

1D and 2D barcodes

Background information

Barcodes have lots of uses. Manufacturers and retailers use barcodes to identify their products because they can be read quickly by scanners and the information automatically passed to a central computer system. Reading these barcodes allows shops and manufacturers to keep track of the location and numbers of each of their products. Barcodes are also used by parcel delivery companies to track parcels so they can see where a parcel is located and when it is delivered.



1D barcode



2D barcode or Quick Response (QR) code

Your task

1. Research 1D and 2D barcodes to find out the following:

(Record your responses in the table on the next page).

- a. How 1D and 2D barcodes work
 - b. The advantages and disadvantages of each type of barcode
 - c. The use of each type of barcode
2. Create 1D and 2D barcodes for some products as follows:
 - Choose a shop website and find 7 products they sell. Check that the products you choose have a product code and a unique webpage on the shop's website.
 - Complete the table on the worksheet with the following information:
 - item name
 - product code
 - a 1D barcode for the product code
 - the url of the product webpage
 - a 2D barcode for the product webpage

Useful information

- Use <https://barcode.tec-it.com/en/> to create 1D barcodes
- Use <https://www.qr-code-generator.com/> to create 2D barcodes

Task 1

1D and 2D barcodes research

1D barcode

How a 1D barcode works

- Series of black and white lines of varying width represents a code.
- Barcode read with a laser scanner to create a binary code.
- Code used as the input data to a system.

Advantages of 1D barcodes

- Easy to use.
- Quicker than using manual data input to a system.
- Technology has been around for 30 years so costs of software and hardware cheaper than technology required for the reading of QR codes.

Disadvantages of 1D barcodes

- Contain up to 86 characters so can not contain as much information as a 2D code.
- Take up a larger area than 2D codes so difficult to use on small items.
- External databases are required to decode 1D barcodes.
- If a 1D barcode is damaged it is hard to read.
- Automated scanners find it harder to locate 1D barcodes compared with 2D scanners looking for 2D barcodes.

Use of 1D barcodes

- Used on products on sale in shops so they can be scanned at the tills.
- Used on parcels to track their location and when they have been delivered.

Task 1 (continued)

1D and 2D barcodes research

2D barcode**How a 2D barcode works**

- QR codes are a series of white and black pixels that form a unique pattern that encodes data.
- They can be read by digital devices like the cameras on smartphones.

Advantages of 2D barcodes

- Hold up to 7089 digits or 4296 characters.
- Can contain a variety of data such as binary, text, numeric.
- The code can be scanned at any angle.
- If a 2D barcode is damaged it may still be possible to read it depending on the level of damage.
- Automatic scanners find it easier to locate a 2D barcode compared with a 1D scanner looking for a 1D barcode.
- Smaller than 1D codes.

Disadvantages of 2D barcodes

- Needs specialized hardware and software to create and read 2D barcodes which can be more expensive than 1D barcodes.
- Hackers can trick people into passing over personal information by replacing legitimate QR codes in public sites such as car parks and information boards with their own QR code which links to the hacker's website. This rogue website then asks users to input their personal data which can then be used for fraudulent purposes.



Use of 2D barcodes

- Individuals can use their smart phones to be directed to a variety of webpages such as:
 - Menus
 - Social media profile
 - Information at a tourist site
- Manufacturers use them to identify parts on production lines.

Task 2

Below is an example of adding a product to the database.

Select seven products from your chosen retailer to create your 1D and 2D barcodes.

Item	Product code	1D Barcode	Website page url	2D Barcode
Input devices	123456QAC	 123456QAC	https://isaacomputerscience.org/concepts/sys_hard_input?examBoard=aqa&stage=gcse	

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