**QR Code Tutorial**

**Introduction**

A QR code is a special type of barcode that can encode information like numbers, letters, and Kanji characters.

**History and Information**

The QR code format was created in 1994 by Japanese company Denso-Wave, which is a subsidiary of Toyota that manufactures auto components. The standard is defined in ISO/IEC 18004:2006. The use of QR codes is license-free.

The smallest QR codes are 21x21 pixels, and the largest are 177x177. The sizes are called versions. The 21x21 pixel size is version 1, 25x25 is version 2, and so on. The 177x177 size is version 40.

In addition, QR codes include error correction: when you encode the QR code, you also create some redundant data that will help a QR reader accurately read the code even if part of it is unreadable. There are four levels of error correction that you can choose from. The lowest is L, which allows the code to be read even if 7% of it is unreadable. After that is M, which provides 15% error correction, then Q, which provides 25%, and finally H, which provides 30%.

The capacity of a given QR code depends on the version and error correction level, as well as on the type of data that you are encoding. There are four data modes that a QR code can encode: numeric, alphanumeric, binary, or Kanji. The Denso-Wave web site's list of QR versions includes information about how many data bits you can encode in each version.

**General Overview of Creating a QR Code**

The following pages of the tutorial will explain the QR code encoding process in detail. Here is a general overview of the process that you can read before moving on to the more detailed steps.

**Step 1: Data Analysis**

**Step 2: Data Encoding**

**Step 3: Error Correction Coding**

**Step 4: Structure Final Message**

**Step 5: Module Placement in Matrix**

**Step 6: Data Masking**

**Step 7: Format and Version Information**