**Performance improvements from utility software**

In this report I will be considering the various gains in performance that different types of utility software can give.

**Anti-virus**Viruses usually do some or all of four different things;  
- Force the user to look at adverts (usually in the form of popups in web browsers)  
- Steal data (files, passwords, etc)  
- Destroy data  
- Use system resources (for the above tasks, or just to be malicious)

Because antivirus stops viruses from doing these things, as well as protecting the users data and privacy, they prevent the viruses using system resources so that the computer will run faster for the programs the user is running.

**Firewall**  
Firewalls block malicious network traffic, stopping hackers and viruses, which brings the performance gains mentioned above, but if the firewall is not on the computer itself but between the router and PC or ISP and router, then the malicious traffic will not use bandwidth, speeding up LAN and WAN connections, making downloads and web browsing faster and safer.

**Cookie removal**Cookies are small files that store information that websites can use. This means that;  
- every time a web page is visited, extra data is being sent and received, slightly increasing page load times.  
- The file system must index these files, cluttering the hard drive and slowing down the file system.  
- Websites can track people and target them with advertisements.

Removing cookies stops these things form happening, giving marginal gains to the performance of the computer.

**Clearing internet history**Most browsers keep a record of every website visited, sometimes saving the website locally. This takes up space on the hard drive, slowing down read/write times due to file indexing and fragmentation.

Clearing the history speeds up the hard drive and frees up storage space.

**Defragmentation**

Fragmentation is when related files are not stored near each other on the hard drive, and are all over the place. This means the read/write head on magnetic drives has to move more, slowing down IO and making the whole computer slower, as anything involving data on the hard drive (almost everything on a computer) will be slowed down. Defragmentation utilities organise the data so the read/write head doesn’t have to move as much, speeding up access times.

**Drive formatting**normally when a file is deleted, the space the file occupied on the drive is left untouched, but the space is marked as empty, so new data can be written there. Overwriting old data is slower than writing to a blank sector. Formatting properly erases the data so write times will be faster. However, it erases all data on the drive, so it should only be used when the drive is being re-purposed (i.e, before installing a new OS on a hard drive, or when clearing an old USB stick).

It can also be used to securely erase data.