# Introduction

Inside of this subtask, I was asked to design a Gaming computer as a prize reward for the Cit-E competition, within this document. I will document what I have done to design a system and the precautions and research that went in to ensuring that the computer met the specifications.

The specifications given are as follows:

*“In this task we need you to come up with a specification and costing out of the gaming PC which will be used for the 1st prize. It needs to be powerful enough to handle most popular gaming titles and yet be as reasonably compact as it can be. You have a maximum budget of £2000 to use for this design, so you will need to make the best use of this when coming up with your ideas.”*

# Research

When researching components, I first went to find the general minimum requirements for most popular games – the games I researched were “Fortnite”, “League of Legends”, “Minecraft”, “World Of Warcraft” and “Grand Theft Auto V”. As the assignment didn’t give any specific games, these games were chosen as these are typical, popular games from a wide variety of genres and age group. As a result of this research, I chose to go with multicore power over single core power as most games (with the only exception being minecraft) heavily focus on balancing the tasks across all cores rather than just loading all tasks on to one core.

In terms of costing the actual components, I used a wide range of sources before coming to a final choice. Ensuring that the product being promised by that website has high and large amount of reviews as well as ensuring that the price is reasonable, I took the most reasonable price and used this to source the price. There was no solid website that had an advantage over price and as a result I used a fairly wide range of sources.

# Component List and Justifications

## Processor

AMD Threadripper 1920X 3.5 GHz 12-Core Processor

I chose this processor because as I said before, most games allow for high amount of processing power on one singular core, thus allowing a high amount of power with a high number of cores. The processor is also pretty decent with single core performance, ranking extremely closely to an I5’s performance. I decided to go with AMD over Intel for this reason, as Intel is good with single core performance, whilst AMD tends to be better with multi-core performance.

## CPU Cooling

ARCTIC Freezer 33 TR (Black/White)

I decided to go with fan cooling over liquid cooling simply because liquid cooling typically requires a lot more maintenance than fan cooling, if I was to force someone who won a competition to maintain such a complicated system, it wouldn’t seem as effective when a fan cooler can do as effective a job. I also needed to choose a cooling solution that fit within the case, this was the best solution as it sufficiently cooled the processor, was a good price and fit within the case. The fan goes at 200 – 1800 rotations per minute, thus allowing sufficient cooling for a mid-range processor such as the one chosen above.

## Motherboard

ASRock X399M Taichi Micro ATX TR4 Motherboard

I decided to go with a micro ATX motherboard as the brief required the computer to be as compact as possible, as a result I decided to go with a high end motherboard that could fit within a small case and fit on a typical desk. The motherboard allowed the cpu to fit as well as included 4 ram slots, which means that on top of the provided ram, the recipient can expand this amount. The motherboard also comes equipped with an audio card and the ability to have a Ethernet cable plugged in with fairly decent speeds (1gb).

## Memory

Corsair Vengeance LPX 16GB (2 X 8GB) DDR4-3000 Memory

In order to ensure that this memory was capable of running on this board, I checked the board manufacturer’s website to ensure that it was within their recommended working list of pre-tested ram. I went with this amount of ram to ensure that they have plenty to run most games, but I didn’t go overboard to keep costs to a decent price. The motherboard allows for a further 2 slots to be filled.

## Storage

Seagate BarraCude 4tb TB 3.5 inch 5400RPM HDD and Samsung 860 Evo 500GB 2.5 inch SSD

I decided to go with 2 storage devices in order to allow the operating system to run from the SSD, making the system boot time a lot quicker. Whilst allowing the main files to be stored on a fairly large 4tb hard drive, this hard drive will ensure that all files from games are able to be stored. I doubt they’ll need to purchase further upgrades.

## Graphics

Zotac Geforce GTX 1060 6GB

After checking most of the games’ minimum requirements – lots of games had minimum requirements of GeForce 760’s. However, more modern and high demanding games required 1050 and above, I decided that this graphic card was a good compromise between the newer 20 TI models and still working on most popular games at the current time, the system should still run most games for at least the next 2 or so years.

## Case

Cooler Master MasterBox Q300L MicroATX Mini Tower Case

I decided to go with a small case and small design for this system as the brief said that the build should be as small as reasonably possible. As a result, I went with a MicroATX board. This meant that I was able to fit the board into the case. After looking through the size requirements for each of the parts that are specified elsewhere I am fairly confident that everything will be able to fit within the case (although it will be tight).

## Power Supply

Corsair RMx (2018) 650 W 80+ Gold Certified Fully Modular ATX Power Supply

The power supply is arguably one of the most important parts of a computer, a cheap power supply can result in components breaking, not having enough power, not being able to run at full capacity etc. As a result, I went for a 650W power supply to ensure that the machine had enough power to easily power the machine without any issues. I predicted that the machine would use around 400W (using estimations provided by various sources/manufacturers and this helped to make an informed choice on how powerful the supply should be.) The supply is also gold standard, which means that it’s more efficient than a lot of lower standard power supplies, thus meaning that the person who wins the computer isn’t dishing out a load of money for electricity bills. An issue with the powersupply is that the motherboard has an additional 4 pin atx power connector, however this power supply doesn’t support that. Within this case, this wouldn’t be an issue as I’ve provided for the amount of wattage used by the machine itself. The machine’s intended usage is not for overclocking or video editing and as a result will never need to use the extra 12V current that this pin provides.

## Optical Drive

None

I chose to go with no optical drive for a couple of reasons, not only did the case not support an optical drive. From reading and researching around the internet, it’s became clear that most people don’t use these drives anymore, normally preferring to collect games from online download managers such as steam, origin etc.

## Operating System

Windows 10 home 64bit

I decided to go with windows for a fairly standard reason, the person probably has more experience with windows over something like linux. I used the home edition because the computer would almost definitely be based and placed at home.

## Monitor (x2)

Asus VG248QE 24.0" 1920x1080 144 Hz Monitor

I decided to go with this monitor because not only is it a fairly decent size, I also think that it’s good quality and durable for a long time. Along with this, it has an extremely high refresh rate for the price spent on the screen. This will deliver a smooth gameplay experience whilst also not blowing the entire budget on higher Hz. The screens should last a long time and have extensive settings to ensure that the user can customise brightness, gamma etc.

## Keyboard

Corsair K55 RGB Wired Gaming Keyboard

I went for this keyboard because the reviews on the keyboard were extremely high. From reading through reviews and looking over those, I have gathered that most people think that this product is durable and customisable (with the light displays). If the end user doesn’t like the provided keyboard, then this isn’t an issue as keyboards are generally a low price and can be purchased by everyday consumers (such as the one winning the competition).

## Mouse

Razer DeathAdder Elite Wired Optical Mouse

I decided to go with this mouse because the mouse is an extremely durable, long term mouse that offers a lot of settings and software that allows people to change light settings and sensitivity of the mouse. Both of these factors are considered to be positive points for the target audience of this machine and as a result. The mouse is a good choice, whilst being sure not to go overboard with pricing.

# Budgeting

|  |  |  |  |
| --- | --- | --- | --- |
| **Component Type** | **Component** | **Price** | **Price Source** |
| CPU | AMD Thread ripper 1920X 3.5 GHz 12-Core | £237 | [Source](https://www.cclonline.com/product/237433/YD192XA8AEWOF/CPU-Processors/AMD-Ryzen-Threadripper-1920X-3-5GHz-Processor-with-32MB-L3-Cache-OPN-PIB-/CPU0479/) |
| CPU Cooling | ARCTIC Freezer 33 TR (Black/White) | £35 | [Source](https://www.amazon.co.uk/dp/B075MYVW5J) |
| Motherboard | ASRock X399M Taichi Micro ATX TR4 | £339 | [Source](https://www.amazon.co.uk/dp/B079Z8W61Z) |
| Memory | Corsair Vengeance LPX 2 X 8GB DDR4-3000 | £67 | [Source](https://www.awd-it.co.uk/corsair-vengeance-black-lpx-16gb-2x-8gb-cmk16gx4m2b3000c15-ddr4-3000mhz-memory.html?wgu=13527_206719_15716622336109_c9dc971640&wgexpiry=1579438233) |
| Graphic Card | Zotac Geforce GTX 1060 6GB | £190 | [Source](https://www.ebuyer.com/752926-zotac-geforce-gtx-1060-6gb-graphics-card-ebuyer-com-zt-p10600a-10l?mkwid=s_dc&pcrid=51482416259&pkw=&pmt=&gclid=EAIaIQobChMInIvmsrKt5QIVycreCh1eiA4REAQYASABEgKAJvD_BwE) |
| Case | Cooler Master MasterBox Q300L MicroATX | £42 | [Source](https://www.awd-it.co.uk/cooler-master-masterbox-q300l-micro-atx-full-windowed-modular-pc-case-black.html?wgu=13527_206719_15716623510379_962c51c94c&wgexpiry=1579438351) |
| Power Supply | Corsair RMx (2018) 650 W 80+ Gold Certified Fully Modular Power Supply | £89 | [Source](https://www.awd-it.co.uk/corsair-rm650x-gold-certified-650w-psu-modular-power-supply-cp-9020091-uk.html?wgu=13527_206719_15716623836198_59117fc5c1&wgexpiry=1579438383) |
| Optical Drive | n/a | £0 | n/a |
| Operating System | Windows 10 home 64bit | £119 | [Source](https://www.microsoft.com/en-gb/store/b/windows) |
| Monitor 1 | Asus VG248QE 24.0" 1920x1080 144 Hz | £190 | [Source](https://www.amazon.co.uk/dp/B00B19T7QC) |
| Monitor 2 | Asus VG248QE 24.0" 1920x1080 144 Hz | £190 | [Source](https://www.amazon.co.uk/dp/B00B19T7QC) |
| Storage 1 | Seagate BarraCuda 4 TB 3.5" 5400RPM | £83 | [Source](https://www.aria.co.uk/Products/Storage/Hard+Drives/3.5+Inch+SATA+Drives/2TB+-+6TB+Hard+Drives/4TB+Seagate+BarraCuda+3.5%22+SATA+III+Hard+Drive+-+ST4000DM004?productId=68634) |
| Storage 2 | Samsung 860 Evo 500 GB 2.5" SSD | £69 | [Source](https://www.amazon.co.uk/dp/B078WQT6S6) |
| Keyboard | Corsair K55 RGB Wired | £49 | [Source](https://www.amazon.co.uk/dp/B01M4LIKLI) |
| Mouse | Razer DeathAdder Elite | £55 | [Source](https://www.amazon.co.uk/dp/B01LXC1QL0) |

**Total**: £1754 / £2000