J836 – Cambridge Nationals Level 1/2 Information Technologies
R050 – IT in the Digital World
TA2: Human Computer (HCI) in everyday life

2.1. The purpose, importance and use of HCI in application

A well designed HCI will…

- **Be clear in its layout:** important information stands out, user interactions are clear
- **Be consistent in its layout:** users know where to find things
- **Be simple:** users can quickly learn how to use the HCI
- **Be user-controlled:** which means the user decides the actions to be taken
- **Provides feedback:** when a user makes an error, the messages should be clear and provide detailed feedback as to how to rectify the error
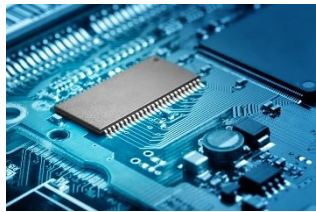
Embedded systems

Advantages	− Greater flexibility in use compared to older devices − Ability to set preferences such as specific heating levels
Disadvantages	− Limited number of functions/options for the user

Banking

Advantages	− Increased security − A customer only has access to their own accounts − Can operate bank facilities without the need for bank staff − Flexibility in when and how to use bank
Disadvantages	− Cannot access accounts if the HCI fails − Incorrect programming could lead to incorrect accounts being shown

Entertainment

Advantages	− Offers users a personalised experience − Different users can use the same device
Disadvantages	− If connection is lost, then the entertainment device will no longer offer a personalised experience to the user

Fitness

Advantages	− Personalised settings − Clear set-up of exercise plans − Easy to see and monitor progress
Disadvantages	− Device-based HCI can be small to read − Input methods can be very restrictive

Home appliances

Advantages	− Appliance performance can be tailored to meet the user requirements − Appliance can be user activated or delayed whenever or wherever the user is located
Disadvantages	− If connectivity is lost, then the appliance will not work as required

2.2. Hardware considerations

Display

Touch Screen	Allows the user to physical touch the screen as part of the interaction
LCD Screen	(**Liquid crystal display**) A type of display that uses a liquid crystal film sealed between glass plates
LED Screen	(**Light emitting diode**) A small device that emits light when an electric current is passed through it; lots of LEDs are used together to make self-illuminating displays
OLED Screen	(**Organic light emitting diode**) A type of display that produces is own light; it is flexible and can include a touch response layer

Resources

Memory	To store HCI program, OS, applications and features/options
Processing power	The more options, and sub-option, an HCI has, the more processing power is needed to complete the requested tasks without being slowed down

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2.3. Software considerations

Operating system (OS)

The operating system allows the hardware to communicate with the different applications that the device has. OS can be GUI or CLI based. OS can also be proprietary or open source.

Windows	Mainly PCs, laptops and tablets
Mac OS/iOS	Apple-based devices including Mac desktops and laptops, iPhones and iPad tablets
Android	Used on mobile devices such as tablets and smartphones
Chrome	Used on Chromebook laptops and smartphones
Ubuntu	Mainly PCs but can also be used on a server
Linux	Mainly PCs and laptops but can also be used on, for example, cars, smartphones, web servers and networking hardware
Unix Unix	Can be used on devices ranging from supercomputers to mobile devices

Graphical User Interface (GUI)

Purpose	A visual interface made up of icons and menus which can be selected. E.g. Click on an icon to open the program.
Used by OS:	– Windows – Mac OS/iOS – Android – Chrome – Ubuntu – Linux – Unix
Advantages	– A help feature is usually included – The same data can be shared between different software applications with the results seen as WYSIWYG – Complicated commands do not have to learnt or remembered – Intuitive and easy to use
Disadvantages	– Very experienced programmers can find these slow to use and select the options needed – The file size is large which means more storage is needed – A large amount of memory and processing power are needed to handle all the graphics and commands

Command Line (CLI)

Purpose	Uses text to give the device instructions. E.g. Opening software using a keyboard.
Used by OS:	– Chrome – Linux – Unix
Advantages	– Limited memory and processing power are needed – An experienced user can quickly interact using the correct commands – Does not need a GUI to run
Disadvantages	– Commands have to be spelt and typed precisely for the operating system to react – There are a large number of commands which need to be learnt and remembered by users

2.4. User interaction methods

Touch and gesture

Advantage	The HCI can be less cluttered as fewer buttons will be needed
Disadvantage	Users need to learn, remember and accurately execute touch commands and gestures

Keyboard and mouse

Advantage	Many people are familiar with the layout
Disadvantage	It is a slow method when you need to write a long piece of writing

Voice

Advantage	Benefit to those who need assistive technology due to a disability as there is little physical interaction needed to interact with the HCI
Disadvantage	Noisy environments, accents and multiple speakers may degrade results