

# Year 10 and 11 IT Knowledge Organiser



# Year 10 IT Spreadsheets

## Summary

In computing, modelling is used to look at large amounts of data to help with scientific or engineering projects. A computer model is a representation of a real-life system or situation, such as the workings of a nuclear reactor or the evacuation of a football stadium.

Simple models can be built in a spreadsheet. A spreadsheet model could be used to plan a school prom. To make sure it came in on budget the spending on food, drinks, entertainment, and the price of tickets could be varied.

A spreadsheet can be used as a modelling tool. The model is controlled by a set of rules introduced by formulae. These rules can be changed easily to vary the model and, for example, provide information about running costs and profit margins.

Spreadsheets are used to store information and data. Once you have your information in a spreadsheet you can run powerful calculations and make charts.

## Key Words

|                |                                                                                            |
|----------------|--------------------------------------------------------------------------------------------|
| Axis labels    | A label for a graph's horizontal or vertical axis that explains what the value relates to. |
| Cell           | An individual spreadsheet box where you enter data.                                        |
| Cell reference | Names of individual cells (A5 for example).                                                |
| Chart          | A graphical way of displaying data.                                                        |
| Column         | Cells that go down the spreadsheet page.                                                   |

## Key Words continued

|                |                                                                                                    |
|----------------|----------------------------------------------------------------------------------------------------|
| Computer model | Predicts and investigates how real-life devices or processes might behave in different situations. |
| Data           | Values, typically letters or numbers.                                                              |
| Field          | A Collection of one data type across multiple records.                                             |
| Format         | The appearance of a document, including the fonts, colours, size and rotation.                     |
| Formula        | Makes automatic calculations that update when the data does.                                       |
| Function       | Makes more complex calculations.                                                                   |
| Label          | Text used to identify cell contents.                                                               |
| Range          | Set of cells next to each other.                                                                   |
| Record         | A collection of data on one person or item.                                                        |
| Row            | Cells that go across the spreadsheet page.                                                         |
| Spreadsheet    | A piece of software used to manipulate data, often used in modelling.                              |
| Workbook       | A collection of worksheets                                                                         |

# Year 10 IT Spreadsheets 2

## Advantages of using Spreadsheets:

- They can simulate real life events safely.
- When actioned correctly, formula will automatically update the result of a calculation when data is amended.
- Data can be presented in the form of charts and graphs.
- You can carry out "what if?" investigations. For example, the grocer could increase his prices to see the effect on sales and the builder could increase his hourly charge to see the effect on his daily total.

## Cell Referencing

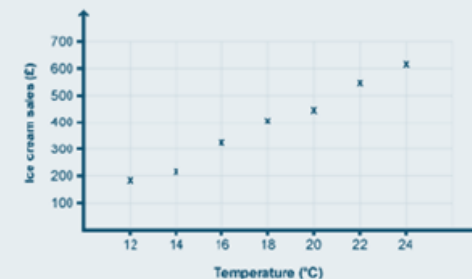
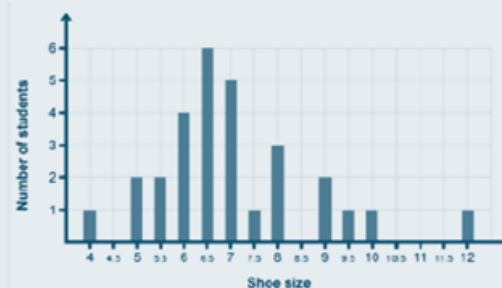
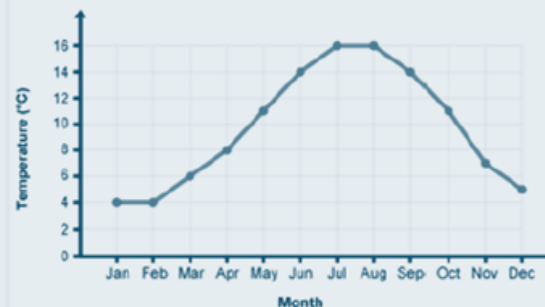
|   | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 |   |   |   |   |   | ▲ |   |
| 2 |   |   | ■ |   |   |   |   |
| 3 |   |   |   |   | ★ |   |   |
| 4 |   |   |   |   |   |   |   |
| 5 |   | ● |   |   |   |   |   |
| 6 |   |   |   |   |   |   |   |

Identify the cells the following shapes are located:

- Square – C2
- Circle – B5
- Star – E3
- Triangle – F1

## Knowing your Graphs

|               |                                                         |
|---------------|---------------------------------------------------------|
| Line Graph    | To show a change over time.                             |
| Pie Chart     | To show the individual parts that make up a whole.      |
| Bar Chart     | To compare things that aren't directly related.         |
| Scatter Graph | To look for a pattern or link between two sets of data. |





# Year 10 IT Spreadsheets 3

## *Creating a model and manipulating data*

| Formula         | Explanation                                                                       |
|-----------------|-----------------------------------------------------------------------------------|
| =A7+B7          | This will add the data in cell A7 with the data in cell B7.                       |
| =D4-J1          | This will subtract the data in cell J1 from the data in cell D4.                  |
| =C5*I9          | This will multiply the data in cell C5 with the data in cell I9.                  |
| =E6/T7          | This will divide the data in E6 with the data in T7.                              |
| =SUM(F4:F12)    | This will add up all the data from cells F4 to F12.                               |
| =AVERAGE(H2:R2) | This will work out the average of the data between cells H2 and R2.               |
| =MAX(A6:A34)    | This will look at cells A6 to A34 and display the maximum value across the range. |
| =MIN(C4:K4)     | This will look at cells C4 to K4 and display the minimum value across the range.  |

| Operator | Explanation                |
|----------|----------------------------|
| =        | Equal to.                  |
| >        | Greater than.              |
| <        | Less than.                 |
| >=       | Greater than or equal to.  |
| <=       | Less than or equal to.     |
| <>       | Less than or greater than. |

IF Functions

|    | A                   | B        | C           | D         |
|----|---------------------|----------|-------------|-----------|
| 1  | <b>School Tests</b> |          |             |           |
| 2  |                     |          |             |           |
| 3  | Surname             | Forename | Test result | pass/fail |
| 4  | Black               | Emma     | 45          |           |
| 5  | Brown               | Simon    | 55          |           |
| 6  | Green               | Louise   | 66          |           |
| 7  | Lilac               | Maddy    | 86          |           |
| 8  | Orange              | Daniel   | 21          |           |
| 9  | Tan                 | Tom      | 100         |           |
| 10 | White               | Jack     | 37          |           |
| 11 |                     | Average  | 59          |           |

**=IF(C4>=50, "Pass", "Fail")**  
IF the value in cell C4 is greater than, or equal to the value of 50. "Pass" will be displayed in cell D4. Otherwise it will display "Fail".

Re-write the formula for D5. This time the pupil will only pass if the match or get higher than the class average.  
**=IF(C5>=C11, "Pass", "Fail")**

## Topic Area 1: Planning and designing the spreadsheet solution

| MB1: 1–3 marks                                                                                                                                                                        | MB2: 4–6 marks                                                                                                                                                                               | MB3: 7–10 marks                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Limited</b> use of design tools and features used to plan the solution, which are under-utilised for the intended purpose.                                                         | <b>Adequate</b> use of design tools and features used to plan the solution, which are mostly utilised for the intended purpose.                                                              | <b>Effective</b> use of design tools and features used to plan the solution, which are fully utilised for the intended purpose.                                                           |
| MB1: 1–4 marks                                                                                                                                                                        | MB2: 5–8 marks                                                                                                                                                                               | MB3: 9–13 marks                                                                                                                                                                           |
| <p><b>Limited</b> functional design of spreadsheet solution.</p> <p><b>Limited</b> design of system output(s) produced.</p> <p><b>Limited</b> design of Human Computer Interface.</p> | <p><b>Adequate</b> functional design of spreadsheet solution.</p> <p><b>Adequate</b> design of system output(s) produced.</p> <p><b>Adequate</b> design of the Human Computer Interface.</p> | <p><b>Effective</b> functional design of spreadsheet solution.</p> <p><b>Effective</b> design of system outputs produced.</p> <p><b>Effective</b> design of Human Computer Interface.</p> |



## Year 10 IT -*Creating a solution for a client*

| MB1: 1–3 marks                                                                                                                                                                                                                                                                                                            | MB2: 4–6 marks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | MB3: 7–10 marks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Limited</b> use of tools and techniques used to create the solution which are under-utilised for the intended purpose.                                                                                                                                                                                                 | <b>Adequate</b> use of tools and techniques used to create the solution which are mostly utilised for the intended purpose.                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Effective</b> use of tools and techniques used to create the solution which are fully utilised for the intended purpose.                                                                                                                                                                                                                                                                                                                                                                                            |
| MB1: 1–4 marks                                                                                                                                                                                                                                                                                                            | MB2: 5–8 marks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | MB3: 9–13 marks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p>The solution allows <b>limited</b> interaction between user and spreadsheet to meet the needs of the scenario.</p> <p>The solution contains <b>inefficient</b> processes that affects the accuracy and quality of the data produced.</p> <p>The information presented is <b>limited</b> in relevance and accuracy.</p> | <p>The solution allows <b>adequate</b> interaction between the user and spreadsheet to meet the needs of the scenario.</p> <p>The solution contains some <b>inefficiencies</b>, but these do not affect the accuracy and quality of the data produced.</p> <p>The information presented is <b>partly</b> relevant and clear, but is open to misinterpretation.</p> <p>Data integrity is preserved using a <b>limited range</b> (one or two) tools and techniques.</p> <p>Future predictions are <b>partially</b> generated using the solution developed.</p> | <p>The solution allows <b>effective</b> interaction between the user and spreadsheet to fully meet the needs of the scenario.</p> <p>The solution contains <b>efficient</b> processes that generates accurate and high-quality data.</p> <p>The information presented is <b>fully</b> relevant to the scenario needs and clear in its message.</p> <p>Data integrity is preserved using a <b>range</b> of tools and techniques.</p> <p>Future predictions are <b>fully</b> generated using the solution developed.</p> |



## Year 10 IT *Creating a solution for a client*

| MB1: 1–2 marks                                                | MB2: 3–4 marks                                                                             | MB3: 5–7 marks                                                                                  |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>Limited</b> technical and/or usability testing undertaken. | <b>Adequate</b> technical and usability testing undertaken with results partly documented. | <b>Effective</b> technical and usability testing undertaken with results thoroughly documented. |

### Topic Area 4: Evaluating the spreadsheet solution

| MB1: 1–2 marks                                                                                                   | MB2: 3–4 marks                                                                                                                | MB3: 5–7 marks                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Basic</b> evaluation which states which parts of the solution meet the client requirements.                   | <b>Adequate</b> evaluation which describes the effectiveness of the solution to meet the client requirements.                 | <b>Comprehensive</b> evaluation which explains the effectiveness of the solution to meet the client requirements.                 |
| <b>Basic</b> evaluation which states which parts of the Human Computer Interface worked well/ did not work well. | <b>Adequate</b> evaluation which describes the effectiveness of the Human Computer Interface to meet the client requirements. | <b>Comprehensive</b> evaluation which explains the effectiveness of the Human Computer Interface to meet the client requirements. |



### 6.1 Selection and justification of the appropriate software tools and techniques to process data to meet the defined objectives in a given context.

When data has been collected, it needs to be processed. There are two main tools that can be used to process data. These are:

- Spread sheets- formula, worksheet, referencing, macros
- Databases- tables, records, queries, validation, reports



### 6.2 Selection and justification of the appropriate tools and techniques to present information, including the purpose and suitability and the advantages and disadvantages.

When data has been stored and processed, the results have to be presented. Which tool is used to present the information will depend on:

- What information is to be presented
- How it is to be presented
- The objectives defined in the project life cycle



Other methods to present data/ information are:

- Word processing
- Desktop publishing
- Power point presentation

Considerations also need to be made regarding:

- The target audience
- Content limitations
- The availability of information
- The impact of distributing the information
- The distribution channel- Messaging services, Websites, VoIP, Multimedia, Cloud-based and Mobile apps
- The presentation methods- Report, Presentation, Charts, Tables, Integrated document and End-user documentation

### 6.3 The resources required for presenting information

- Hardware requirements
- Software requirements
- Connectivity requirements
- Consideration of the user's requirements and your audience



### Summary

A **database** is a way of storing information in an organised, logical way. **Validation and verification** are two ways to check that the data entered into a computer is correct. Data entered incorrectly is of little use.

There are two main methods of verification:

**Double entry** - entering the data twice and comparing the two copies. This effectively doubles the workload, and as most people are paid by the hour, it costs more too.

**Proofreading data** - this method involves someone checking the data entered against the original document. This is also time-consuming and costly.

**Validation** is an automatic computer check to ensure that the data entered is sensible and reasonable. It does not check the accuracy of data.

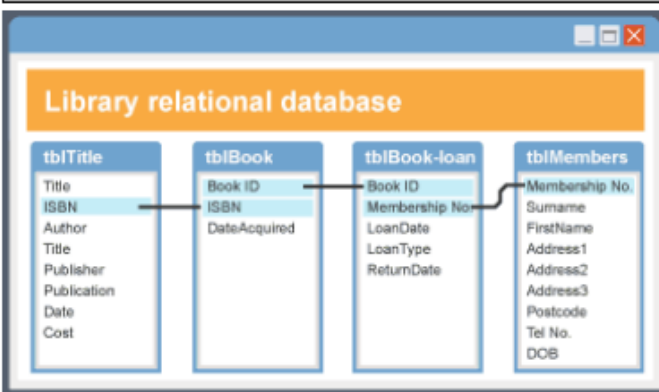
### Relational databases

A relational **database** has more than one table and the tables are linked using **key fields**. For example, a library database could have three tables:

**Customer** - when a customer joins the library a **record** is created. It stores their details such as their first name and surname and includes a unique Customer ID.

**Book** - each book in the library has a record. It stores details about the book, such as the author and title and includes a unique book ID.

**Lending** - when a customer borrows a book, the lending table stores the customer's unique ID and the book's unique ID in a record. The record could also include additional information such as when the book was borrowed and when it's due back.



### Why use a database?

- ◆ Databases can store very large numbers of records efficiently (they take up little space).
- ◆ It is very quick and easy to find information.
- ◆ It is easy to add new data and to edit or delete old data.
- ◆ Data can be searched easily, e.g. 'find all Ford cars'.
- ◆ Data can be sorted easily, for example into 'date first registered' order.
- ◆ Data can be imported into other applications, for example a mail-merge letter to a customer saying that an MOT test is due.
- ◆ More than one person can access the same database at the same time - multi-access.

### Validation

For example, a secondary school student is likely to be aged between 11 and 16. The computer can be programmed only to accept numbers between 11 and 16. This is a **range check**.

### Types of validation

There are a number of validation types that can be used to check the data that is being entered.

- ◆ **Lookup table**
- ◆ **Range check**
- ◆ **Spell check**
- ◆ **Format check**
- ◆ **Presence check**
- ◆ **Length check**

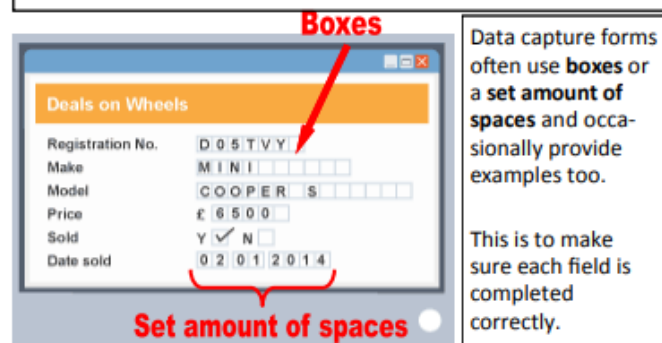
### Key Vocabulary

|                           |                                                                                                                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>Criteria</b>           | A set of rules or conditions that must be met. Often used in searches.                                                         |
| <b>Database</b>           | A data store designed in an organised way, making it easier to search for the information you need.                            |
| <b>Field</b>              | An element of a database record in which one piece of information is stored. For example 'name' in an electronic address book. |
| <b>Front-end</b>          | The part of an application seen and used by the end user.                                                                      |
| <b>Flat-file database</b> | A database in which all the data is stored in a single table is known as a flat file database.                                 |
| <b>Key Field</b>          | A unique identifier for a database record or table entry.                                                                      |
| <b>Multi-Access</b>       | A system that can be used by several users simultaneously via a local area network (LAN).                                      |
| <b>Query</b>              | A search or question performed inside a database.                                                                              |
| <b>Record</b>             | All of the data relating to one entity in a database.                                                                          |
| <b>Validation</b>         | Checking input data is sensible and in the right format.                                                                       |
| <b>Verification</b>       | Verification is performed to ensure that the data entered exactly matches the original source.                                 |

## Data capture

Before setting up a database the data must be collected. This can be done using a data capture form.

A **data capture form** is designed to collect specific data.



**Boxes**

**Set amount of spaces**

Data capture forms often use **boxes** or a **set amount of spaces** and occasionally provide examples too.

This is to make sure each field is completed correctly.

# Year 11 IT

## Theory 1

### LO4: LO4: Understand the factors to be considered when collecting and processing data and storing data/information

| Malware Type        | Why/how it's used                                                                                                                                                                  | How to mitigate                                                                                                                                                                                                                               |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Adware</b>       | Generates revenue for its author; this is any software that shows adverts such as pop-ups.                                                                                         | Install, run and update a security software package. Do not run software/click links from unknown sources.                                                                                                                                    |
| <b>Bot</b>          | Takes control of a computer system; this is a type of malware that works without a user's knowledge. It can result in a 'botnet', which is a network of infected computer systems. |                                                                                                                                                                                                                                               |
| <b>Bug</b>          | Connected to flaws in software; usually the result of human error during coding of the software.                                                                                   | Check for and install any patches that are released from software vendors.                                                                                                                                                                    |
| <b>Ransomware</b>   | Holds data on a computer system to ransom; usually encrypts files and displays a message to the user. It spreads like a worm.                                                      | Install, run and update a security software package. Do not run software/click links from unknown sources.                                                                                                                                    |
| <b>Rootkit</b>      | Designed to remotely access a computer system; allows a remote cyber attacker access to steal/modify data and/or configuration on a computer system.                               | Difficult to detect as they are not usually detected by security software; regular software update, keeping security software up to date and not downloading suspicious files are the only ways to trying to avoid a rootkit being installed. |
| <b>Spyware</b>      | Collected data from infected computers; usually hidden from the user and installed without the user's knowledge.                                                                   | Install, run and update a security software package. Do not run software/click links from unknown sources.                                                                                                                                    |
| <b>Trojan horse</b> | Standalone malicious program designed to give full control of a PC to another PC; can be hidden in valid programs.                                                                 |                                                                                                                                                                                                                                               |
| <b>Virus</b>        | Attempts to make a computer system unreliable; replicates itself from computer to computer.                                                                                        |                                                                                                                                                                                                                                               |
| <b>Worm</b>         | Standalone program that replicates itself to other computers; almost always cause harm to networks even if only by using bandwidth.                                                |                                                                                                                                                                                                                                               |

### LO4: Understand the factors to be considered when collecting and processing data and storing data/information

**RFID:** Radio Frequency Identification Tags can use radio frequency to transfer data from the tags to a computer system, for example to allow access to a room.

**Access rights:** Control over who has access to a computer system, folder, files, data and/or information.

**Permissions:** A set of attributes that determine what a user can do with files and folders, for example to read, write, edit or delete.

**Encryption software:** Software that is used to encrypt a file or data.

**Encryption code/key:** A set of characters, phrase or numbers that is used when encrypting or decrypting data or a file.

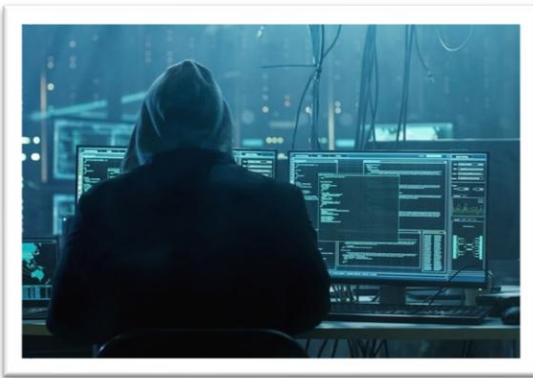




## Current relevant IT legislation:

|                                               |                                                                                                                                                                                                  |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>GDPR 2018</b>                              | Aims to protect the rights of the owners of data - the data subjects. It does not protect the data itself.                                                                                       |
| <b>Copyright, Design and Patents Act 1998</b> | Makes it illegal to copy a work without permission from the owner of copyright holder. It is also illegal to make unauthorised copies of software.                                               |
| <b>Computer Misuse Act 1990</b>               | Aims to protect data and information that is held on computer systems.                                                                                                                           |
| <b>Health and Safety at Work Act 1974</b>     | Provides guidance to employers and employees when working with computer systems. The act also defines actions that an employer should take to protect employees who work computers in their job. |
| <b>Freedom of Information Act 2000</b>        | Provides public access to information held by public authorities.                                                                                                                                |

**Public authorities:** Include government departments, the NHS, state schools and the police force.



## THE POSTURE TO ADOPT WHILE USING A PC



## Hacking

3 main types of hacking:

- **White hat hacking:** The hacker is given permission to hack into systems to identify any loopholes
- **Grey hat hacking:** The hacker hacks into computer systems for fun
- **Black hat hacking:** The hacker hacks into a computer system with malicious intent.

**(DDOS) Distributed denial of service:** is an attempt to make a computer or network system unavailable

**Pharming:** is a cyber security attack that tries to redirect visitors from a genuine website to a fake one.

### Impacts of a cyber security attack

Identify theft - personal details are stolen

Denial of service attack - authorized users unable to access a website



## Impacts of a cyber security attack

**Data destruction** - data is destroyed by a cyber security attacker

**Data manipulation** - data is edited

**Data theft** - steals data from a person

## Consequences of a Cyber security attack

- Financial loss
- Loss of reputation

## Prevention measures

- Bio metric protection measures
- Access rights and permissions
- Anti virus software
- Encryption
- Secure backup
- Overwriting data
- Magnetic wipe
- Physical destruction

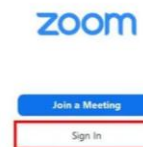


iCloud

## L06: Understand the different methods of processing data and presenting information

**Distribution channel:** The methods that can be used to share information by individuals

- Email
- Social Media
- Websites
- Intranet - private network
- Internet
- VoIP enables voice calls to be made over the internet
- Multimedia - text, sound, video and graphics
- Cloud
- Mobile apps
- Integrated document - document containing components from other documents
- End user documentation - User guide



# Augmented Reality

| 1.1. Purposes and uses of AR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                  |                                                                                                                                                                                                       |                                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| What AR is and its purpose                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | The sectors where AR can be used |                                                                                                                                                                                                       | Uses of AR                                                                                                                                                                                                                           |
| <ul style="list-style-type: none"> <li>A collection of technologies that are used to combine computer-generated information with the user's natural senses.</li> <li>AR is a way of viewing the real-world environment with an overlay of computer-generated inputs, such as audio, video, graphics, photos and text.</li> <li>AR is a combination of the real world seen by the user and a computer-generated virtual world that augments the entire scene while also providing additional information.</li> <li>The purpose of AR is that the user cannot tell the difference between the real world and the virtual augmentation of it.</li> </ul> | Architecture                     | <ul style="list-style-type: none"> <li>Buildings</li> <li>Renovations</li> <li>Home improvements</li> <li>Gardens</li> <li>Outdoor spaces</li> </ul>                                                  | <b>Training</b> <ul style="list-style-type: none"> <li>Increase engagement</li> <li>Reduce costs</li> <li>Increased safety</li> <li>Assists with cognitive barriers</li> <li>Available on demand</li> <li>More motivating</li> </ul> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Education                        | <ul style="list-style-type: none"> <li>Virtual examples of subjects such as history</li> <li>Professional training for industries such as aviation, aerospace, healthcare and the military</li> </ul> |                                                                                                                                                                                                                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Entertainment                    | <ul style="list-style-type: none"> <li>Gaming</li> <li>Travel and tourism</li> <li>Art and museum galleries</li> <li>Theatre</li> <li>Music</li> <li>Television</li> </ul>                            | <b>Virtual tours</b> <ul style="list-style-type: none"> <li>Look around</li> <li>Walk up to objects</li> </ul>                                                                                                                       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Retail                           | <ul style="list-style-type: none"> <li>'Try-before-you-buy' experiences</li> </ul>                                                                                                                    | <b>Visualisation designs, interiors and concepts</b> <ul style="list-style-type: none"> <li>Create 3D dynamic models</li> <li>Full-scale models</li> <li>Provides the opportunity for a more collaborative design process</li> </ul> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Lifestyle                        | <ul style="list-style-type: none"> <li>Social media such as Snapchat</li> <li>Virtual makeup</li> </ul>                                                                                               | <b>Marketing</b> <ul style="list-style-type: none"> <li>Unique experiences for customers</li> <li>Available on smartphones</li> <li>Enhance branding materials such as business cards and brochures</li> </ul>                       |



# Augmented Reality

## 1.2. Types of AR and user interaction

| Types of AR                             |                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Object recognition/ marker-based</b> | Uses markers, such as QR codes or a logo, to trigger an augmented experience.                                                                                                                                                                                                                                                         |
| <b>Markerless</b>                       | Enables the user to decide where to put the virtual object. It relies on the device's hardware, including the camera, GPS, digital compass and accelerometer to gather the information needed for the AR software to work as required. <i>E.g.</i> Pokémon Go.                                                                        |
| <b>Location-based</b>                   | The AR content is tied to a specific location. <i>E.g.</i> Use the smartphone's camera to view the street and give information about nearby businesses.                                                                                                                                                                               |
| <b>Superimposed</b>                     | An object in the physical world is recognised by the superimposition AR. It is then enhanced to provide an alternative view. <i>E.g.</i> Visualising what a new sink will look like in the kitchen.                                                                                                                                   |
| User interaction/layers                 |                                                                                                                                                                                                                                                                                                                                       |
| <b>User interaction</b>                 | <ul style="list-style-type: none"> <li>– AR headset</li> <li>– Gestures for mobile devices</li> <li>– Voice interaction</li> </ul>                                                                                                                                                                                                    |
| <b>Static or interactive</b>            | <ul style="list-style-type: none"> <li>– Static: if the digital content in an AR app is text, visual cues or 3D models (whose appearance does not alter during interaction with the user).</li> <li>– Interactive: the digital content such as animation or video changes its appearance during interaction with the user.</li> </ul> |

## 1.3. Devices used with AR

|                                        |                                                                                                                                               |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Smartphones</b>                     | Portable.                                                                                                                                     |
| <b>Tablets/phablets</b>                | More computing power and larger display compared to a smartphone.                                                                             |
| <b>AR headsets</b>                     | They cover the eyes for a more immersive experience. Allows viewers to see images that are imposed on the real-world environment of the user. |
| <b>AR glasses</b>                      | Use a front-facing camera to add 3D images, animations and videos to the user's real-world environment.                                       |
| <b>Kiosk systems/ AR installations</b> | Used by museums, art galleries and retailers. They have a higher graphic quality.                                                             |
| <b>Desktop computers/ Laptops</b>      | Desktop AR is a technology that enables laptops and PCs to create an illusion of 3D objects that float in front of the screen.                |

