What is QR code?

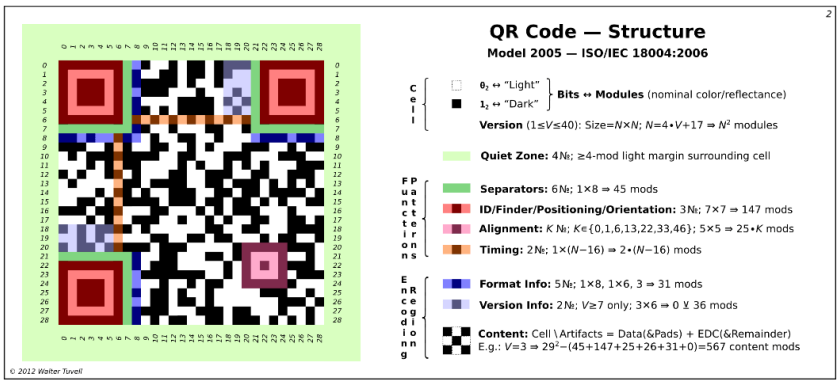
QR codes have become increasingly popular, becoming a tool for logging into websites, WiFi networks, sharing information, electronic payment, data storage or electronic tickets ...

Launched in 1994 in a small branch of Toyota, Denso Wave, which is used to track vehicles and vehicle components in automated production processes, QR codes have become more and more popular as tools for logging in. access to websites, WiFi networks, information sharing, electronic payment, data storage or electronic tickets .

QR Code (QR Code, short for Quick Response Code) was recognized as an international standard in 2000 and mobile users in Japan have adopted this standard since 2002. Although Denso Wave still holds the technology patent but Anyone can use QR codes without charge, as long as this intellectual property is used according to ISO / JIS.

Just like any bar code, using QR codes is simple: just scan with the image sensor on the phone camera, the application will convert the code into a binary form and display the information or perform the behavior. Programmed, such as opening a website, in other words, allowing real objects to be hyperlinked to a digital location.

There are many applications dedicated to scanning QR codes, but more and more popular applications integrate their scanning tools into their products.



Additional Notes

"Light"/"dark" are understood relative to per-symbol global threshold (reflectance midway between minimum and maximum for the symbol). Polarity can be reversed (0_2↔"dark", 1_2↔"light") — if decoder cannot locate finder patterns, try reversing polarity (only one polarity can be valid). Other variations may also be supported, depending on the reader/decoder (e.g., physical/3D markings, such as dice-like dot/peen dimples). Easily depicted in ASCII, too (using *, ␣).

Corner features (quiet zone, finder patterns, separators) enable identification, location, rotational orientation, reflectance polarity.

Timing patterns (alternating reflectance) supports symbol density, version/size to be determined, and provide positions for determining row/col coordinates (rectangular, not just square).

Alignment patterns, located symmetrically about diagonal, supports symbol distortions to be detected/corrected.
№: 0 (V=1); 1 ($2 \le V \le 6$); 6 ($7 \le V \le 13$); 13 ($14 \le V \le 20$); 22 ($21 \le V \le 27$); 33 ($28 \le V \le 34$); 46 ($35 \le V \le 40$).

Version info: $7 \le V \le 40$ only (not present in our sample); 2 copies, each 18 bits (6 data, 12 EDC); encodes value V ; special-snake/zigzag layout; unmasked.

Version info EDC uses binary Golay 18,6 ECC (≤3-bit correction). The $\mathbb{F}_2[X]$ polynomial of degree ≤ 6 whose coefficients are bits 17–12 (which encode V), multiplied by $X^{18-6}=X^{12}$, is divided by designated generator polynomial $X^{12}+X^{11}+X^{10}+X^9+X^8+X^5+X^2+1$, and the remainder polynomial's coefficients are taken as bits 11–0. See ISO/IEC spec, §D.2, for error detection/correction procedure.

Damage to fixed patterns (deviation from ideal appearance of corner features, timing patterns, alignment patterns) can be evaluated, for quality control purposes (see ISO/IEC 15415 Print Quality specification).

Structure of QR codes

In 2016, Snapchat and iMessage support the ability to scan QR codes to add contacts. WhatsApp uses QR codes to quickly access the desktop version application. Android has just released similar features to send SMS and MMS messages on PC.

1. How to add contact by QR code on Viber
2. How to login to Facebook computer with QR code
3. How to load via QR code using Mobifone Next application

What are the squares of QR codes?

A QR code consists of many squares, in which a number of cells are used for positioning image sensors (3 large squares in 3 corners), the rest contain format information, version, data and error correction codes (ECC - method of detecting and correcting errors when data transmission occurs.

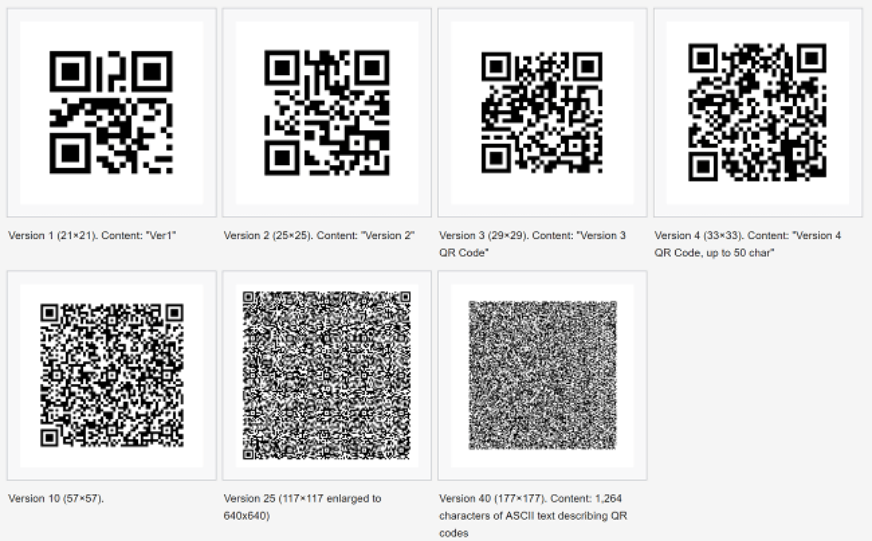
Most bar codes are one-way, QR codes are two-way and offer more benefits. For example, you can scan QR codes in any direction. They contain thousands of alphanumeric characters and when there is a high ECC, they can still function normally even if broken.

The more QR codes that fix the error, the less data you can store, And the more data you store, the more QR codes are available. The number of squares also increases when the error correction level is higher. QR codes that want a little beauty will have to reduce storage capacity.

The first version of the 2D bar code system has only 21 x 21 modules and contains 4 data characters. While the largest version (40) has 177 x 177 modules, stores 1,264 ASCII characters or up to 7,089 digits. Information is encrypted in many ways. In a QR code, many types of coding can be used.

1. Number (10 bits on 3 digits)
2. Numbers or letters (11 bits per 2 characters, without storing non-capitalized letters)
3. Byte (8 bits per character)
4. Kanji (13 bits per character)
5. Some other modes like FNC1 or ECI

In addition to the standard on traditional QR codes, there are also dimensions for new versions, used over the last few years such as MicroQR (11 x 11 modules containing up to 25 numeric characters), iQR Code (containing 80% of the top data an area of ??standard QR code), FrameQR (allowing image creation in QR codes) and AQRC (general and separate data storage, in which private data can only be read by certain scanning tools).



Types of QR codes

Do not always believe in QR codes

Often QR codes are said to be safe, but a popular way of exploiting is to use a URL data type to redirect users to malicious websites to trick or store executable data, exploiting vulnerabilities in victim's applications. (reader, web browser, image viewer).

There are also cases of malicious code that infiltrates Android phones, such as sending SMS messages that cost a lot of money or steal bank account information that users don't know.

How to create a QR code

Besides mobile apps, there are many websites that help create QR codes with different functions and access rights, without you having to register or pay. Most are just filling in information, saving the code as an image like JPG or PNG. There is also software to help program QR codes from 0. Please refer to some code creation tools TipsMake.com introduced on both computers and phones below.

1. Create QR codes on computers with QRCode Monkey
2. Instructions on how to create QR codes on Android with QR Code Generator
3. How to create your own QR code on iPhone phones

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