

ZNOTES.ORG



UPDATED TO 2020 SYLLABUS

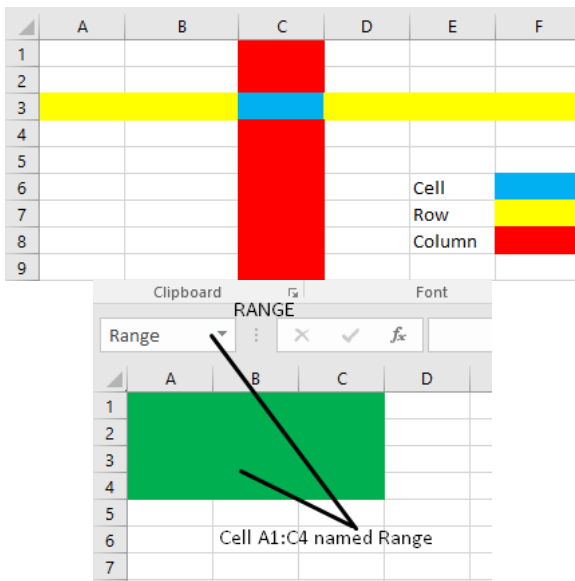
**CAIE AS LEVEL
IT (9626)**

SUMMARIZED NOTES ON THE PRACTICAL SYLLABUS

1. Spreadsheets

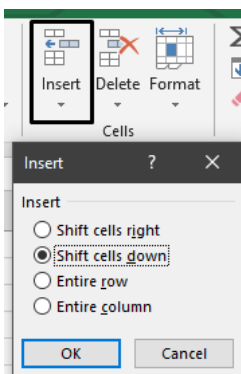
1.1. Create a Spreadsheet

Term	Definition
Cell	A rectangle within a spreadsheet where data can be positioned
Formula	A mathematical calculation
Orientation	The direction of text, for example horizontal or vertical
Alignment	Positioning text so that it is in line, for example on the left, right or centre
Function	A ready-made formula representing a complex calculation
Validation	The process of checking if data matches specific rules
Verify	To check that data matches the original data
Row	A horizontal set of cells
Column	A vertical set of cells
Range	A set of one or more cells referenced by a name
Worksheet	A set of rows and columns
Workbook	A set of one or more worksheets

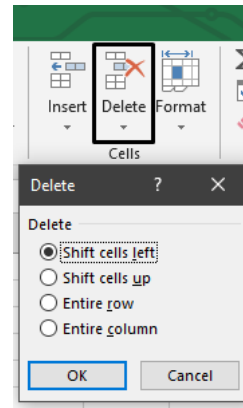


1.2. Manipulating Rows and Columns

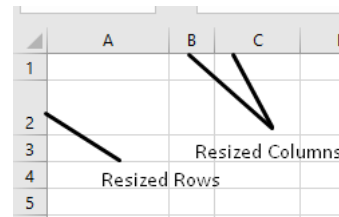
- Rows and Columns can be added



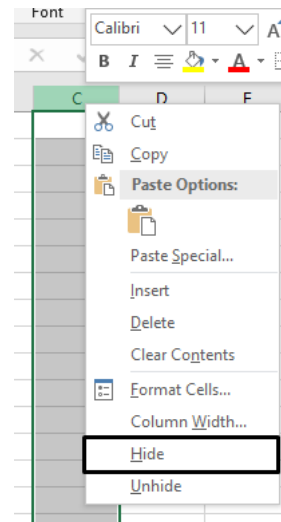
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- Resized

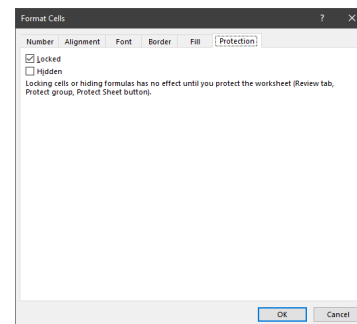


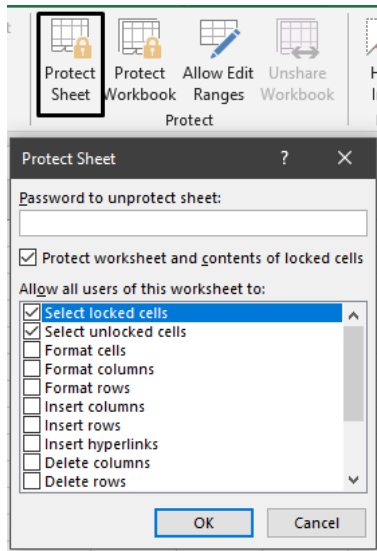
- Hidden



1.3. Spreadsheet Security

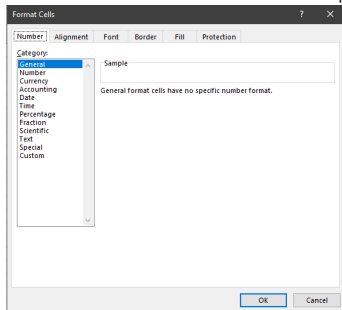
- Different parts of the spreadsheet can be secured depending on the software being used. This allows developers to:
 - Prevent Individual worksheets from being removed
 - Prevent new worksheets from being added
 - Prevent changes being made to certain data, and select certain individual cells, rows or columns.
 - Protect the worksheet, but still allow users to enter data into certain cells.
 - Prevent formulas from being seen and/or changed.



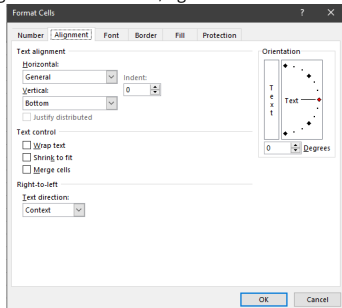


1.4. Format a spreadsheet

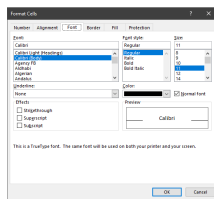
- Format Data Type- The cells in a sheet can be formatted to be in a specific data type



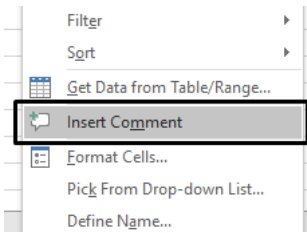
- Change Text Orientation and Alignment- The text in a cell can oriented to either diagonal or vertical, and be aligned either to the left, right or centre



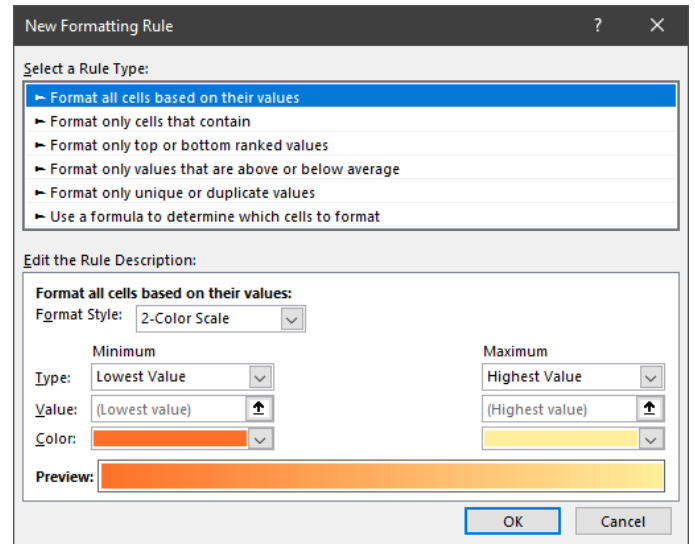
- Emphasis Certain Cells- Certain cells can be formatted to stand out.



- Comments can be added.

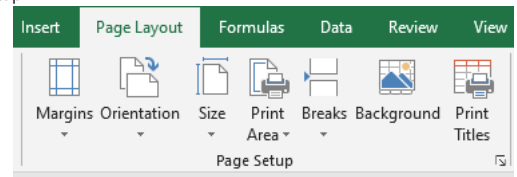


- Conditional Formatting- Cells can be formatted based upon certain conditions being met.

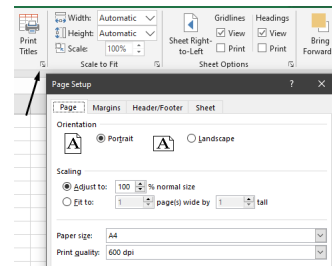


- Page Formatting

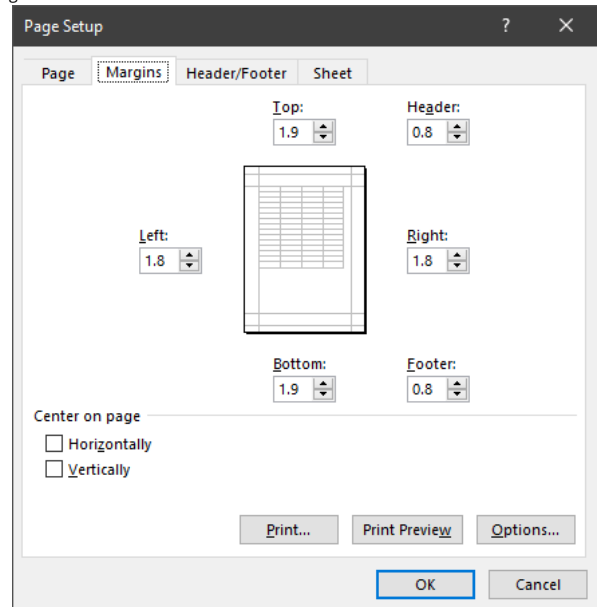
- Page Setup



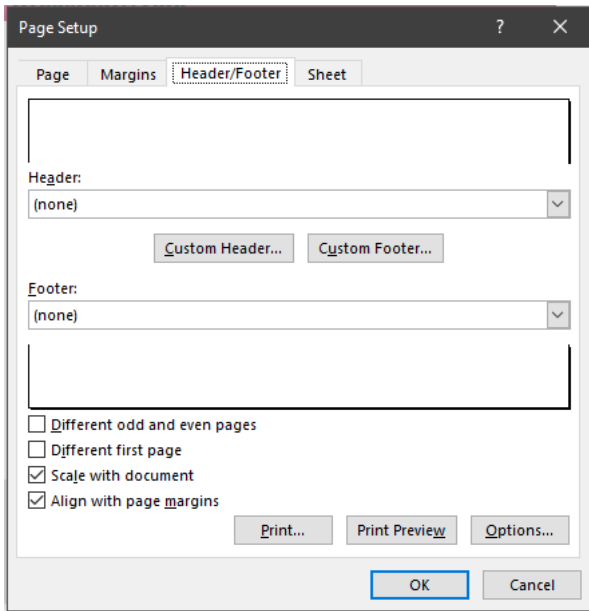
- Fit to Page



- Margin



- Header and Footer



1.5. Create Formulae and Functions

- **Formulae**- A formula uses basic arithmetic calculations, which use +, -, * and /.

	A	B	C	D
1	22	23		=A1+B1
2				=A1-B1
3				=A1*B1
4				=A1/B1
5				

- **Relative Cell Referencing**- RCR is used when you want the content of a cell change based on its relation to its row and column position.

	A	B	C
1	Cost	Quantity	Total
2	12.5	1	=A2*B2
3	45.75	3	=A3*B3
4	31.25	7	=A4*B4
5			
6			

- **Absolute Cell Referencing**- ACR is used when you do not want a cell reference to change when other cells are filled in, or when replicating formulae.

To stop a row from being changed, add \$ before the row number

	A	B	C
1	Name	Grade	Percentage
2	Max Score	100	
3	Max	82	=B3/B\$2
4	Junior	67	=B4/B\$2
5	Baljeet	99	=B5/B\$2
6	Michael	89	=B6/B\$2
7			

To stop a column from being changed, add \$ before the column letter

	January	February	March	April
11	Month			
12	Salary	200	=B12*\$B14	=C12*\$B14
13				
14	Increases each month by	2		
15				

To stop both column and row changing, a \$ must be put before the column letter and

row number

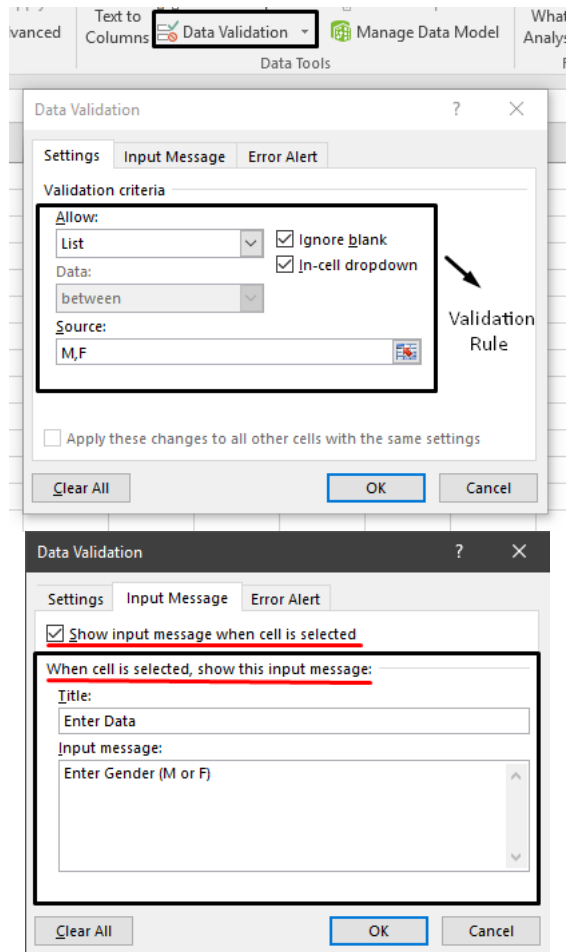
	A	B	C	D
1	Cost	Quantity	Tax	
2	2.35	2	=(A2*B2)*\$D\$8	
3	2.65	3	=(A3*B3)*\$D\$8	
4	7.45	4	=(A4*B4)*\$D\$8	
5	3.35	6	=(A5*B5)*\$D\$8	
6	2.35	4	=(A6*B6)*\$D\$8	
7				
8			Tax rate	7.5%
9				
10				

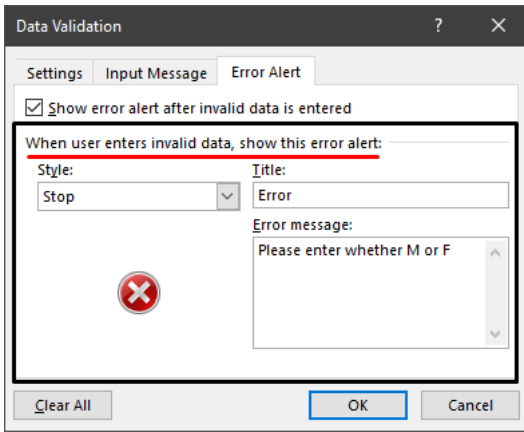
- **Functions**- They are ready-made formulae representing a complex calculation.
 - Summary Functions

Function	Purpose	Example										
SUM	Calculates the total of values within a range	<table border="1"> <tr><th colspan="2">A</th></tr> <tr><td>1</td><td>=SUM(B1,C1,D1)</td></tr> <tr><td>2</td><td></td></tr> <tr><td>3</td><td></td></tr> <tr><td>4</td><td></td></tr> </table>	A		1	=SUM(B1,C1,D1)	2		3		4	
A												
1	=SUM(B1,C1,D1)											
2												
3												
4												
AVERAGE	Calculates the average of values within a range	<table border="1"> <tr><td>3</td><td>=AVERAGE(B1,C1,D1)</td></tr> <tr><td>4</td><td></td></tr> </table>	3	=AVERAGE(B1,C1,D1)	4							
3	=AVERAGE(B1,C1,D1)											
4												
MINIMUM	Calculates the smallest value within a range	<table border="1"> <tr><td>5</td><td>=MIN(B1,C1,D1)</td></tr> </table>	5	=MIN(B1,C1,D1)								
5	=MIN(B1,C1,D1)											
MAXIMUM	Calculates the largest value within a range	<table border="1"> <tr><td>5</td><td>=MAX(B1,C1,D1)</td></tr> </table>	5	=MAX(B1,C1,D1)								
5	=MAX(B1,C1,D1)											

1.6. Validation rules

Validation rules can be applied to data in a spreadsheet. If the data passes the validation rule, it will be accepted. However if it fails the rule, it will be rejected and an error message will be shown.





1.7. Validation applied to a spreadsheet

There are different types of test data:

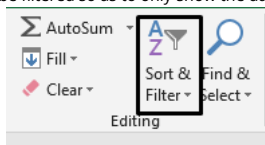
Type of test data	Purpose
Normal	Data that is acceptable/ valid, that will pass the validation test
Abnormal	Data that is at the limits of acceptability/validity, and will just pass the validation rule
Extreme	Data that is outside the limits of acceptability/validity, and will not pass the validation rule

1.8. Test a spreadsheet model and evaluate the effectiveness of test plans for a spreadsheet model

- To test formulae and functions
 - The Input data to be used for calculation should be identified
 - The Output data expected should be identified
 - The expected Output should be calculated with traditional methods and then compared to the result from the spreadsheet
 - The Worksheet containing the Input and Output data should be identified as they may be on different worksheets
 - Cell and Worksheet protection and Conditional Formatting can be tested
 - A good range of Input values should be used, with both types of extreme values
 - Invalid Inputs should only be used if Validation Rules are set up

1.9. Filter data

- Data in a spreadsheet can be filtered so as to only show the data that is required

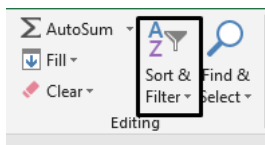


- Text Filters

Filter	Purpose	Example
Contains	Selects data that in a column that contains specific text	Contains "AB" will only show data which contains the letters A and B
Starts with	Selects data that starts with the text specified	Starts with "AB" will only show data that starts with the letters A and B
Ends with	Selects data that ends with the text specified	Ends with "AB" will only show data that ends with the letters A and B

1.10. Sorting Data

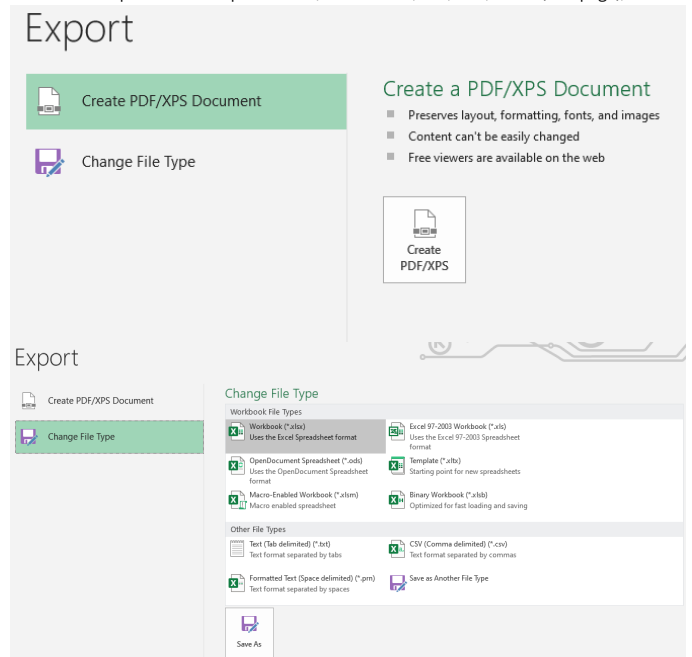
- Data in a spreadsheet can sorted to either be ascending or descending.



1.11. Import and export

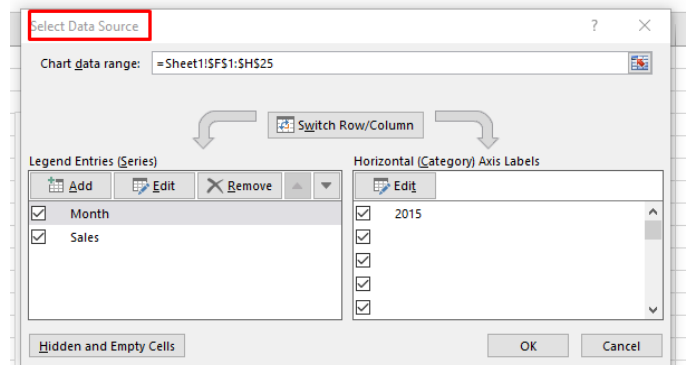
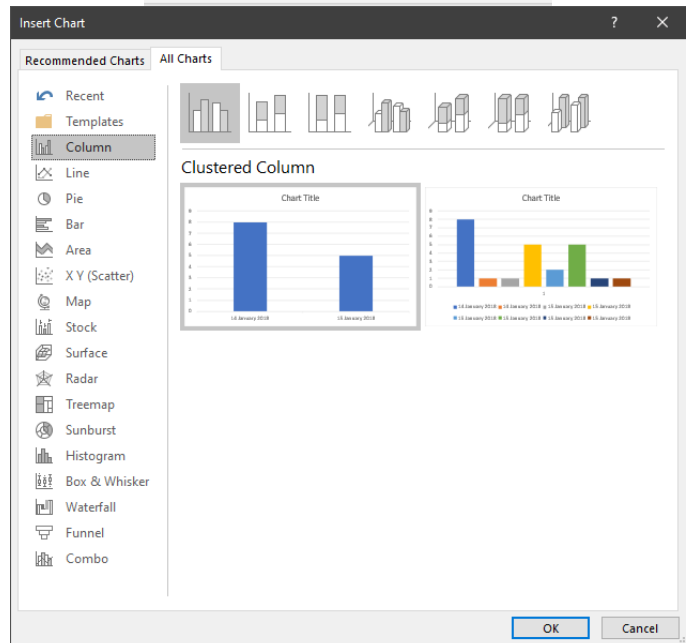
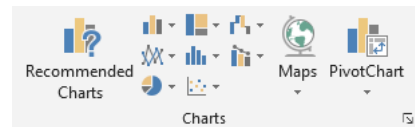
- Data can be imported from other formats such as CSV (Comma Separated Values) file, TXT (text) file, or from another database. It is important that you select the option to show all the files when importing a file.

- Data can be exported in multiple formats, such as CSV, TXT, PDF, HTML (Webpage), etc.

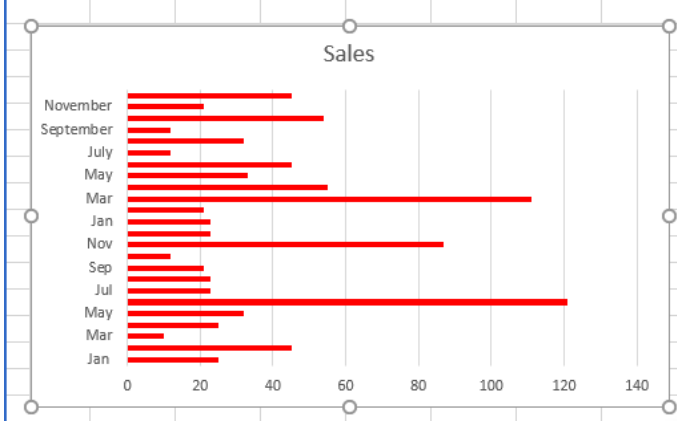


1.12. Graphs and charts

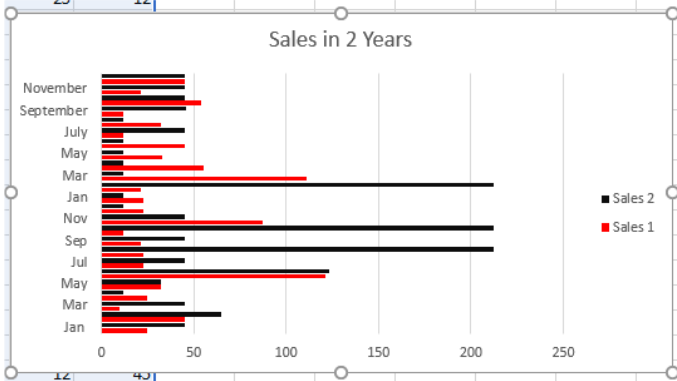
- Graphs and charts are used in a worksheet to present data in a format that allows users to compare values.



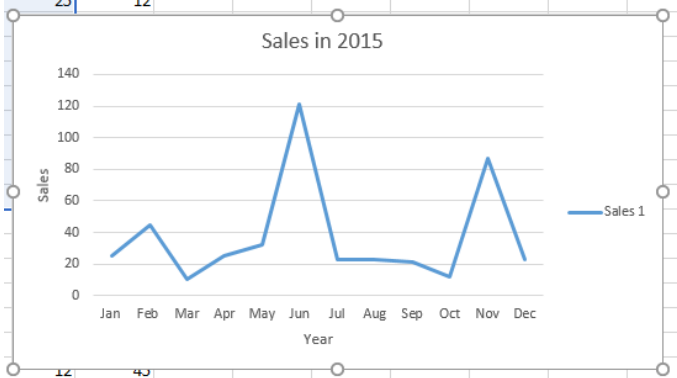
- **Bar/Column chart-** Used to show a single series of data in columns or rows.



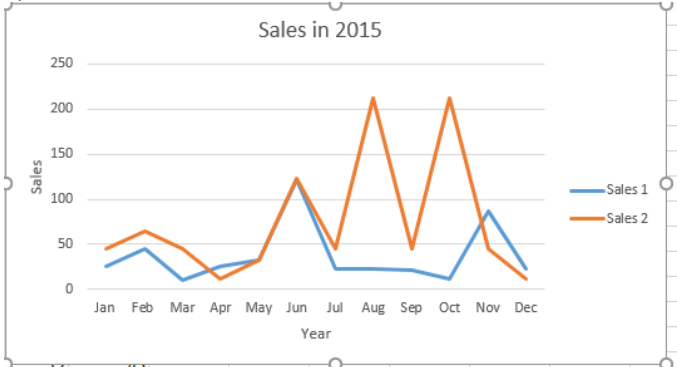
- **Comparative bar/ Column chart-** Used to compare more than one series of data in columns or rows.



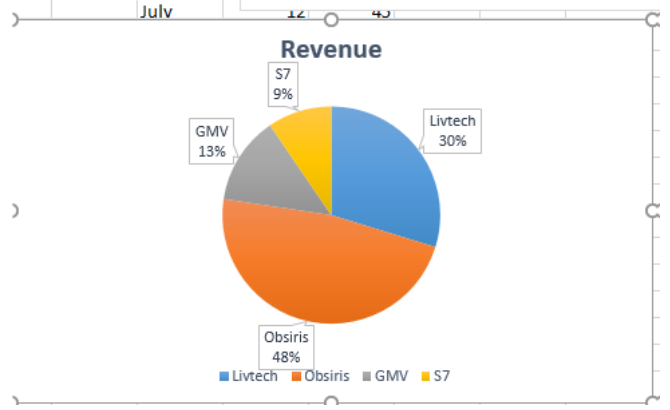
- **Line Graph-** Used to show how a single series of data changes over a period of time.



- **Comparative line graph-** Used to compare how more than one series of data changes over a period of time.

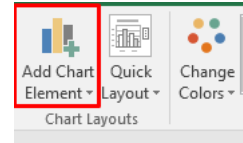


- **Pie chart-** Used to show the proportion that is used by each item of data.



1.13. Create a graph or chart

- When creating a graph or chart, they should be labelled appropriately.



Label	Purpose
Title	A brief overview of what the graph chart is showing
Legend	A key to show what the colours used represent
Value axis	Each of the axes (x and y) should include the values including the any units
Category axis	Each of the axes should include a title to state what the data represents
Percentages	When using a pie chart , the percentages may need to be displayed for each segment
Segmented labels	Instead of legend, each segment in a pie chart could be labelled with its description
Segmented value	As well as, or instead of the percentage, each segment in a pie chart could be labelled with its quantity
Scale	The interval between each value on an axis
Axis scale maximum	The maximum value to be used on an axis
Axis scale minimum	The minimum value to be used on an axis

2. Database And File Concepts

2.1. Create a database

Term	Definition
Database	A structured method of storing data
Table	A set of similar data
Record	A common word for entity
Entity	A set of data about one thing
Attribute	A category of information within an entity
Field	A common word for attribute
Primary key	A field that contains the unique identifier for a record
Foreign key	A field in a table that refers to primary key in another table
Normal form	The extent to which a database has been normalized
Index	A list of keys or keywords which identify a unique record and can be used to search and sort records more quickly
Entity relationship diagram	A diagram that represents the relationship between entities
Flat file	A database stored in a single table
Compound key	Two or more fields that form a primary key
Referential integrity	Data in the foreign key of the table on the many side of a relationship must exist in the primary key of the table on the one side of the relationship
Query	A question used to retrieve data from database
Parameter	Data used within the criteria for a query
Database Management System	Software used to manage the database

2.2. Data types and field sizes

- Each field in a table will have data type assigned to it
 - (Short/Long)Text**- Used for titles, names, descriptions, etc. Short text (or Alphanumeric) can hold a maximum of 255 characters, while Long text can hold more than 255 characters (60,000 and upwards). Can include numbers, letters and symbols.

Field Name	Data Type
User ID	Short Text
Description	Long Text

- Number (Integer/Decimal)** - Used for numeric values. Integer is used in fields which only contain whole numbers, while Decimal is used for decimal values.

Field Name	Data Type
Field Size	Integer

- Date/Time**- Used to store date and time values. The format of the data can be specified.

Field Name	Data Type
Format	General Date

- Currency**- Used for Currencies. Depends on the regional setting on the Computer.

Field Name	Data Type
Price	Currency

- Yes/No (Boolean)** - Used when the data need to be either yes or no.

Field Name	Data Type
Premium membership	Yes/No

- AutoNumber**- Used to generate a value (usually numeric) that is unique to each record. They are used in Primary key fields and this field is used to distinguish between each record.

Field Name	Data Type
User ID	Short Text

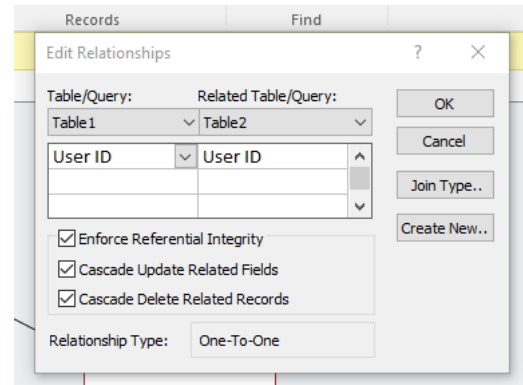
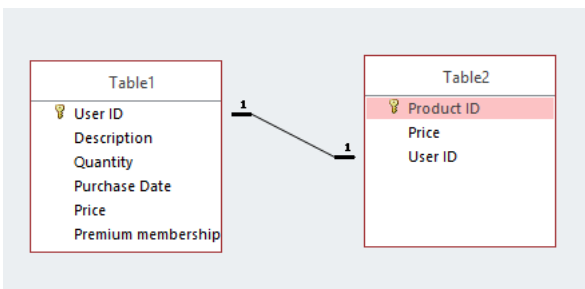
Primary Key field

- Field size**- Each field will have a maximum field size; some field sizes can also be specified

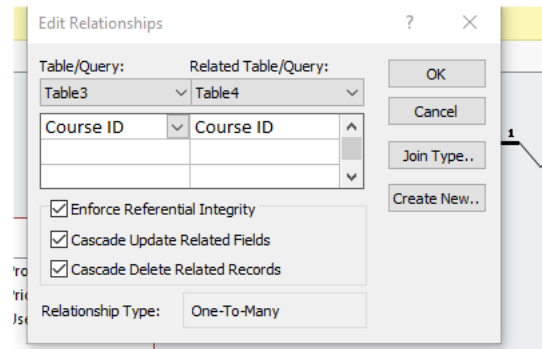
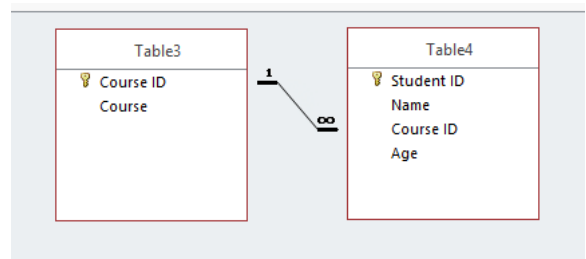
Field Name	Data Type
Field Size	255

2.3. Relationships

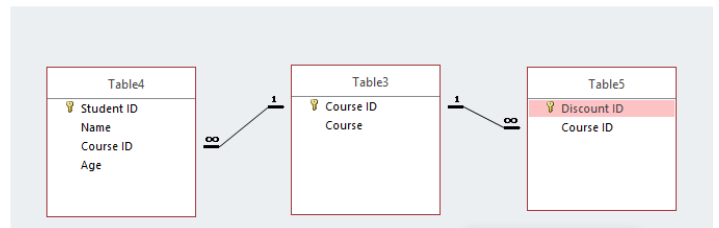
- Database relationships can be used to connect entities together
- One-to-one Relationship**
 - In this relationship, each record in one table is connected to one record in another table
 - Each foreign key value will only be linked to one primary key values and Vic versa.
 - The data type and field size must be the same for the two fields
 - Only data items that is present in the primary key can be used in foreign key (**Referential Integrity**)
 - Make sure the index for both fields is set to **Yes (No Duplicates)**



- One to many Relationship**
 - In this relationship, each record in one table is connected to many records in another table
 - The foreign key will be on the many side of the relationship while the primary key will be on the one side of it
 - The data type and field size must match
 - Only data present in the primary key (one side) of the relationship can be present in the foreign key (many side)



- Many-to-many Relationships**
 - These are basically two sets of One-to-many relationships



2.4. Difference between flat file and relational database

- Flat File**- A database that consists of a single table, having only fields and records.
 - Advantages**
 - Flat files are easy and fast to set up
 - Since there is only a single file, it is easy to share, store and backup
 - New columns can be added easily
 - All the required data is in a single file
 - Disadvantages**
 - Since all the data is in one table, there can be a lot of redundant data that can take up additional memory
 - Making updates can be tricky and time consuming, and if there are data inconsistencies errors can occur
 - When running a query, the whole database must be loaded and searched
- Relational database**- A database that's consists of multiple tables, connected together with multiple relationships.
 - Advantages**
 - Redundancy is reduced and less unnecessary space is taken up

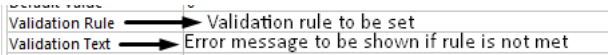
- When running a query, only the required tables need to be loaded
- Less errors occur as there will be less inconsistencies
- The database is more organized and the data can be managed more properly
- Security can be applied to separate tables, so different user can access different tables
- Data can be sorted and searched efficiently, unlike a flat file
- Detailed reports can be produced from a relational database
- Disadvantages**
 - Takes time and some understanding of relationships to set up
 - Processing may take some extra time compared to a flat file
 - Since there are multiple table, if one or more tables are lost, errors can occur
 - They are very hard to share as there are multiple tables

2.5. Referential integrity

- Referential integrity-** It exists when data in the foreign key of the table on the many side of a relationship exists in the primary key of the table on the one side of the relationship.
- If the related records does not exist, than the database will prevent data from being entered in the foreign key.
- It is necessary to maintain the accuracy of the data within the database.

2.6. Validation and verification

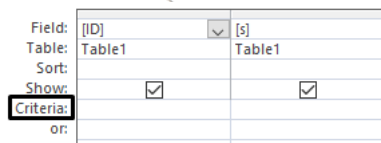
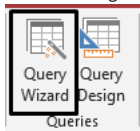
- Validation- Validation rules can be applied to data in the database
- Types of validation
 - Lookup in list
 - Range
 - Data type
 - Format
 - Length
 - Presence



Rule	Type	Purpose
"M" or "F"	Lookup in list	Must be either "M" or "F"
IN("Mrs.", "Mr.", "Miss", "Dr")	Lookup in list	Must be any of the values in the list
>DATE()	Range	Must be after today's date
>28/03/1980	Range	Must be after the date listed
Between 3 And 10	Range	Value must be greater than 3 but less than 10
>2	Range	Value must be greater than 2
Like "[A-Z][A-Z]"	Data type	Must be two text characters
Like "*@*. *"	Format	Email address
IS NOT NULL	Presence	Field must not be empty

2.7. Searches

- It is possible to filter out data in a database by using certain criteria
- Simple queries-** Used for searching data with a single criteria using a premade table



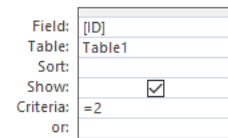
Criteria	Format	Purpose
Equals to	"X"	Searches for values that equal "X"
True	True	Searches for all the data in the field that are true
Does not equal to	Not "X"	Searches for all data except "X"
Null	Is Null	Searches for all empty fields
Not null	Is Not Null	Searches for all fields that are not null
Contains	Like ("*X*")	Searches for all data that contain "X"
Not contains	Not like ("*X*")	Searches for all data that does not contain "X"
Begins with	Like("X*")	Searches for all data that starts with "X"

Criteria	Format	Purpose
Comes after	>="X"	Searches for all data that come after "X" alphabetically
Between (numbers)	Between A and B	Searches for values between A and B
Greater than (numbers)	>A	Searches for all values greater than A
Greater than or equal to (number)	>=A	Searches for all values greater than or equal to A
Between(date)	Between "#dd/mm/yyyy#" and "#dd/mm/yyyy#"	Searches for data between the specified dates
Today(date)	=Date()	Searches for all records containing today's date

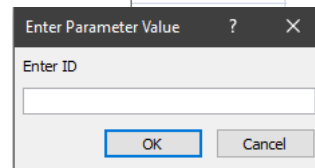
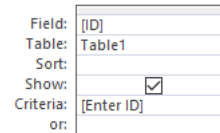
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2.8. Static and dynamic parameters

- Static parameters-** Used in the queries mentioned so far. The parameter values will not change each time the query is run.

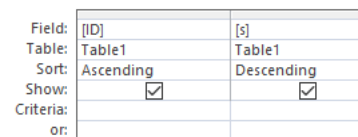


- Dynamic parameters-** Used when the parameter values can be chosen every time the query is run, and so the values are never fixed.

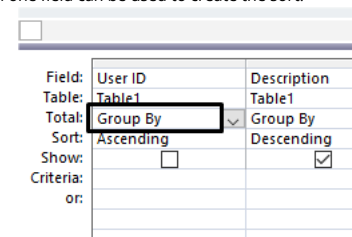


2.9. Sort Data

- Ascending/descending-** Data can be stored in either ascending or descending order within a table, query or report.

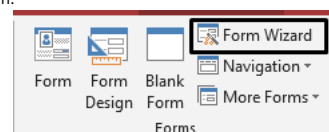


- Grouped-** More than one field can be used to create the sort.



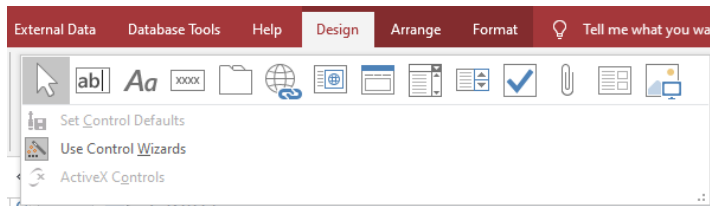
2.10. Data entry form

- Used for entering data. Multiple factors are to be considered when making an effect and user-friendly data form.



- Appropriate font styles and sizes-** The text in the form must be easy to read, be an appropriate colour and must have a consistent font style
- Spacing between fields-** There must be appropriate spacing between each field so the data and clear and distinguishable
- Character spacing of individual fields-** There must be sufficient space between each character within the data to be viewed properly

- **Use white space-** Used to separate data and prevent screen from looking like a mess
- **Navigation buttons-** To allow users to navigate between records
- ****Radio boxes-****To allow users to select one mutually exclusive option
- **Check boxes-** Used to select items
- **Drop-down menus-** To allows users to select from a set of options
- **Highlight key fields-** Important fields should be highlighted



2.11. Export data

- Data can be exported to common formats
- **Table-** CSV, Txt, or a table in an RTF file
- **Query-** Same way as tables
- **Report-** RTF and PDF

2.12. Data dictionary

- **Data dictionary-** It is a document that describes the structure of the data held within a database, in other words, metadata about a database.
- They will include:
 - **Data about fields**
 - Field names to identify each field
 - Data types
 - Field size
 - Format of fields
 - Default values in the fields
 - Primary keys, Compound keys and Foreign keys
 - Indexed fields to improve search times
 - Validation rules
 - **Data about table**
 - The primary key of the table
 - Sort order of the data
 - Relationships to other tables
 - Total number of records
 - Validation rules that apply
 - Permissions and security

2.13. File and data management

- **Files types-** Data can be stored in multiple file types. Each files will usually contain a header (metadata), the main content to be stored and the end-of-file marker

Extension	File type	Purpose
txt	Text	Stores plain text without formatting.
csv	Comma separated value	Stores structured data in rows and columns separated by commas. Used for databases
rtf	Rich text format	Stores text-based documents with formatting. Can be used in other applications without the formatting being lost
docx	Microsoft Word XML document	Saves word processed documents by saving all objects separately
pdf	Portable Document Format	Used for read-only documents. Used for web documents
ods	Open document spreadsheet	Open source file type for text documents that can be used in open source software
odt	OpenDocument text	Open source file type for spreadsheets that can be used in open source software
xml	Extensible Markup Language	A data file that uses markup language to define objects and their attributes. Can be read by a simple text editor
avi	Audio Video Interleave	A data file that stores video files with very little compression. Large in size, but no data lost
mp4	Moving Picture Experts Group (layer 4 video file)	Audio and Video are compressed and videos can be shared across the internet
wav	Waveform Audio File Format	Stores audio files as waveform data that allows different sampling and bit rates. Used with CDs
mp3	MPEG (layer 3 audio compression)	Stores audio files in a compressed format. 10% the size of a .wav files

Extension	File type	Purpose
bmp	Bitmap Image	Stores images as uncompressed raster images, each pixel being stored individually. Can be used in any software
jpg	Joint Photographic Experts Group	Stores images as compressed raster images. Common digital camera and web formats use this file type
png	Portable Network Graphic	Stores images as compressed raster images and can include background transparency colours
svg	Scalable Vector Graphics	Stores Images as two-dimensional (2D) vector graphics. Used for vector graphics on the web
exe	Executable program file	Stores program object code that allows the program to be executed by the computer

2.14. Proprietary and open- source file formats

- **Proprietary file formats-** File formats developed by software manufactures solely for use within their software.

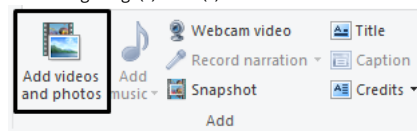
Extension	Software	Manufacturer
.docx	Word processor	Microsoft Word
.wpd	Word processor	Corel Word Perfect
.msg	Email message	Microsoft Outlook
.ra	Audio/video streaming	Real Networks
.MOV	Movie	Apple
.psd	Graphics	Adobe Photoshop
.ai	Graphics	Adobe Illustrator
.accdb	Database	Microsoft Access

3. Sound and Video Editing

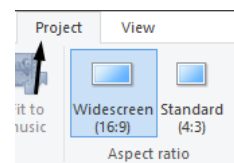
Term	Definition
Pixel	A very small square area of one colour that is illuminated on display screen. When combined, they form a bitmap image
Frame	A single still image in a video
Rendering	Combining the effects created in a video file to create an output video file
Transition	The movement from one clip to the next
Filters	An effect, often colour related, that can applied to a clip
Track	A single audio section in a sound or video file
Pitch	The highness or lowness of a tone
Aspect ratio	The ratio of width to the height of a screen
Resolution	The number of pixels horizontally compared to the number of pixels vertically
Sampling rate	The number of samples of the recorded sound
Reverb	The effect created on sound when it repeatedly bounces back off a surface

3.2. Video editing

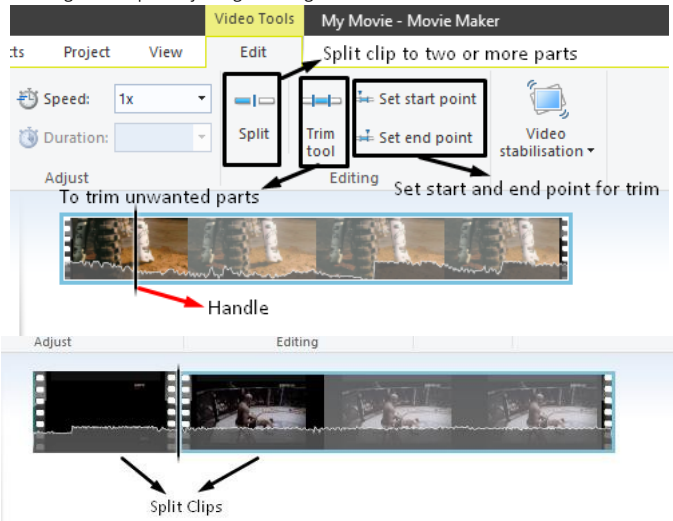
- Importing files and inserting image(s)/video(s)



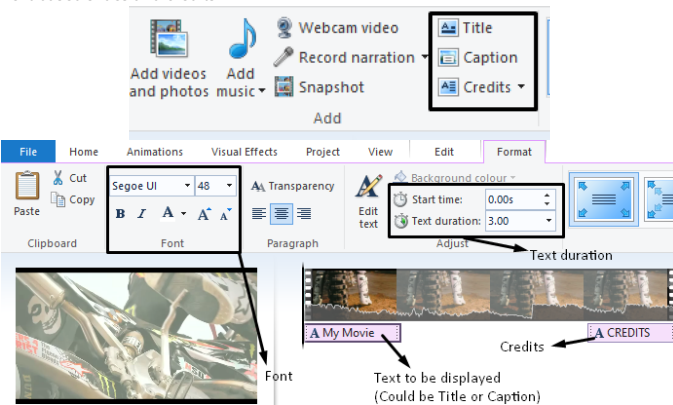
- Setting aspect ratio



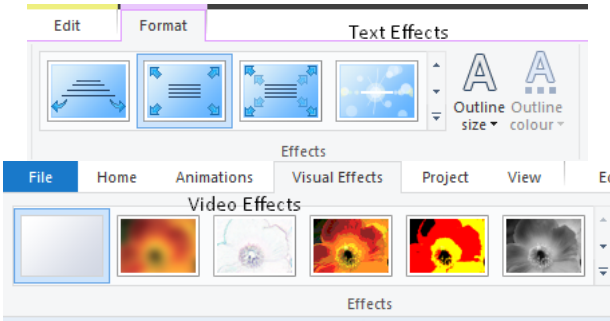
- Trimming video clips and joining them together



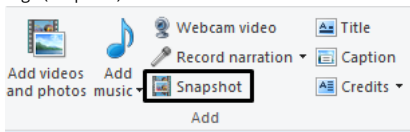
- Text based slides and credits



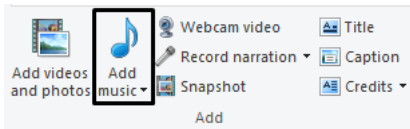
- Animation and effect



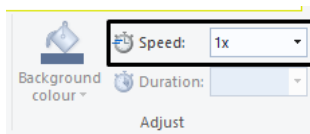
- Extracting a still image (snapshot)



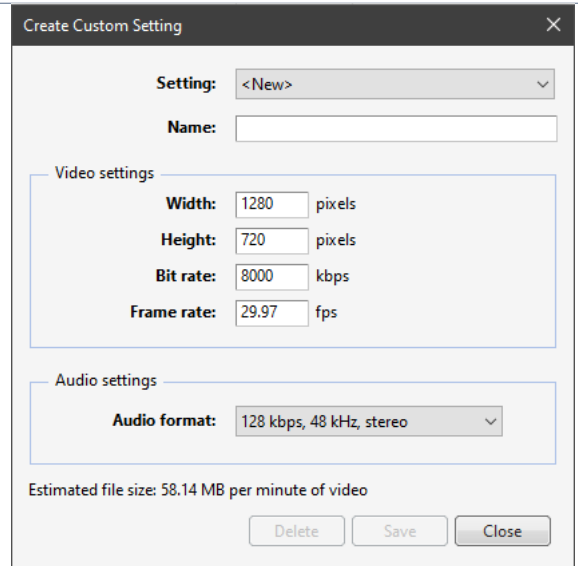
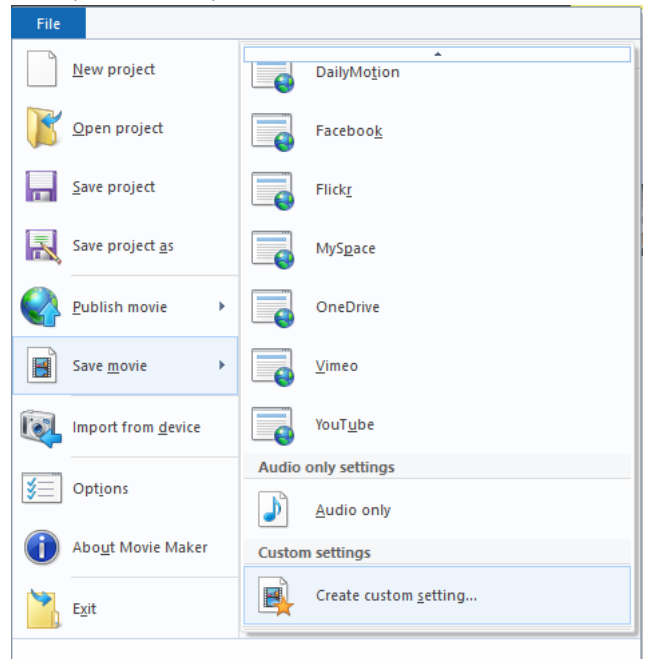
- Adding sound file



- Video clip speed

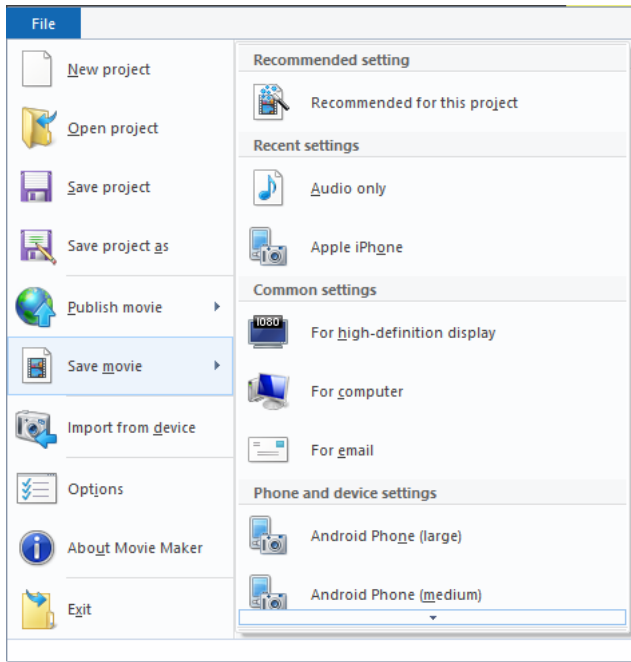


- Resolution (custom resolution)



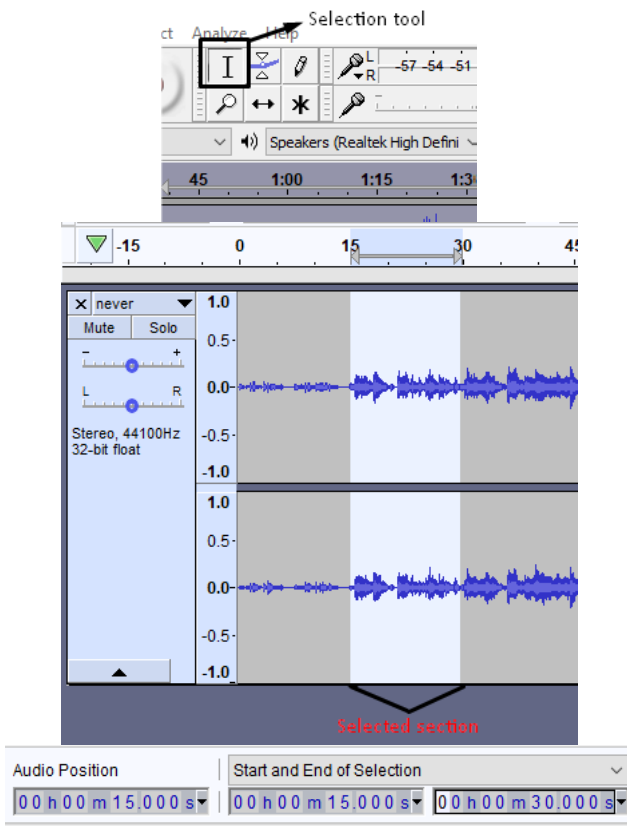
- Exporting

- Most websites use .mp4, .avi, .mpv for videos.

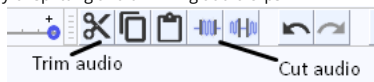


3.3. Sound editing

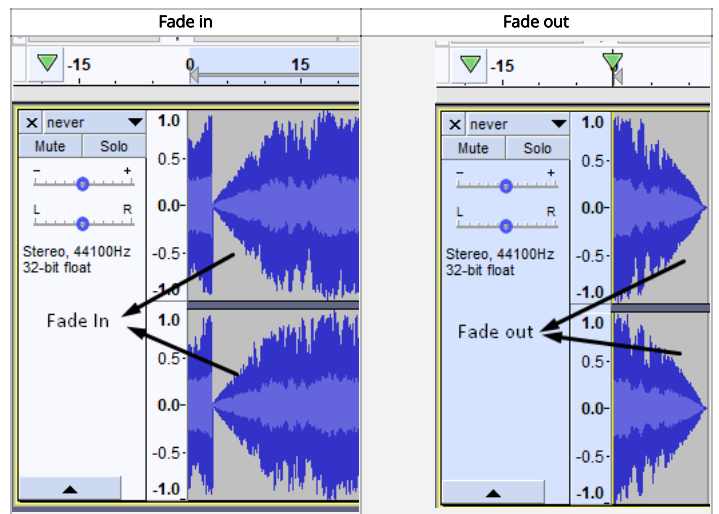
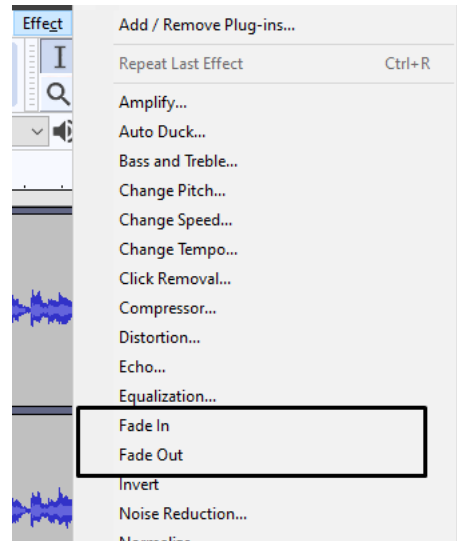
- Trimming and joining audio clips



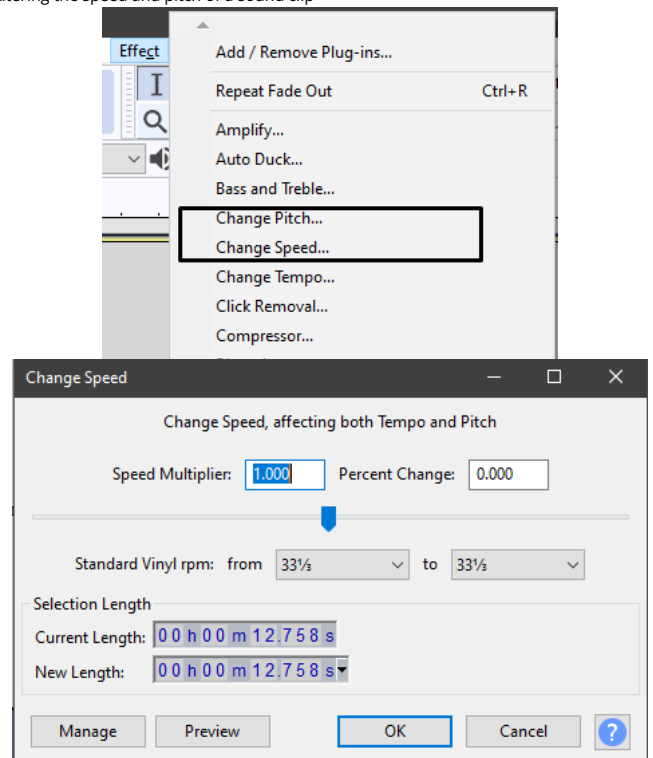
^ A more accurate way of splitting and trimming audio clips



- Fade in and out

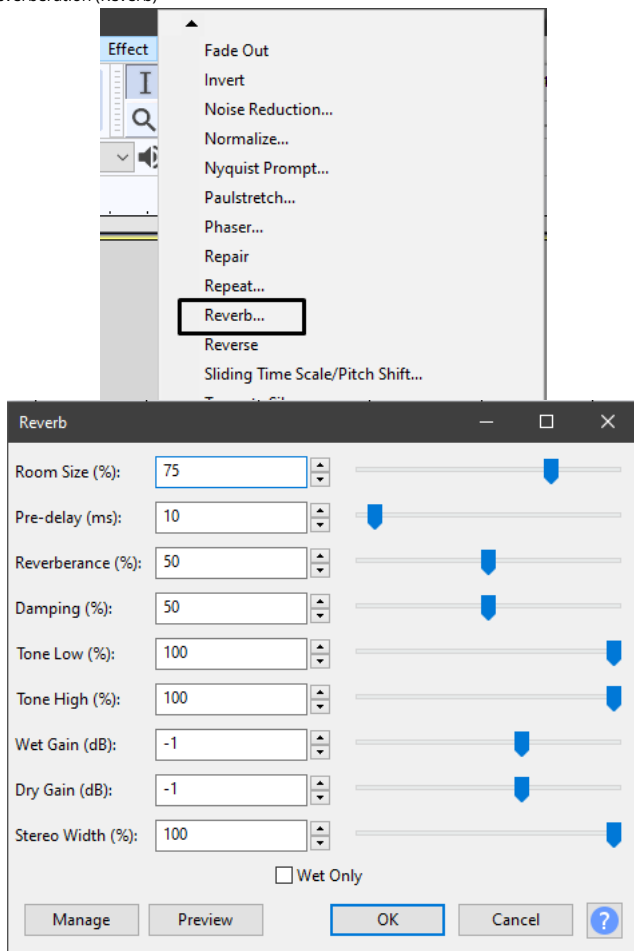


- Altering the speed and pitch of a sound clip

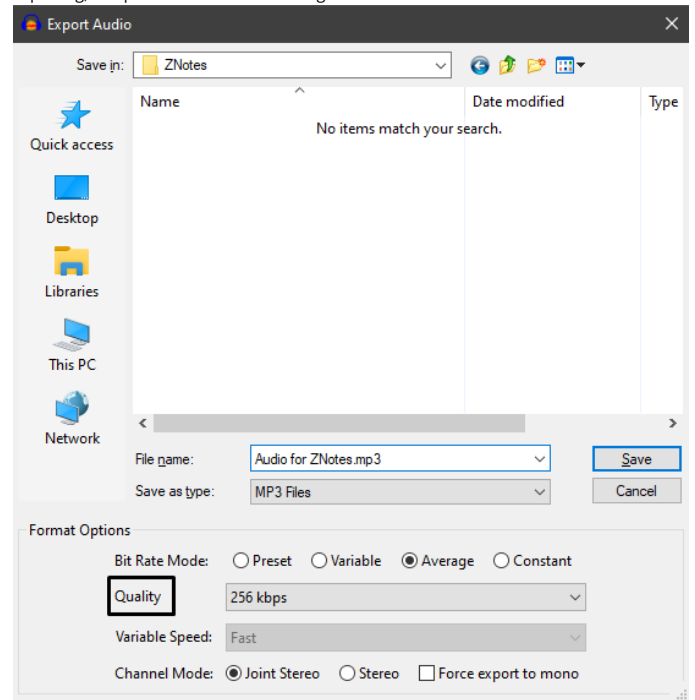


- Changing the speed of an audio clip also changes the pitch of the clip

- Reverberation (Reverb)



- **Exporting**- The most commonly used format for audio clips are .mp3, and during exporting, sample rates can also be changed.



CAIE AS LEVEL IT (9626)

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