**S3 Prelim Revision Notes**

|  |  |
| --- | --- |
| **Hardware** | *Input Devices*Mouse, Keyboard, Scanner, Microphone, Webcam, Trackpad*Output Devices*Monitor, Printer, Speakers, Headphones, *Interfaces*used to connect peripherals (printers, keyboards) to the processor; compensate  |
| **Biometrics** | *Retina scanning*The retina is an area at the back of our eye. Scanning this area of the eye to confirm a person’s identity. *Fingertip recognition*A fingerprint scanned on a device is compared to fingerprints saved in a database.*Palm print recognition*Palms prints provide unique identification of users in a similar way to fingerprints but over the larger physical area of a palm rather than a single fingerprint*Face recognition*Images of a person’s face are taken from different angles with measurements used to identify the shape of the face and complex algorithms used to store any distinguishable features such as marks on the skin |
| **Databases** | *Fields and Records*A database file stores all of the information on a particular subject. It is made up of records. A record stores all the information about one person/thing. It usually consists of several different fields. A field stores one piece of information.There are five fields and three records in the table below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Title** | **Surname** | **Gender** | **Age** | **Job** |
| Mr | O’Neil | M | 25 | Plumber |
| Miss | Jackson | F | 36 | Firefighter |
| Mrs | Alice | F | 45 | Teacher |

*Primary Key*A primary key is a field used to uniquely identify every record in the database.*Foreign Key*A foreign key is a primary key from one table that appears in another table to link the two together.*Anomalies*This table will be used to describe insert, update and delete anomalies:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Student Number** | **Student Name** | **Address** | **Course Number** | **Course** |
| S21 | Jamie | Glasgow | 9201 | Maths |
| S21 | Jamie | Glasgow | 9267 | Computing |
| S30 | Rachael | Edinburgh | 9322 | Physics |
| S32  | Gavin | Dundee | 9201 | Maths |
| S33 | Tom | Dundee | 9267 | Computing |

*Insert Anomaly*Occurs when certain attributes cannot be inserted into the database without the presence of other attributes e.g. a new course can’t be added without a student*Update Anomaly*Changes made to data in a table are not automatically updated e.g. if Jamie moves to Aberdeen then his Address has to be changed from Glasgow to Aberdeen everywhere it appears. Easy for a small table but could be very difficult for a table with 1000s of records!*Delete Anomaly*Cannot delete data from a table without having to delete an entire record e.g. we cannot remove Rachael from the table without also having to remove all information about the Physics course*Splitting Tables*Flat File:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Exhibitor Code** | **Company Name** | **Area** | **Stand Number** | **Product Reference** | **Item Name** | **Price (£)** |
| SG100 | FutureTech | Tech Zone | 22 | GD101 | 3D Printer | 1245 |
| SG100 | FutureTech | Tech Zone | 22 | GD102 | 3D Printer XL | 1699 |
| SG176 | Digital80 | Photo Zone | 49 | GD208 | 360 Camera | 800 |
| SG203 | TechATive | Active Zone | 123 | GD187 | GoJet | 1300 |
| SG203 | TechATive | Active Zone | 123 | GD324 | RollerJet | 500 |
| SG489 | ABCMusic | Music Zone | 234 | GD387 | Xkey | 350 |
| SG489 | ABCMusic | Music Zone | 234 | GD367 | Xkey Plus | 500 |
| SG512 | HitechGaming | Games Zone | 288 | GD654 | HowPower2 | 149 |

Linked Tables:**Exhibitor Table** (Exhibitor Code, Company Name, Area)

|  |  |  |  |
| --- | --- | --- | --- |
| **Exhibitor Code** | **Company Name** | **Area** | **Stand Number** |
| SG100 | FutureTech | Tech Zone | 22 |
| SG176 | Digital80 | Photo Zone | 49 |
| SG203 | TechATive | Active Zone | 123 |
| SG489 | ABCMusic | Music Zone | 234 |
| SG512 | HitechGaming | Games Zone | 288 |

**Product Table** (Product Reference, Item Name, Price (£), Exhibitor Code\*)

|  |  |  |  |
| --- | --- | --- | --- |
| **Product Reference** | **Item Name** | **Price (£)** | **Exhibitor Code** |
| GD101 | 3D Printer | 1245 | SG100 |
| GD102 | 3D Printer XL | 1699 | SG100 |
| GD208 | 360 Camera | 800 | SG176 |
| GD187 | GoJet | 1300 | SG203 |
| GD324 | RollerJet | 500 | SG203 |
| GD387 | Xkey | 350 | SG489 |
| GD367 | Xkey Plus | 500 | SG489 |
| GD654 | HowPower2 | 149 | SG512 |

It is important to note that a primary key will be underlined. A foreign key will have a \* symbol after it. Exhibitor Code and Product Reference are used as primary keys because they are each unique values for every record. Exhibitor Code is used as a foreign key in the Product Table to link the two tables together. |
| **Security Risks** | *Keylogger*A keylogger records all of the keys that you press on your computer system. Can be installed by viruses or Trojans; can also be physical hardware devices that can be plugged between the USB socket on a computer and the keyboard USB plug. This is a major security risk as you will be typing a lot of personal information:* Usernames
* Passwords
* Credit card numbers
* Email addresses

*Phishing*This is an attempt by someone to get you to send them personal information, such as usernames, passwords, email addresses and bank account details.Often an email will be sent that asks you to update your details, contribute to charities or claim cash prizes. The website that the email asks users to access will often be a replica of a similar legitimate site.Ways to spot phishing scams:* Email contains spelling errors.
* Lack of personalisation - 'Dear Customer' used instead of your real name.
* Email contains links that appear to go to one website, but direct you to another.
 |
| **Security Precautions** | *Encryption*Encryption ensures that data being sent across a network is kept secure by scrambling the data into random numbers and letters.*Passwords*A method of keeping a system secure. Choosing a longer password that is difficult to guess makes it even more secure.However, passwords come with their own problems:* Users often have simple passwords that are easy to guess.
* Users often use the same passwords for multiple accounts; if one service is compromised then all the users accounts can be accessed.
* Computer programs can randomly generate millions of passwords and unlock them.
* Users forget their passwords.

It is important to pick a password that you can remember, but one that is also difficult to guess. You can read online about the best format, but two beliefs are:* Choose at least 8 characters, with upper and lower case, a special symbol and a numeric character
* Combine four different unconnected words together of any length
 |
| **Memory** | *RAM*Random Access Memory – temporary storage location that does not save data when the PC is switched off*ROM*Read Only Memory – permanent storage location that saves data when the PC is switched off |
| **Laws** | *Copyright, Designs & Patents Act*This act is in force to protect the creative work of individuals or businesses. Protects against software piracy, illegal download of video and audio files, downloading images without permission of copyright holder.*Data Protection Act*Aims to protect anyone who has personal information stored on a computer system. It outlines a set of responsibilities for the person who stores the data.*Computer Misuse Act*Determines whether people are allowed to access computers and modify the data on the computer system. Makes hacking, unauthorised access and unauthorised changing of data illegal.*Communications Act*Protects against stealing someone else’s internet connection without their permission, threatening behaviour online, and sending offensive or indecent images.*Health & Safety*A set of rules that apply to employers so that they create a safe working environment for their employees. Examples include:* No trailing wires
* Suitable lighting with no glare or reflections
* Adjustable chairs etc.
 |
| **Energy Use** | *Reducing Energy used by a Computer System** use energy efficient monitors
* reduce brightness and backlighting on monitors during the day
* activate standby settings on energy efficient monitors after 15 minutes of inactivity
* avoid the use of screensaver on energy efficient monitors
* activate sleep/standby settings for your laptop or desktop
* only switch peripherals on when they are needed
 |
| **Computer Structure** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Main Memory |  |  |
|  |  |  |  |  |
| Input Device |  | Central Processing Unit (CPU) |  | Output Device |
|  |  |  |  |  |
|  |  | Backing Storage |  |  |
|  |  |  |  |  |

 |
| **Processor** | *Control Unit*Controls all the other parts of the processor and makes sure instructions are executed in the correct order. *Arithmetic & Logic Unit*The part of the processor that performs all the calculations and makes decisions.*Registers*Temporary storage locations within the processor. Stores addresses, data or instructions whilst the processor is using them.*Dual-core*Two processors on one chip*Quad-core*Four processors on one chip*Speed*The speed of a processor is measured in Hertz (Hz). |
| **Buses** | *Address Bus*Carries the address location of the instruction from processor to main memory or peripherals*Data Bus*Carries the actual data of the instruction from processor to main memory or peripherals. |
| **Storage Devices** | *Magnetic*Makes use of a magnetisable coating and dots that are created, read and erased by very small electromagnets. Examples include:* Magnetic tape
* Hard disk drive

*Optical*Makes use of a laser to shine and reflect light to read the data stored. Examples include:* CDs
* DVDs
* Blu-ray
 |