**Barcodes**

“The barcode was invented by Norman Joseph Woodland and Bernard Silver and patented in the US in 1951.[[1]](https://en.wikipedia.org/wiki/Barcode#cite_note-patent-1) The invention was based on Morse code[[2]](https://en.wikipedia.org/wiki/Barcode#cite_note-2) that was extended to thin and thick bars.” (Wikipedia,url: <https://en.wikipedia.org/wiki/Barcode>, accessed 28/10/2019).

“Barcodes became commercially successful when they were used to automate supermarket [checkout](https://en.wikipedia.org/wiki/Point_of_sale) systems, a task for which they have become almost universal. Their use has spread to many other tasks that are generically referred to as [automatic identification and data capture](https://en.wikipedia.org/wiki/Automatic_identification_and_data_capture) (AIDC)” (Wikipedia,url: <https://en.wikipedia.org/wiki/Barcode>, accessed 28/10/2019).

“GS1” (gs1.org, url: <https://www.gs1.org/standards/barcodes/10-steps-to-barcode-your-product/english>, accessed 28/10/2019), is a company that provides barcodes to organisations and has a comprehensive list of steps that can be followed to obtain a barcode (see link above). A barcode consists of a prefix of 2 or 3 characters and a company number, which can be assigned to an organisation by GS1 (and other companies). Once these are assigned, then a decision has to be made as to the type of barcode to be used, from a simple code, to one that can contain URL information, from codes to be used at a POS device (must support omni-directional scanning), warehouse (larger size codes for distribution scanning) or healthcare items (omni-direction scanning not required), all require different types of barcodes.

Our project will have the capability of be using bar-codes that have been generated by either a web-service or program (see following for options available - windowsreport: url: <https://windowsreport.com/software-create-barcodes/>, accessed 28/10/2019). This page provides 7 different options to enable the generation of barcodes for use within the project / application, to allow the users of the application to identify where they are.

Since the generated barcodes are compliant with current standards, any standard or conventional barcode reader will be able to read the generated barcode. (wikihow.com, <https://www.wikihow.com/Scan-Barcodes-With-an-Android-Phone-Using-Barcode-Scanner>, accessed 28/10/2019). Using the link (previous), it is possible to install onto a Android Phone, an App that can read both Barcodes and QR codes, and this can be used to test the readability of the barcodes that have generated.

**QR Codes**

**QR code** (abbreviated from **Quick Response code**) is the trademark for a type of [matrix barcode](https://en.wikipedia.org/wiki/Matrix_barcode) (or two-dimensional [barcode](https://en.wikipedia.org/wiki/Barcode)) first designed in 1994 for the [automotive industry in Japan](https://en.wikipedia.org/wiki/Automotive_industry_in_Japan). A barcode is a machine-readable optical label that contains information about the item to which it is attached. In practice, QR codes often contain data for a [locator](https://en.wikipedia.org/wiki/URL), identifier, or [tracker](https://en.wikipedia.org/wiki/Website_visitor_tracking) that points to a website or application. A QR code uses four standardized encoding modes (numeric, alphanumeric, byte/binary, and [kanji](https://en.wikipedia.org/wiki/Kanji)) to store data efficiently (Wikipedia, URL: <https://en.wikipedia.org/wiki/QR_code>, accessed 28/10/2019)

QR Codes are now very common and can be found almost anywhere and nearly all smartphones can scan a QR Code and act on the contents of the QR Code. From bringing a user to a site, allowing for payments, for virtual store shopping, website and Wi-Fi network logins to the ability to have QR codes engraved on headstones so that visitors to a gravesite can find out about who was buried there and possibly, information about their life.

Since QR Codes are now so common, it is nearly mandatory for the project to be able to read QR codes as they are very easy to generate, the same websites and applications for barcodes can be used for QR Codes. Users of the project / application may be more familiar with scanning in QR Codes than Barcodes, but the project / application will support both methods, as well as Bluetooth beacons and NFC Tags.