHz
- 3 buttons
- 1200 dpi
- Optical
- For left or right handed use

20956875 | JW-0710-2

14.95

12.15 excl. VAT

Add to basket

Keyboard:

Logitech Wireless Keyboard K270

✔ Expected delivery: 4 - 5 working days

- Interface - RF
- QWERTY
- Silent keys

20125772 | 920-003736

~~34.99~~

32.99

26.82 excl. VAT

Add to basket

Monitor:

Samsung Smart Monitor M5 - 32"

✔ **Expected delivery: 4 - 5 working days**

- 32 inch
- Full HD VA display (1920 x 1080)
- 8 ms response time
- 60Hz Refresh rate
- 2x HDMI

21057714 | LS32AM500NRXEN

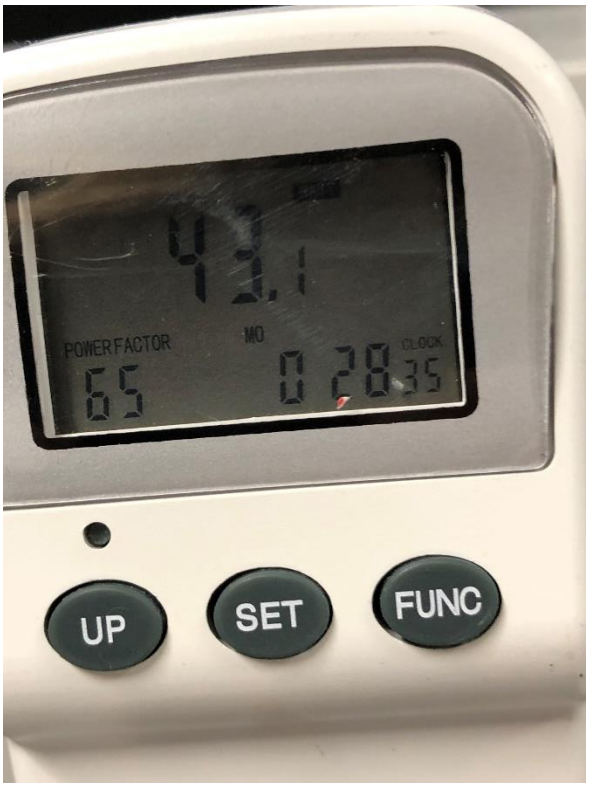
~~259.-~~
239.-
194.31 excl. VAT

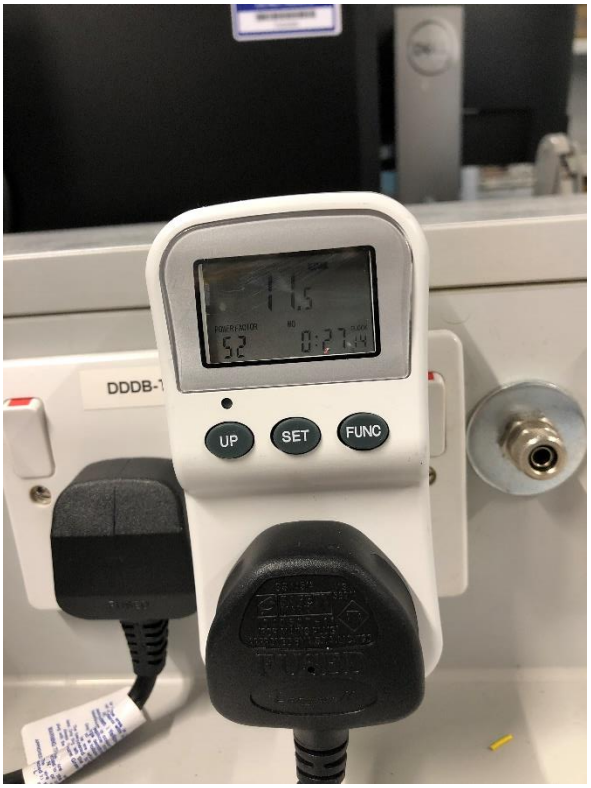
Add to basket

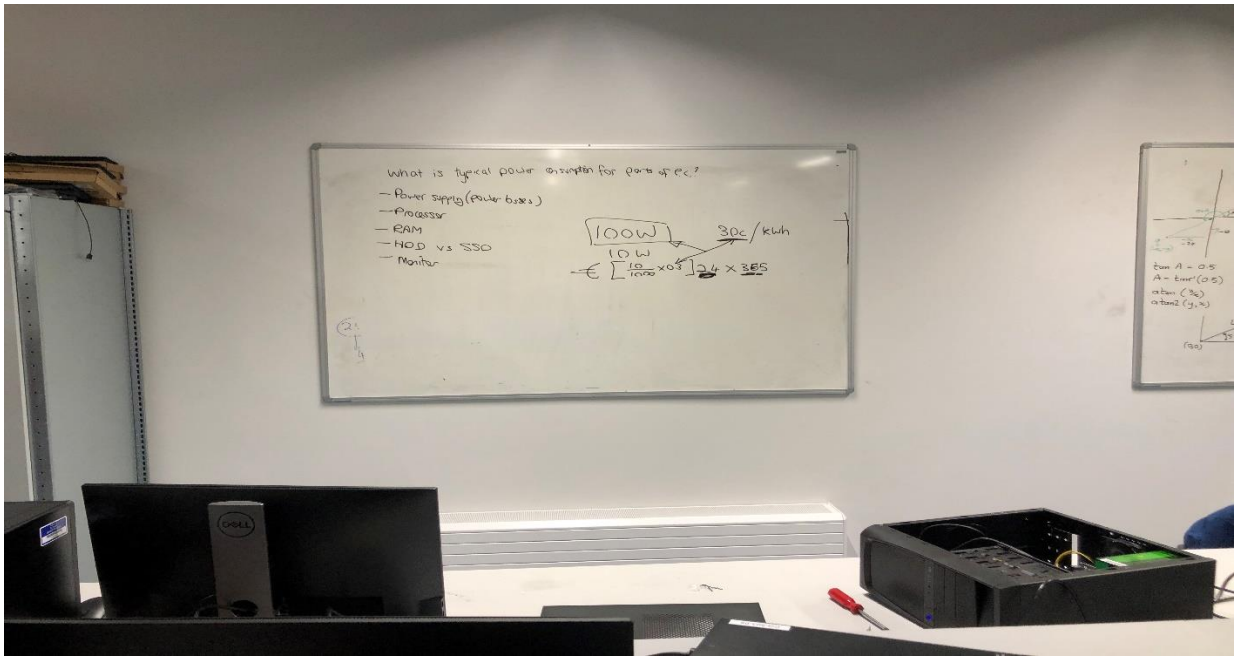
(1)

Appendix B Energy Consumption of a PC:

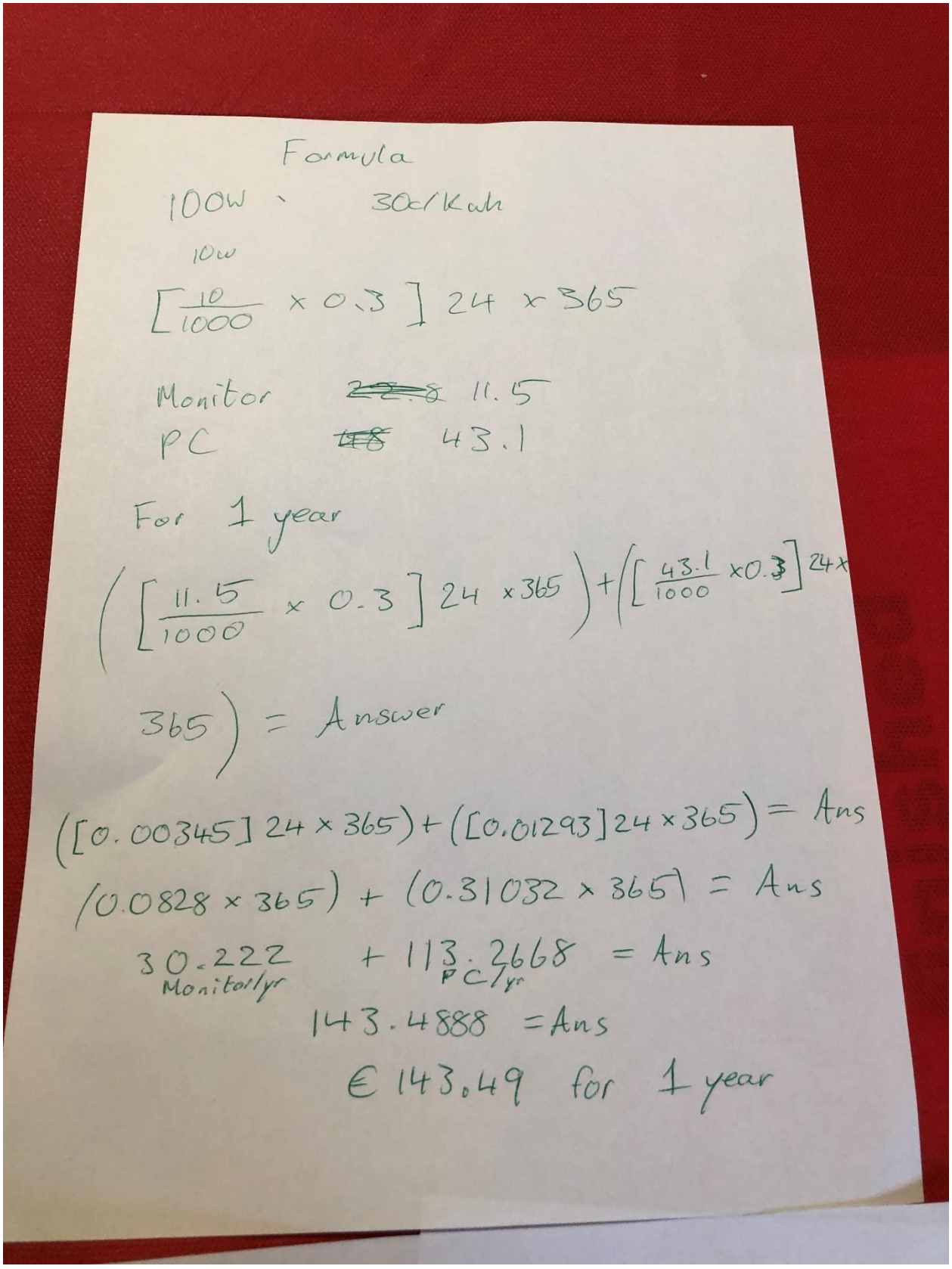
The wattage of the pc was measured using a tool we plugged into the socket and plugged the machines into. For measuring the monitor wattage, the tool read an in take of 11.5 watts. For the measuring of the Pc wattage, the tool read an in take of 43.1 watts.



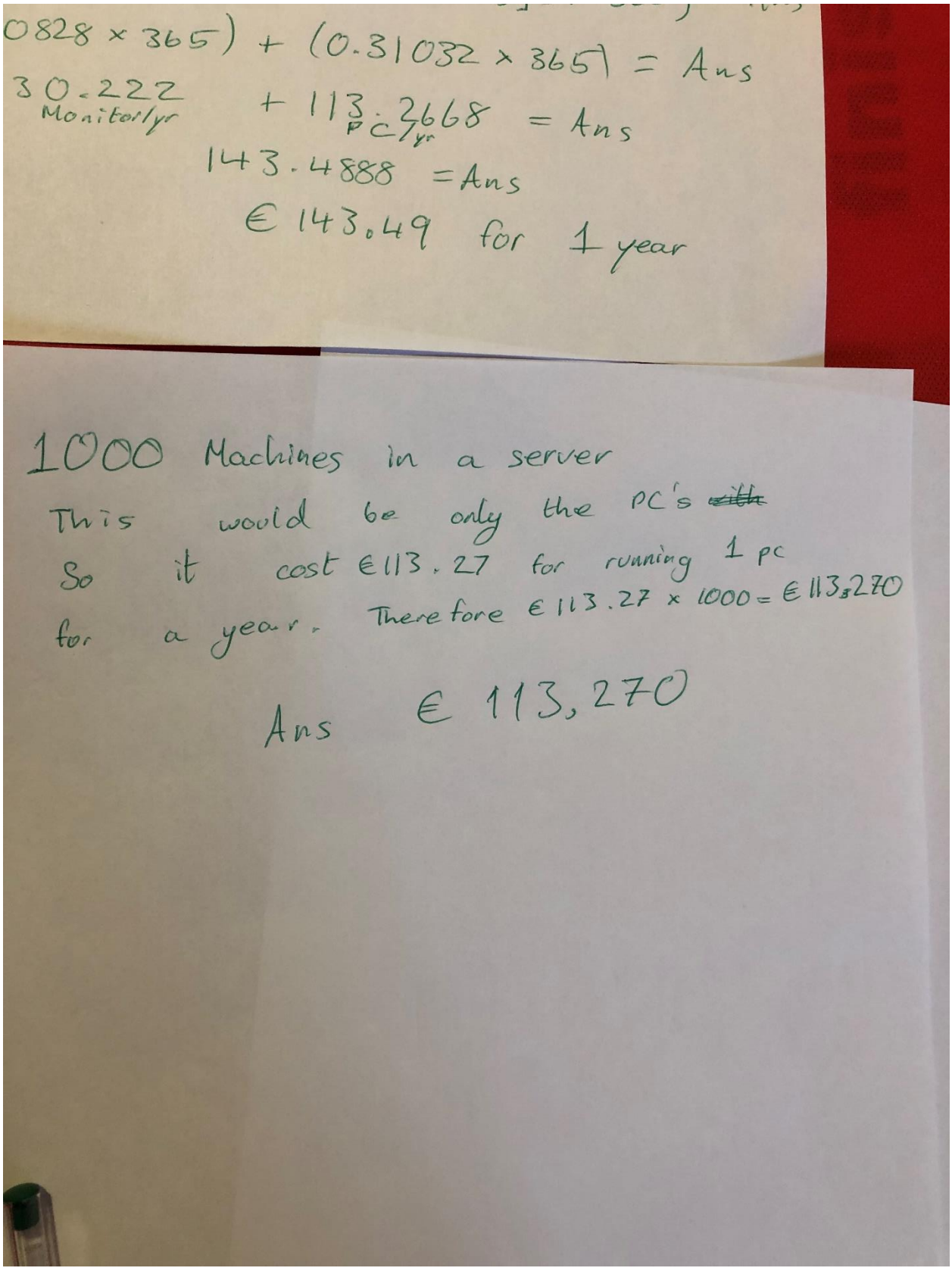



What is typical power consumption for parts of PC?
— Power supply (Packet boxes)
— Processor
— RAM
— HDD vs SSD
— Monitor
100W
10 W
30c/kWh
€ [10/1000 x 0.3] 24 x 365

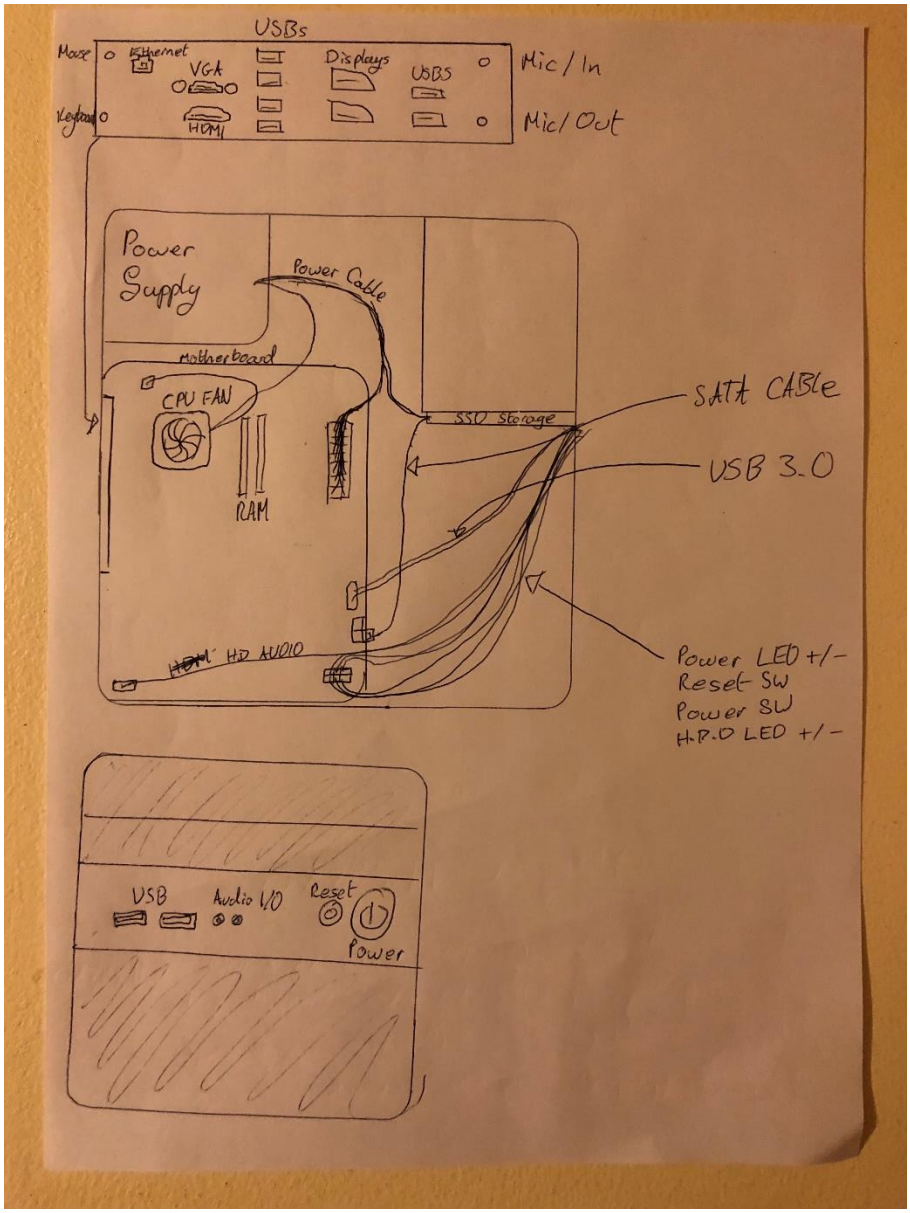
Using these measurements, we can calculate the cost of running the monitor and pc for a whole year using the formula shown.



Then we can use the results we found to determine the amount it would cost to run a computer farm with 1000 machines running for a year. We just get the cost of running our pc for a year and multiply that by 1000 to give us a rough estimate.

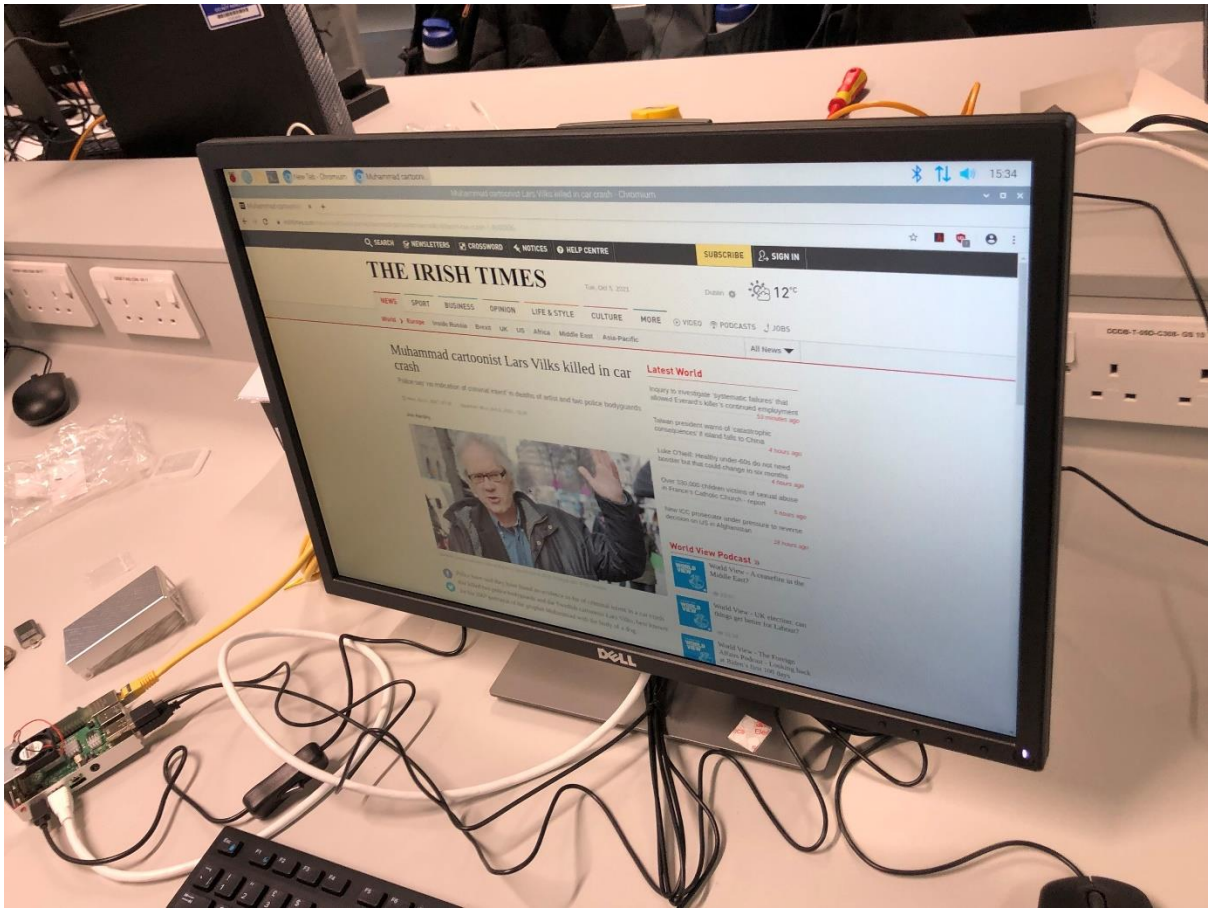


Appendix C Sketch a PC Layout:



Appendix D Raspberry Pi:

When unboxing the raspberry pi, we took out all the parts and laid them out for assembly/ There was the heat sinks that needed to be applied to each a=main microchip and then there was the CPU fan that needed to be attached to the CPU. Once that was done, we inserted the two pins onto the raspberry pi using a manual to know which pins should be used for the fan. The two pins used were the grounded pin and the 5V pin. This would supply power to the CPU fan. Once done the case was screwed onto the raspberry pi and the SSD chip was inserted. Then we plugged in the Monitor, keyboard and mouse into the USB and HDMI ports on the raspberry pi. Once everything was connected, we connected the network cable to the raspberry pi and plugged in the power cable. The switch was turned on and the raspberry pi was booted up. Once on the raspberry pi already started installing the Operating system it would be using. We then followed the necessary steps to have an account made for the raspberry pi and connected it to the network. We tested the LAN connection and used remote access from the other computer connected to the network.



References

1. Paradigit. [Online].; 2021 [cited 2021 December. Available from: http://www.komplett.ie/.