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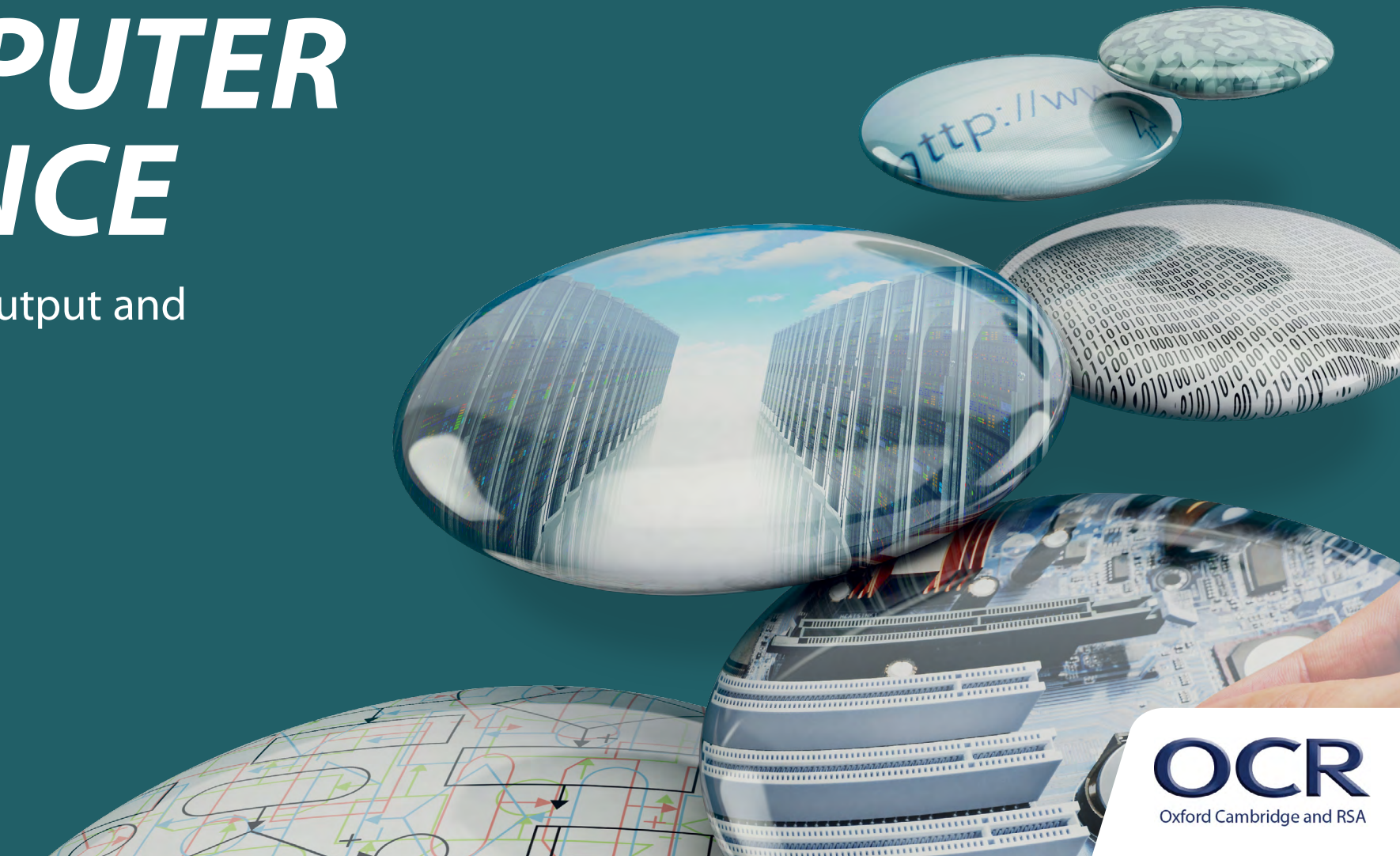
A LEVEL
Delivery Guide

H446

COMPUTER SCIENCE

Theme: Input, Output and Storage

April 2015



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Introduction

Delivery guides are designed to represent a body of knowledge about teaching a particular topic and contain:

- Content: a clear outline of the content covered by the delivery guide;
- Thinking Conceptually: expert guidance on the key concepts involved, common difficulties learners may have, approaches to teaching that can help learners understand these concepts and how this topic links conceptually to other areas of the subject;
- Thinking Contextually: a range of suggested teaching activities using a variety of themes so that different activities can be selected that best suit particular classes, learning styles or teaching approaches.

If you have any feedback on this Delivery Guide or suggestions for other resources you would like OCR to develop, please email resources.feedback@ocr.org.uk.

KEY

Click to view associated resources within this document.

Click here — Click to view external resources

AS Level only — AS Level content only

Curriculum Content

a)	How different input output and storage devices can be applied to the solution of different problems.
b)	The uses of magnetic, flash and optical storage devices.
c)	RAM and ROM.
d)	Virtual storage.

Thinking Conceptually

Approaches to teaching the content
This unit considers the input, output and storage devices for a given solution to a problem. This could be a simple mobile device based App, a school based server system or a large organisation's full IT infra-structure. It is important that learners can select appropriate input, output and storage devices for a range of given problems. In considering the suitability of the solution, learners can further explore magnetic, flash and optical storage devices, considering their features, uses and effectiveness as a storage device for a given purpose. Since storage is a type of memory that holds data, logically learners will be able to distinguish between the functions of RAM and ROM and how they work, before looking at the role of Virtual storage and its impact on a computer system.

Introduction
Learners could start off by thinking about and writing down as many storage devices available as possible. This could be completed as a whole class work or completed in smaller groups with feedback to the whole class.

Activities section	Resource
Input and Output Devices Learners can use Quizlet to revise key terms and learn definitions of input and output devices: http://quizlet.com/43972384/input-and-output-devices-flash-cards/ They may wish to create their own version and share it with their class group.	Click here
The use of storage You can use a fairly advanced set of flash cards for learners to learn optical and magnetic storage properties: http://quizlet.com/28751022/264-22-flash-and-optical-storage-vocab-and-content-king-n-flash-cards/ Learners could refer back to their original list of storage devices and now identify each device as flash, magnetic or optical. Learners can then discuss where each type of storage is used and its suitability.	Click here
The future of memory An interesting article on how optical memory will become obsolete in the future, flash memory replacing both the magnetic and optical methods. Learners should discuss the main points of the article and feedback what other types of memory could be produced and used in the future, for example DNA memory, atomic memory. http://www.cnet.com/uk/news/crave-talk-how-flash-will-destroy-optical-and-magnetic-storage/	Click here

Thinking Conceptually

Activities section	Resource
RAM and ROM Learners can begin to understand how RAM, ROM and storage are related to an everyday device such as an Android Phone: http://www.techrepublic.com/article/ram-a-lama-dont-be-a-ding-ding-about-android-storage/ This video, although old, compares the differences between RAM and ROM: https://www.youtube.com/watch?v=wJ4dAFI7xLw#t=137 Learners could make their own informational video or animation, to include modern day features and usages: http://www.diffen.com/difference/RAM_vs_ROM#Video_explaining_the_differences The concept of: a slow computer requires more RAM, so why not just download some more? Learners can discuss the issues or reality of this is RAM downloadable? Would it work?	Click here Click here Click here
Virtual storage Learners could compare the advantages and disadvantages of virtual storage: http://en.wikipedia.org/wiki/Storage_virtualization Why was it created? How is it used? What are the alternatives?	Click here

Conceptual links to other areas of the specification – useful ways to approach this topic to set learners up for topics later in the course.
This topic will support further understanding in **1.2.1 Systems Software**.

ACTIVITIES

Activities	Resources
Activity 1 • For each of the problems in the table in Learner Resource 1, identify the input, output and storage devices that can be applied as a solution to a given problem. • Discuss various elements that you selected with another student, compare them with other learners' answers and solutions.	Learner Resource 1
Activity 2 • Learners should complete the comparison table in Learner Resource 2, which focuses on the various storage types available.	Learner Resource 2
Activity 3 • Learners should create an original video or animation about how RAM or ROM or both work. • An example is here: https://www.youtube.com/watch?v=TMV_Dwsd8dI. • This example talks about what RAM does but the drawing style is one approach that learners could take: https://www.youtube.com/watch?v=SOyzN62rZ40 • For fun, learners could create a sketch about RAM and ROM that includes their knowledge and key content from this part of the course; see the following link for a fun example: https://www.youtube.com/watch?v=NdREEcfaihg	Click here Click here Click here

Learner Resource 1 Input, output and storage devices

See page 8

Problem	Input	Output	Storage	Issues	Reasons for choice
Transferring data from one device to another					
Backing up a large organisation's data (e.g. 1500 users)					
Supermarket checkout	Barcode reader	Printer TFT display	Database – Magnetic Hard Drive Magnetic tape for back up		Requires high speed access and dependability
A traffic light system					
Police speed camera					

Learner Resource 1 Input, output and storage devices

Problem	Input	Output	Storage	Issues	Reasons for choice
A school network					
Saving files to cloud based storage					
Setting up an online feedback form					
Make up a choice of your own					

Learner Resource 2 Types of storage devices

See page 8

Storage Device	Features	Capacity (Size of Memory)	Speed	Portability	Durability (How long the data lasts)	Reliability	Uses
External hard disk							
Magnetic tape backup							
CD-ROM							

Learner Resource 2 Types of storage devices

Storage Device	Features	Capacity (Size of Memory)	Speed	Portability	Durability (How long the data lasts)	Reliability	Uses
CD-RW							
DVD							
Flash memory stick							

Learner Resource 2 Types of storage devices

Storage Device	Features	Capacity (Size of Memory)	Speed	Portability	Durability (How long the data lasts)	Reliability	Uses
SD card							
Cloud storage							
SSD card							

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