O Level Computer Studies 7010
Unit 7: Organisation of data

Recommended Prior Knowledge
Students need to have studied unit 6, generic software, along side this unit or before beginning this unit.

Context
Understanding of data, its storage and conversion to useful information forms the basis of successful project work.

Outline
This unit introduces the standard methods of data collection, verification and validation, and where it is appropriate to use particular methods. Candidates should understand that data, particularly data held in files, requires access in different ways depending on the particular application. The medium on which the data is stored, and particularly the way in which it is organised, depend on the requirements for access. Candidates should be familiar with the idea of file ordering and the principles of sorting and merging. They should have experience of sequential file processing and of processing individual records by means of record keys.

AO	Learning outcomes	Suggested Teaching activities	Learning resources
4.2	The relationship between information and data	Review Input, Process Output and introduce the idea of information as processed data	http://www.theteacher99.btinternet.co.uk/theteacher/gcse/newgcse/module1/task1.htm introduction to data http://www.teach-ict.com/gcse/theory/datainfo/ch1/index.htm reviews input, process, output and introduces the idea of information – contains quiz and gapped handout L+W 12.1
	The collection of data; methods of ensuring its correctness (including validation and verification and the distinction between these)	Look at ways of ensuring that data is reasonable and that no errors are introduced. Stress the need for verification and validation and highlight the differences between these two techniques. Ensure that the students know about different types of validation checks, this can link with practical work on spreadsheets and databases.	http://www.theteacher99.btinternet.co.uk/theteacher/gcse/newgcse/module2/task1.htm introduction to data capture http://www.theteacher99.btinternet.co.uk/theteacher/gcse/newgcse/module5/task10.htm introduction to validation

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			http://www.theteacher99.btinternet.co.uk/theteacher/gcse/newgcse/module5/task9.htm introduction to verification http://www.ictgcse.com/sub_projects/ictgcse_th_datavalidation.htm a discussion of the reasons for verification and validation L+W 12.1
	the coding of data for input; the presentation of useful information from processed data	Introduce the idea of preparing data so fewer mistakes are made.	http://www.theteacher99.btinternet.co.uk/theteacher/gcse/newgcse/others/data_encoding.htm introduction to coding L+W 12.4
	analogue-to-digital and digital-to-analogue conversions.	Consider how continuously changing data can be input into a computer. The concept of: • data loggers (including the idea of automatic data capture; data loggers allow 24/7 monitoring, are more accurate since they eliminate transcription errors (etc.); data loggers contain RAM memory to store the new info and ROM memory to store the programs to control its operation) use of sensors (use of temperature sensors, moisture sensors, pressure sensors etc. – this links into 1.1 in unit 1; since sensors often give analogue output need to consider use of ADC – if it is a control system may need DAC to control motors etc.) – consider a number of applications which require sensors for monitoring and control	http://www.bbc.co.uk/schools/gcsebitesize/ict/measurecontrol/3dataloggingrev1.shtml an introduction to data logging http://www.teach-ict.com/gcse/software/datalogging/datalogging/index.htm introduction to data logging including the use of sensors and analogue to digital conversion http://www.klbschool.org.uk/ict/gcse/theory/hardware/comms.htm#digitise_need clear diagrams and a useful discussion of why analogue-to-digital conversion is required L+W 12.2
	File organisation: different forms of organisation, depending on the data stored and the requirements for processing; processing methods	File organisation and data types can be introduced together as a record within a file may contain fields with differing data types. This can be done in conjunction with practical work on spreadsheets and databases. File organisation can be introduced at this point:	http://www.klbschool.org.uk/ict/gcse/theory/software/database.htm#file introduction to data types http://www.theteacher99.btinternet.co.uk/theteacher/gcse/newgcse/module5/ta

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		• field length, field type, concept of key field, relationship between fields and records (ref databases and spreadsheets) • types of access (serial, sequential, direct/random and the advantages of each type of access) and their applications (e.g. serial access in batch processing, direct access in real time systems, etc.)	sk1.htm introduction to data types and file structures http://www.psionica.co.uk/gcseict/database.htm looks at data base structure links with unit 6 http://www.school-resources.co.uk/Keyfields.htm introduction to key fields
	Data types: numbers, characters, strings, arrays, the need for different data types and structures to represent the data of problems which are being solved using a computer	updating fields (e.g. car sales room will insert data when a new car arrives, delete data when a car is sold and amend data if there is an error or they have a sale and reduce price, etc.)	http://www.sohamcollege.org.uk/curriculum/Ict/gcseictweb/index.htm file structures and file access http://www.theteacher99.btinternet.co.uk/theteacher/gcse/newgcse/others/file_access.htm introduction to serial access and random access L+W 12.5 L+W 12.4