CHAPTER 1 HEALTHY COMPUTING

INFOCUS

Working with computers involves more than just using software and hardware. For instance, using a computer for prolonged periods of time can create physical discomfort that may, over time, lead to long-term physical injury. To preserve your physical well-being and health, it is important to understand how to work with a computer safely.

In this session you will:

- ✓ gain an understanding of **Work Health** and **Safety** in **Australia**
- ✓ gain an understanding of performing a computer risk assessment
- ✓ gain an understanding of how to set up a workstation ergonomically
- ✓ gain an understanding of what constitutes a good computing work environment
- ✓ gain an understanding of exercises you can do while working at a computer
- ✓ gain an understanding of the standards and specifications associated with ergonomics
- ✓ gain an understanding of stopping and controlling influenza in the workplace
- ✓ gain an understanding of social problems that are associated with computer addiction.

WORK HEALTH AND SAFETY

A safe and healthy workplace is essential for successfully running a business of any size. Business owners have rights and responsibilities regarding the health and safety of their employees, their customers and also the general public. In Australia the states and territories have each enacted their own *Work Health & Safety* (WHS) laws.

Employer Obligations

Even though each state and territory in Australia has its own WHS legislation, the laws are similar enough to ensure that all employers are obliged to provide:

• Safe premises

• Safe machinery and substances

• Safe systems of work

• Information, instruction, training and supervision

• A suitable working environment and facilities

It doesn't matter whether you sit on a chair in front of a computer in an office or descend two kilometres underground to dig coal, as an employee your health and safety is covered by WHS legislation, and heavy penalties exist for employers who fail to meet their obligations.

Acts, Regulations and Codes of Practice

Each state and territory in Australia has its own *WHS Act* which sets out the requirements for ensuring safe and healthy workplaces. These acts are general in nature and explain the responsibilities and duties of various people who play a role in workplace health and safety.

Some hazards in the workplace require more specific regulations or codes of practice. The various states and territories have created their own codes of practice to regulate these hazards. For example in New South Wales there is a code of practice dealing with *The Safe Removal of Asbestos*, another for *Working in Confined Spaces,* and yet another for the *Collection of Domestic Waste*. These codes spell out more detailed regulations, procedures and responsibilities for dealing with specific hazards to employees, customers and the general public.

WHS Authorities

Each state and territory has its own authority that is responsible for enforcing the WHS laws, codes and regulations. These authorities also work with a national *Safe Work Australia* authority. Each of these authorities has its own website where you can obtain WHS information specific to the state in which you work. The authorities are listed below.

State/Territory	Authority	Website
ACT	WorkSafe ACT	www.worksafe.act.gov.au
New South Wales	WorkCover NSW	www.workcover.nsw.gov.au
Northern Territory	NT WorkSafe	www.worksafe.nt.gov.au
Queensland	Workplace Health and Safety Queensland	www.worksafe.qld.gov.au
South Australia	SafeWork SA	www.safework.sa.gov.au
Tasmania	Workplace Standards Tasmania	www.wst.tas.gov.au
Victoria	WorkSafe Victoria	www.worksafe.vic.gov.au
Western Australia	WorkSafe WA	www.commerce.wa.gov.au/WorkSafe/

These authority names and website addresses were correct at the time of writing but may vary and change over time. You can use an internet search engine (such as *Google*) to find the relevant WHS authority for the state in which you work.

PERFORMING A COMPUTER RISK ASSESSMENT

To ensure that you are working safely and in a healthy manner with your computer and at your workstation you can perform a *risk assessment* to ascertain where any potential problems lie. A risk assessment tool can simply be a checklist with questions like the ones shown below. This checklist can then be used to rectify potential problems.

Workstation

Is the desk between 68cm and 72cm high and have a top dimension larger than 115cm x 90cm?	Yes	No
Is the workstation designed to prevent undue twisting of the neck or trunk?	Yes	No
Can all frequently used items such as telephones and documents be placed within easy reach?	Yes	No
Does the chair have height adjustment, backrest adjustment, lumbar support, and a 5 star castor base?	Yes	No
Are your thighs fully supported with 2-3 finger space behind the knees when seated and with the back fully supported by the chair?	Yes	No
Is a footstool required?	Yes	No
Can the keyboard be placed at a height where your forearms are parallel with the floor?	Yes	No
Can the mouse be positioned next to and at the same height as the keyboard?	Yes	No
When sitting tall and looking straight ahead can you look at the top edge of the screen?	Yes	No
Is a document holder available?	Yes	No
Is the screen at approximately one arm's length away and at a comfortable reading distance?	Yes	No
Is the image on the screen steady and free from flicker?	Yes	No
Is the screen free from glare and reflection?	Yes	No

Work Environment

Can the level of lighting be adjusted, perhaps through the use of window blinds?	Yes	No
Is access and egress to the workstation and work area free from obstacles?	Yes	No
Is the area free of tripping and slipping hazards?	Yes	No
Are adequate storage facilities available?	Yes	No
Is ventilation, heating and cooling adequate?	Yes	No
Is the level of noise conducive to concentration?	Yes	No

Work Practices

Can your posture be changed at least every hour, perhaps by changing the variety of tasks?	Yes	No
Do you have control over your workload and the ability to take breaks?	Yes	No

Safety Equipment

Is a first aid kit available?	Yes	No
Are electrical cords and connections safe (undamaged and not caught around or under equipment)?	Yes	No
Have appropriate circuit breakers been installed in electrical circuits?	Yes	No

There are many checklists available on the internet that can be used a source of inspiration for your own. Some of the questions on the checklist above have been adapted from a checklist published on the internet by the University of Western Australia and other organisations.
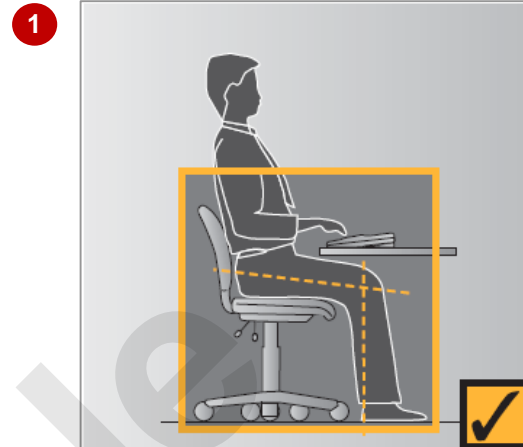
SETTING UP AN ERGONOMIC WORKSTATION

Many of the office-based injuries to the neck, arm and wrist can be prevented by having a properly set up workstation. This section presents some guidelines for you to work with in setting up a safe computer workstation. However, common sense must always prevail and if you feel any pain or discomfort as a result of using a computer you should stop immediately.

(1) *Chair* The chair should be a gas-adjustable type chair. Adjust the height of the chair so that feet are comfortably flat on the floor, the thighs are approximately horizontal and the lower legs approximately vertical. Position the backrest to the curve of the back – if not comfortable, lower the height several centimetres and try this position.

(2) *Arm Rests* Arm rests are usually not recommended unless they are well out of the way.

(3) *Desk* Having adjusted the chair as above, adjust the height of the desk (where available) so that the top surface is just below elbow height. Ensure that there is ample clearance under the desk and that the desk is not too cluttered.

(4) *Keyboard* The common and preferred setting for the keyboard is where the feet (under the keyboard) are lowered so that the keyboard sits flat on the desk. Place the keyboard as close to the front of the desk as is comfortable so that the top half of the arms are approximately vertical.

(5) *Mouse* Place the mouse directly beside the end of the keyboard. When your hand is on the mouse, place your forearm on the desk or on a wrist rest if you find the edge of the desk painful. Try to use the mouse both left-handed and right-handed and change hands regularly.

(6) *Screen* Position the screen after you have positioned the chair and desk. The top of the screen should be level with or slightly lower than your eyes. It should be at an arm's length away from the user. Position the screen to avoid reflective glare from windows and lights.

(7) *Document Holder* Try to place documents so that they are at eye level and just to the side of the screen.

(8) *Laptop Computer* If you use a laptop for more than 2 hours per day connect a separate mouse and LCD screen and position both as directed above.

A GOOD WORKING ENVIRONMENT

In addition to setting up for good posture at your computer workstation it is important that the environment and the ambience surrounding the workstation are conducive to healthy and safe computing. Environmental factors include such things as lighting, noise, ventilation, space and storage, equipment safety, and the like.

Lighting and Glare

To avoid excessive reflections and glare a computer user should not be facing an uncovered window. If a window is uncovered the workstation should be positioned at right angles to the window.

With regard to lights, a computer monitor should be positioned to the side of a light source and not underneath it. If the monitor is well away from windows and there are no other sources of bright light you should use a low level of service light of 300 lux*. If the room has strongly contrasting light levels, then a moderate level of lighting of 400 – 500 lux may be desirable.

Noise

Excess noise can be distracting to a computer user. Excessive noise around a workstation can be filtered out using portable panels and partitions, double glazing on windows, noise cancelling headphones, and the like. You can also download specialist software, such as ***ChatterBlocker*** which purports to reduce distraction from nearby conversations by blurring it using a blend of soothing nature sounds, music and background chatter.

Ventilation, Heating and Cooling

A comfortable working environment leads to better concentration and therefore productivity. Computers and their peripheral devices such as printers can produce fumes and heat. It is important therefore that the workplace has adequate ventilation to prevent these fumes from causing health problems.

It is important to maintain a comfortable level of heating and cooling, dependent upon the location and the season.

Space and Storage

Your workstation should be able to accommodate all of the items and equipment that you need to do your work. Your desk should have enough space for items such as a keyboard, mouse, document holder, telephone, pens, and other items that you would use during the normal course of your work. If you work from books or document the desk should be large enough for you to work from these without too much clutter. If your desk is not large enough to do this, then you could consider having a side table for items that are not used or accessed that frequently.

Keyboarding from Documents

When keyboarding from documents a good document holder should be used. Touch typists should use an A4 document holder placed level with and close to one side of the screen. Non touch typists should use an A3 document holder above the keyboard and in front of the screen.

Computer Radiation

All computer monitors emit low levels of radiation that may affect your health. You should avoid sitting to the side or back of monitors and keep at least one metre away. Where possible use liquid crystal display (LCD) monitors as these emit less radiation than older style CRT monitors. If you use an older style CRT monitor use a radiation filter screen over the front of the monitor to reduce the rays emitted. Monitors should be turned off when not in use.

Equipment Safety

Computers are electrical devices and therefore have cabling associated with them. Cabling can present both a tripping and an electrical hazard at the workplace. All electrical devices, including computers, should be electrically tested periodically to ensure that they are safe and working correctly. Cables should not be placed where they present a tripping hazard – dangerous and exposed cables should always be re-routed by an electrician.

Older style double adaptors should be avoided, as should overloading a powerboard with too many appliances. These pose significant office fire risks.

*Lux is a unit of measure used to measure the illuminance and luminosity of light output.

BREAKS AND EXERCISES

Prevention is definitely better than cure when it comes to any form of illness or injury. Here are a number of suggestions for rest breaks and stretching exercises for you to try while working at the computer. Make sure that you relax and perform the exercises gently. You should stop immediately if you feel any discomfort.
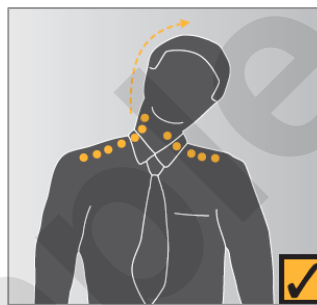
Rests and Breaks

- Take a rest break away from the computer for 5 to 10 minutes every hour.
- Active rest during a break with some other type of activity, such as walking or stretching, is more beneficial than passive rest – get up off your chair and walk to the printer to collect those print jobs!
- Vary activities where possible interspersing computer tasks with non-computer tasks.
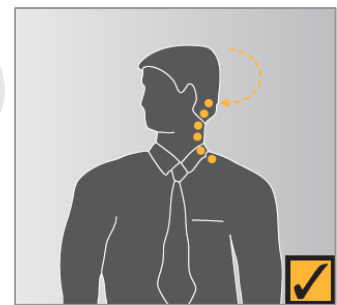- Try to limit computer time to 5 hours per day – break this time up into segments.

Exercises

Head Rolls
Gently lower ear to shoulder and hold for 10 seconds. Slowly roll chin to chest and up to other shoulder and hold chin for 10 seconds. Repeat several times and be careful not to extend your neck back too far.
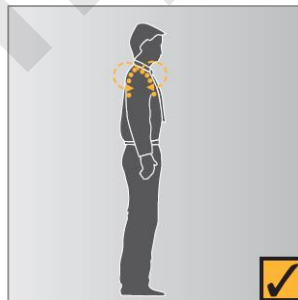
Head Turns
Turn head to look over left shoulder and hold for 10 seconds. Turn head the other way and hold for 10 seconds. Repeat several times.

Shoulder Rolls
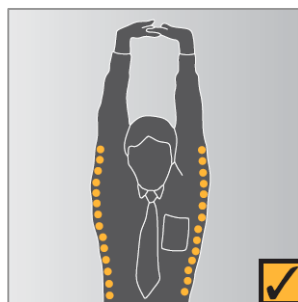Circle shoulders forward several times, then backwards. Repeat 3 to 5 times.
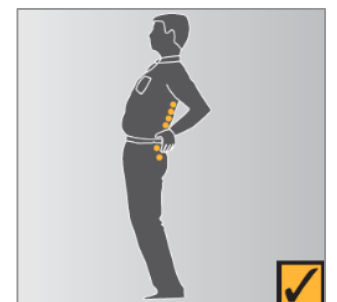
Wrist Stretch
Interlace fingers, palms outwards, and straighten arms in front. Hold for 10 seconds and repeat several times.

Upper and Lower Back Stretch
Interlace fingers and turn palms upward above head, straighten arms then slowly lean slightly from side to side. Repeat movement several times.

Back Arching
Stand up and support your lower back with your hands then gently arch for five to ten seconds.

For a comprehensive range of exercises for office workers refer to **Appendix B** in *Officewise: A Guide to Health and Safety in the Office* published by **WorkSafe Victoria**. You can download a copy from the download link on the home page of **WorkSafe Victoria** (http://www.worksafe.vic.gov.au).

Neck Stretch

Head Turns

Shoulder Rolls

Wrist Stretch

Upper and Lower Back Stretch

Back Arching

SPECIFICATIONS AND STANDARDS

WHS is a huge subject and is constantly evolving. There are many WHS sources of information related to computing especially in regard to ergonomics. Most countries around the world recognise the importance of WHS and there are now a number of national and international standards that can help you determine how to correctly setup a workstation.

Common Specifications and Dimensions

Height of work surface (from floor)

Fixed desk: 680mm to 720 mm

Adjustable: 580 mm to 730 mm

Work surface area

Width: 1,500mm minimum

Depth: 900 mm minimum

Leg space volume

Width: 800 mm minimum

Depth: 550 mm minimum

Height: 580 mm minimum

Viewing distance to work

350 mm to minimum

750 mm to maximum

Height of display

30 mm to 40 mm below eye level

Seat pan height

Surface of seat to floor: 380 – 510 mm

Seat pan depth: 330 – 430 mm

Footrest area: 300 – 375 mm

National Standards Pertaining to Computer Ergonomics

AS3590.1-1990 Screen-based Workstations – Visual Display Units

AS3590.2-1990 Screen-based Workstations – Workstation Furniture

AS3590.3-1990 Screen-based Workstations – Input Devices

National/International Standards Pertaining to Computer Ergonomics

AS/NZS 4438:1997 Height Adjustable Swivel Chairs

AS/NZS 4442:1997 Office desks

AS/NZS 4443:1997 Office panel systems

International Standards Pertaining to Computer Ergonomics

ISO 9241-1:1997(E) Ergonomic requirements for office work with visual display terminals

Part 1: General introduction

Part 3: Visual display requirements

Part 4: Keyboard requirements

Part 5: Workstation layout and postural requirements

Part 6: Environmental requirements

Part 7: Requirements for display with reflection

These standards are all very comprehensive and are supplied in quite large books. If you perform a search on the internet (using Google or something similar) you will easily be able to locate retailers who can provide these standards to you should you require them.

INFLUENZA IN THE WORKPLACE

Influenza, or *flu*, contributes significantly to workplace illnesses and absence. While flu is not new, recent strains of influenza, such as SARS, H5N1 (avian flu) and H1N1 (swine flu) have caused widespread concern in the community and has prompted the government to recommend that WHS risk control measures be incorporated by businesses to cope with pandemic outbreaks.

Background

New strains of influenza emerge, usually in the cooler months, almost every year and effect literally tens of thousands of employees in the workplace. Some strains, however, are more severe than others and may reach pandemic stage. A pandemic occurs when a new subtype of influenza emerges that can spread easily between humans and is capable of causing severe disease. According to *Comcare*:

> *"It is anticipated that up to 25% of the population could become infected and ill during the course of a pandemic. Some people will die and it is estimated that with an infection rate of 25% there could be between 13,000 to 44,000 deaths in Australia."* [1]

It is important in periods of heightened risk that preventative measures designed to reduce the spread of influenza be undertaken in the workplace.

Responsibility of Employers and Employees

Under the *WHS* Act employers must take all reasonably practical steps to protect the health and safety of their employees during an influenza pandemic which is relatively foreseeable. Employees must co-operate with their employer in implementing the appropriate control measures.

How Infections Are Transmitted

Infections general occur through:

- *Contact* – including direct person to person contact (handshaking, touching, kissing, etc), touching contaminated surfaces, or from handling infected materials. Generally a virus will survive several hours on common surfaces.
- *Airborne droplets* – generally transmitted through the air by coughing and sneezing.
- *Aerosol transmission* – through air-conditioning concentrations of the virus suspended in moisture or dust particles.

Managing the Direct Risks of Infection

Comcare recommends a number of ways of managing the direct risk of infection, including:

Social distancing	Allowing only essential staff to attend work; using alternative work options such as working from home; prohibiting handshaking, kissing, and touching in the workplace; replacing meetings with electronic communications such as video conferencing; closing or reducing service counters
Hygiene	Undertaking additional cleaning of the workplace and especially equipment handled by a number of people; encouraging personal hygiene such as regular and thorough hand washing, covering of the face when coughing and sneezing, disposal of tissues; wearing of surgical masks by employees who develop symptoms
Controlled entry	Imposing an exclusion period and restricting the entry to the workplace by persons who may have influenza or who may be at risk of contracting it
Managing illness	Isolating staff who become ill at work and ensuring that they can safely be sent or taken home (avoiding public transport); cleaning of the employees work area once they have left.

1. *OHS Preparedness for an Influenza Pandemic: A Guide for Employers* (published September 2009); Australian Government, Comcare

SOCIAL PROBLEMS OF COMPUTER ADDICTION

While most people find spending some time online to be productive, compulsive internet use can interfere with work, relationships and daily life. When you feel more comfortable with your online friends than your real ones or you can't stop playing games, gambling or surfing compulsively, even when it has negative consequences in your life, then you may be using the internet too much.

What Is Computer Addiction?

Computer addiction (also known as internet addiction or online addiction) is the name given to a variety of problems including:

- *net compulsions* such as compulsive online gaming (like World Of Warcraft), stock trading or compulsive use of online auction sites such as eBay, often resulting in financial and job-related problems

- *cyber-relationship addiction* such as addiction to social networking, chat rooms and messaging to the point where virtual, online friends become more important than real-life relationships with family and friends

- *computer addiction* such as obsessive playing of offline computer games (like Solitaire or Minesweeper) or obsessive computer programming

- *cybersex addiction* such as compulsive use of internet pornography, adult chat rooms or adult fantasy role-play sites impacting negatively on real-life intimate relationships.

Symptoms Of Computer Addiction

Signs and symptoms of computer addiction vary from person to person, but some general warning signs that your internet use may have become a problem include the following.

- *Losing track of time while online* – Do you frequently find yourself on the internet longer than you intended? Does a few minutes turn into a few hours? Do you get irritated or cranky if your online time is interrupted?

- *Having trouble completing tasks* – Do you find yourself working late more often because you can't complete your work on time? Do you find laundry piling up or no dinner on the table because you've been busy online?

- *Isolation from family and friends* – Is your social life suffering because of the time you spend online? Are you neglecting your family and friends? Do you feel like no one in your 'real' life, even your spouse, understands you like your online friends?

- *Feeling guilty or defensive about your internet use* – Are you sick of your spouse nagging you to get off the computer and spend time together? Do you hide your internet use or lie to your boss and family about the amount of time you spend on the computer and what you do while you're online?

- *Feeling a sense of euphoria while online* – Do you use the internet as an outlet when stressed, sad, or for sexual gratification or excitement? Have you tried to limit your internet time but failed?

How Do People Become Addicted And How Can They Overcome It?

Many people turn to the internet in order to manage unpleasant or overwhelming feelings such as stress, loneliness, depression, anxiety and boredom. Losing yourself online can temporarily make these feelings evaporate into thin air.

But as much comfort as the internet can provide, it's important to remember that there are healthier and more effective ways to keep difficult feelings in check – for example, exercise, meditation, sensory relaxation strategies, and simple breathing exercises. For many people, the best way to overcome internet and computer addiction is to find alternative ways to handle these difficult feelings, such as going to the gym or spending time with friends.

Even when your internet use is back to healthy levels, the painful and unpleasant feelings that may have prompted you to engage in unhealthy internet use in the past will remain. So, it's worth spending some time thinking about different ways that you can deal with stressful situations and the daily irritations that would normally trigger you to log onto the internet.

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CHAPTER 2   # COMPUTERS

INFOCUS

Computers come in all sorts of shapes and sizes and with vastly dissimilar price tags and performance abilities. And as a result, different types of computers have different uses.

In this session you will:

✓ gain an overview of information technology

✓ gain an understanding of the different types of computers

✓ gain an understanding of the different types of personal computers

✓ gain an overview of how the different types of computers are used

✓ gain an overview of computer performance.

INFORMATION TECHNOLOGY AND COMPUTERS

Information technology basically involves the use of equipment and techniques to handle and process information. The term is used more specifically to refer to electronic communications and the use of computing which have really allowed the easy dissemination of information to enter virtually every aspect of daily life.

Information Technology

Since information technology is primarily concerned with communications, the earliest forms of information technology included the use of ochres and dyes to create cave paintings, the use of an abacus to perform calculations, and later, a printing press to disseminate information.

It is believed the term *information technology* itself was first coined in the 1970s to refer to the advances in electronic technology that burgeoned at the time. Today, it incorporates a wide spectrum of technology including communications, broadcasting, consumer electronics and computing.
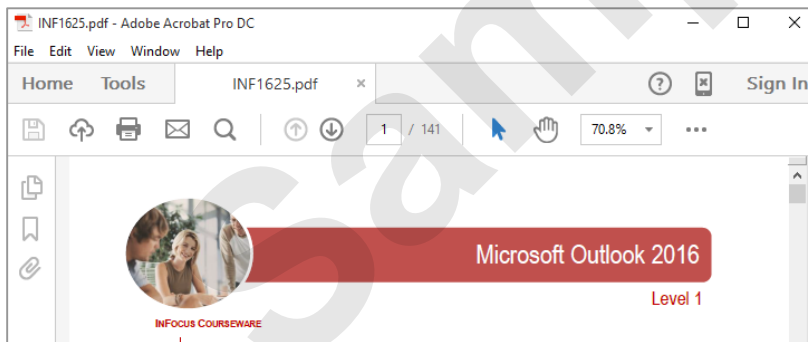
At the heart of the *information technology revolution*, as it has been called, are computers.
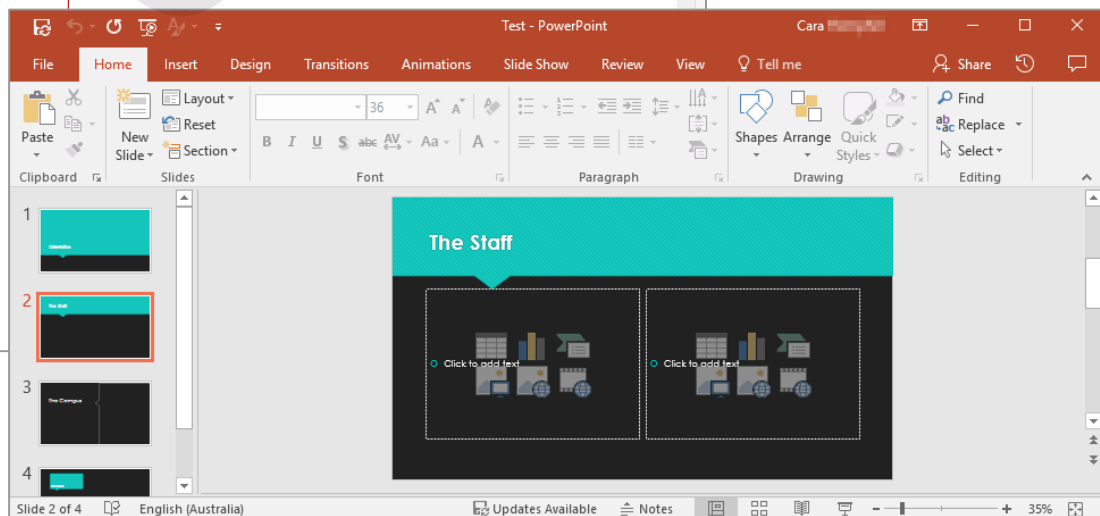
Hardware and Software

A computer is made up of two components: the *hardware* and the *software*.

The hardware refers to the physical components of the computer including the monitor (the screen), the computer cabinet, the various peripheral devices such as the keyboard and mouse, and even the printer that is used to print information. In general terms, hardware means all of the electrical and electronic components of the computer together with the cabinets, boxes, or shells, in which they are housed.

The software refers to the instructions (also known as programs) that make the computer work. Basically, it is the software that tells the computer what to do and how to do it.

Here are examples of two software packages: Adobe Reader to the left and Microsoft PowerPoint below.

In very general terms, *hardware* refers to the tangible aspects of the computer (the case, the mouse, the keyboard, and so on), while *software* refers to the intangible elements of the computer such as the processing instructions.