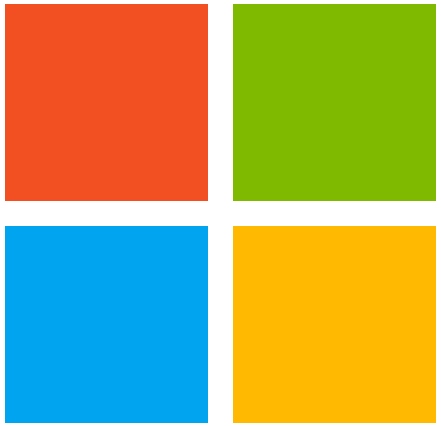

2019 TJMSC Tech. Courses

QRCode Generation

Sen Wang
Le Yang
Tongji Microsoft Student Club

May 25, 2019

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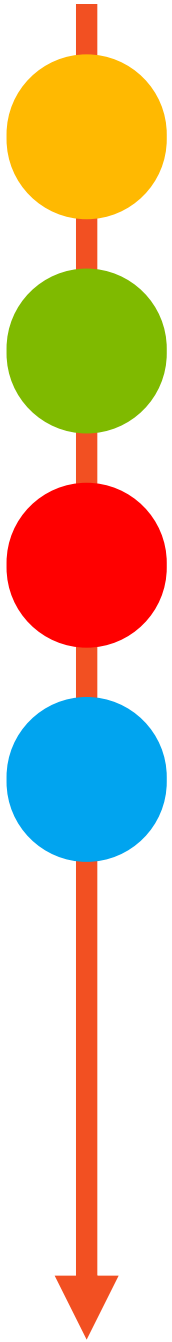

QR Code is a kind of code

Dive into QR Code

Structure of QR Code

Process of Generating QR Code

Most materials are referenced from ISO(IEC) 18004

What's Code?

QR Code is a kind of Code

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Binary code

QR Code is a kind of Code

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How to transfer QR Code into binary code string?

QR Code is a kind of Code

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Black is 1
White is 0

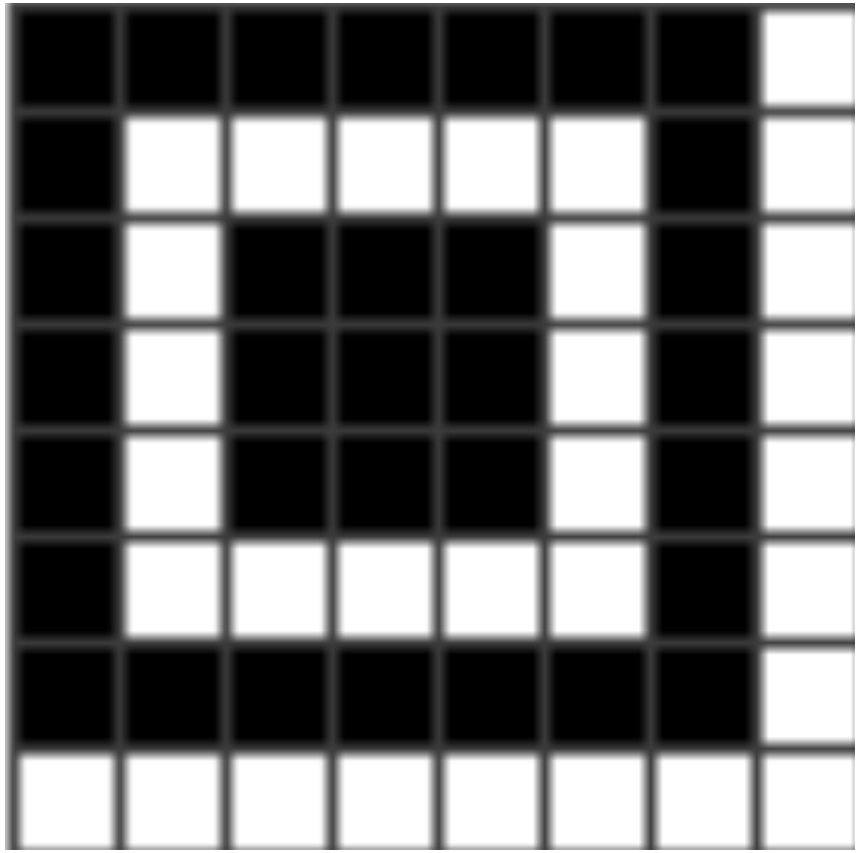
String:

11111110, 10000010, 10111010,
10111010, 10111010, 10000010,
11111110, 00000000

Just an example to help understanding, not accurate.

First from left to right

Then move to the next line



Dive into QR Code

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Dive into QR Code

Some Structures similiar

Some postions different

Different Sizes and Different Version

Structure of QR Code

1. Recognition

2. Information

3. Data

Structure of QR Code

1. Recognition

2. Information

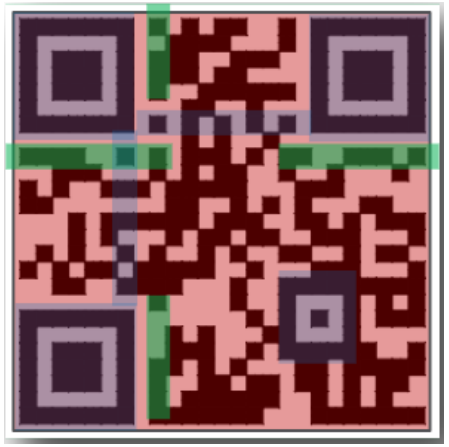
3. Data

Structure of QR Code

1. Recognition
2. Information
3. Data

Structure of QR Code

1. Recognition
2. Information
3. Data



Structure of QR Code

Version n's size:

$$Size = (17 + 4n) \times (17 + 4n)$$

$$n = 1, 2, \ldots\ldots, 40$$

Structure of QR Code

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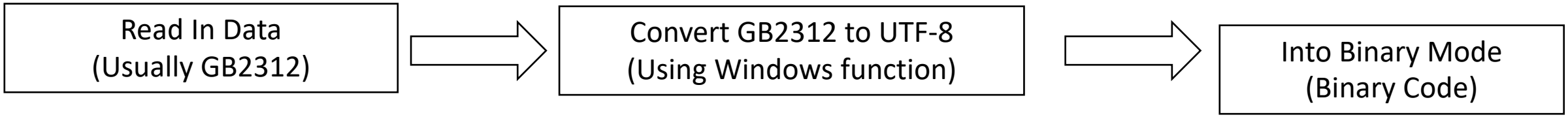
Data Code= Encode Code+ Correct Code

Encode Code

Recommended way



Structure of QR Code

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Correct Code

Reed-Solomon error correction

Omitting

if Interested

https://baike.baidu.com/item/RS%E7%BC%96%E7%A0%81/6967624?fr=aladdin

Generating QR Code

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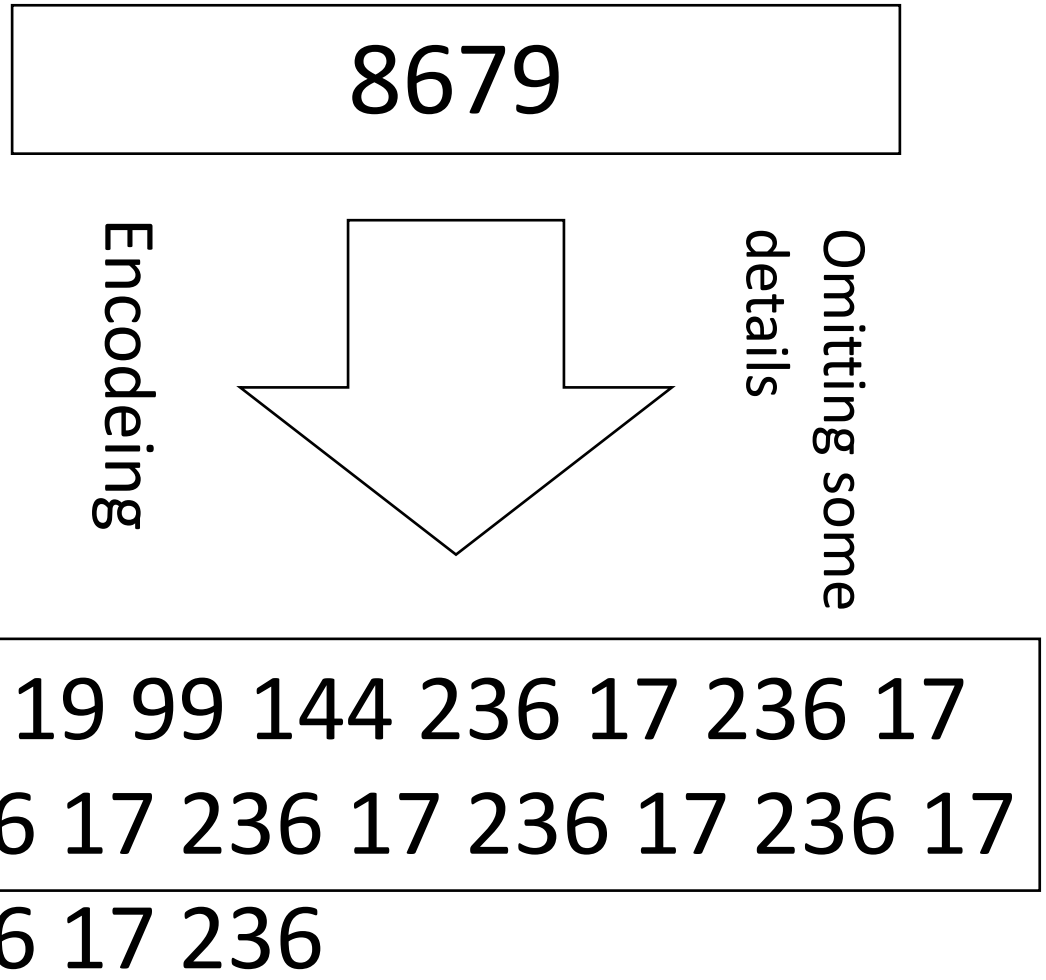

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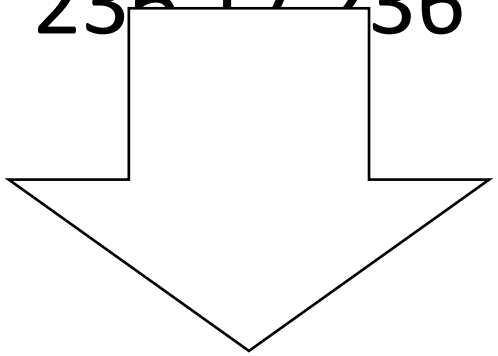
16 19 99 144 236 17 236 17
236 17 236 17 236 17 236 17
236 17 236



Correction

91 66 236 16 210 50
228

Generating QR Code

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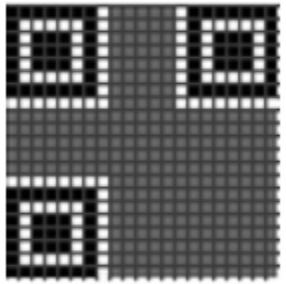
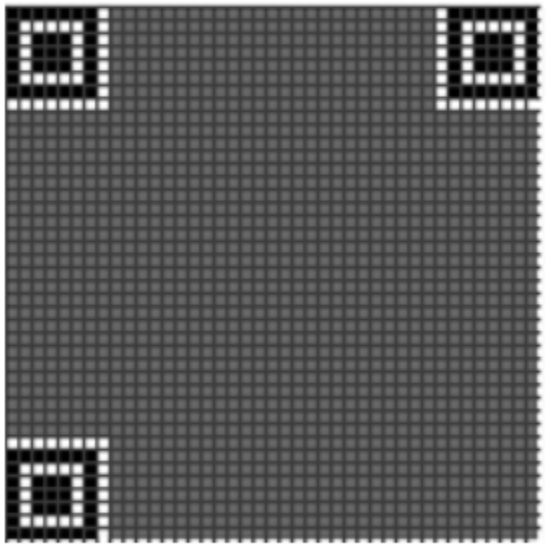
Step 1

Recognize Pattern





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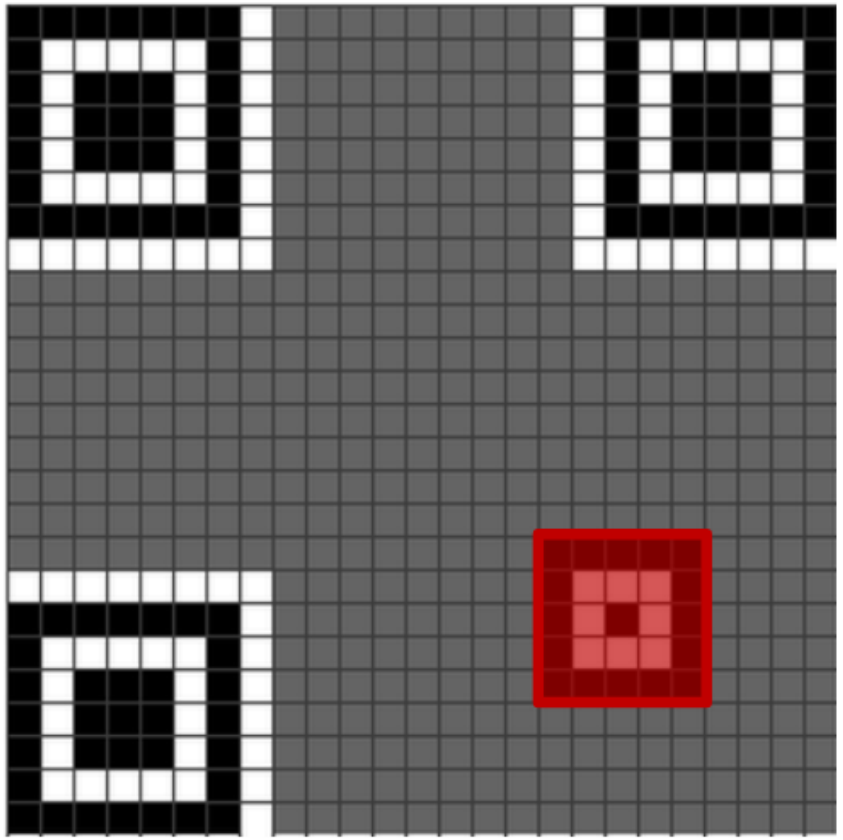
Step 2

Aligned Pattern



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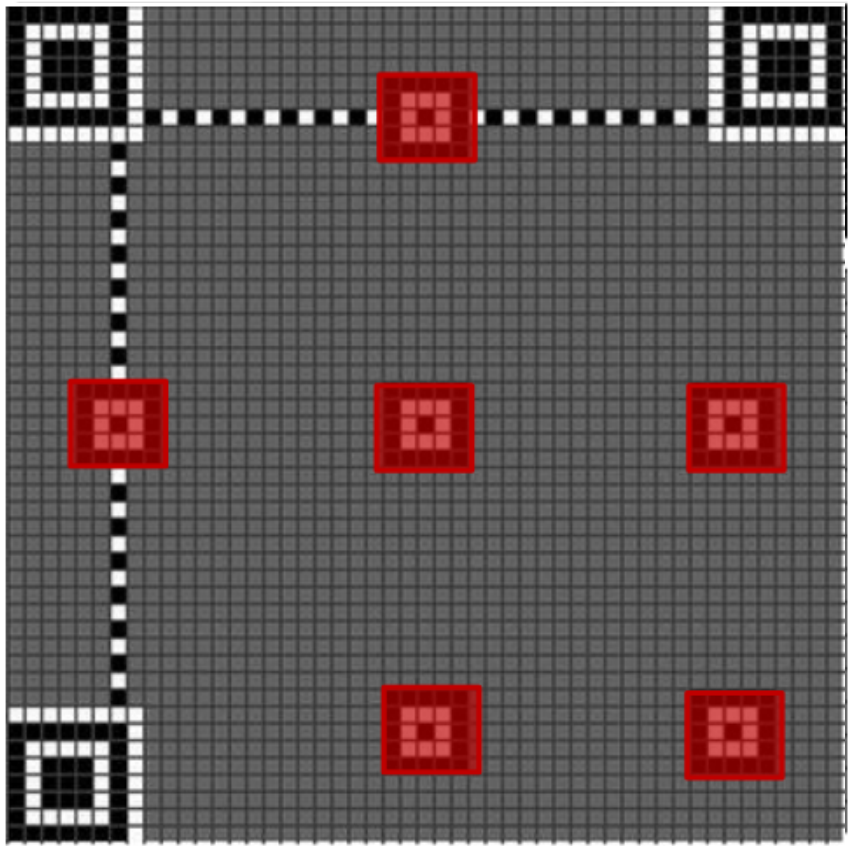
Step 2

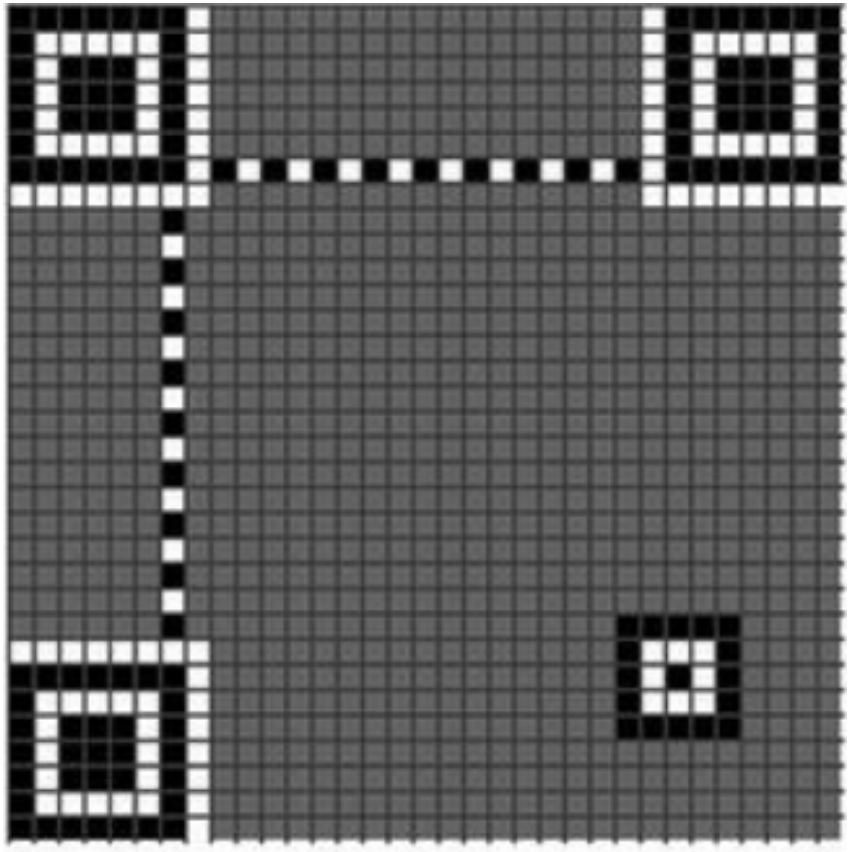
Aligned Pattern



Generating QR Code

Step 3

Timing Pattern



Generating QR Code

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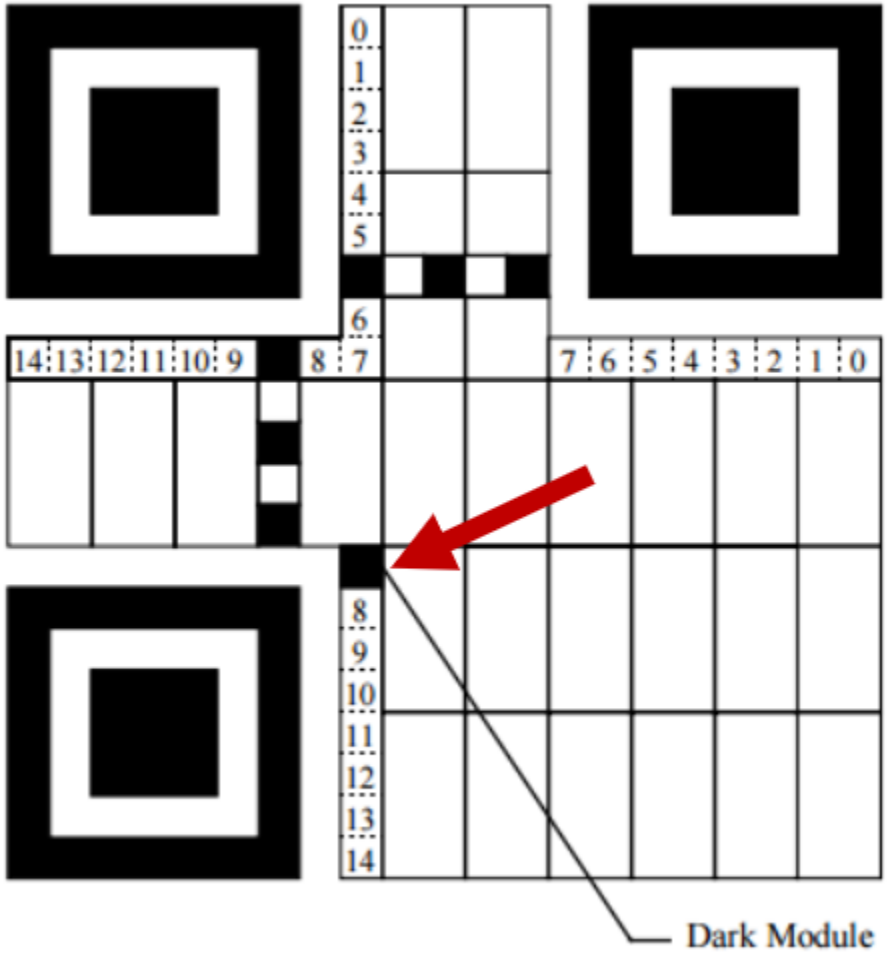
Step 3

Timing Pattern



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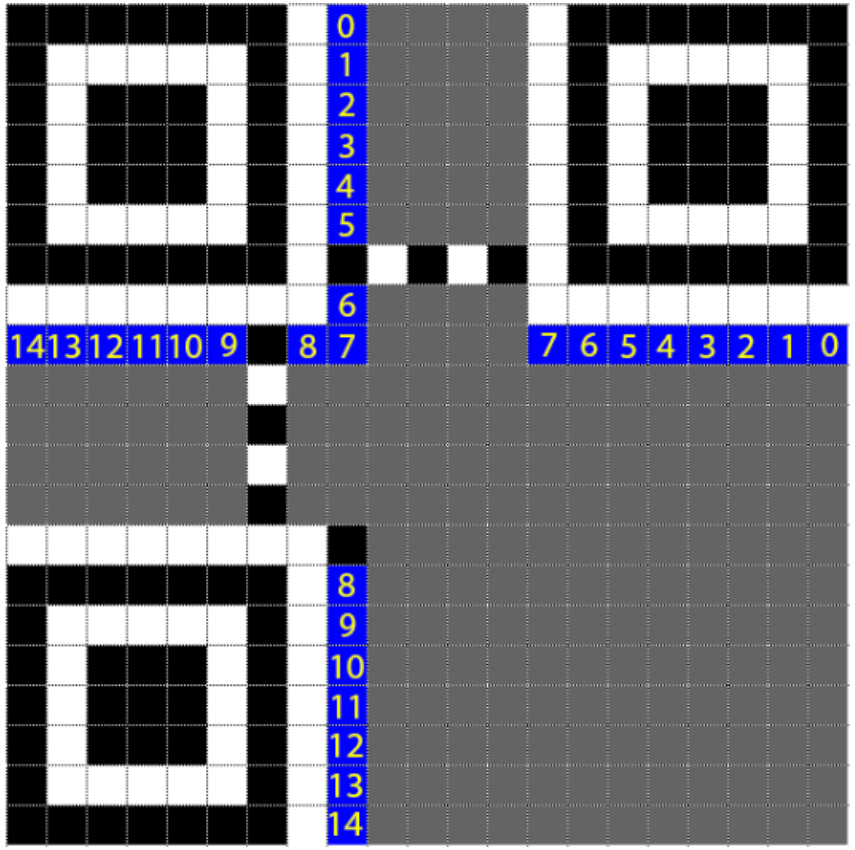
Step 4
Format Information



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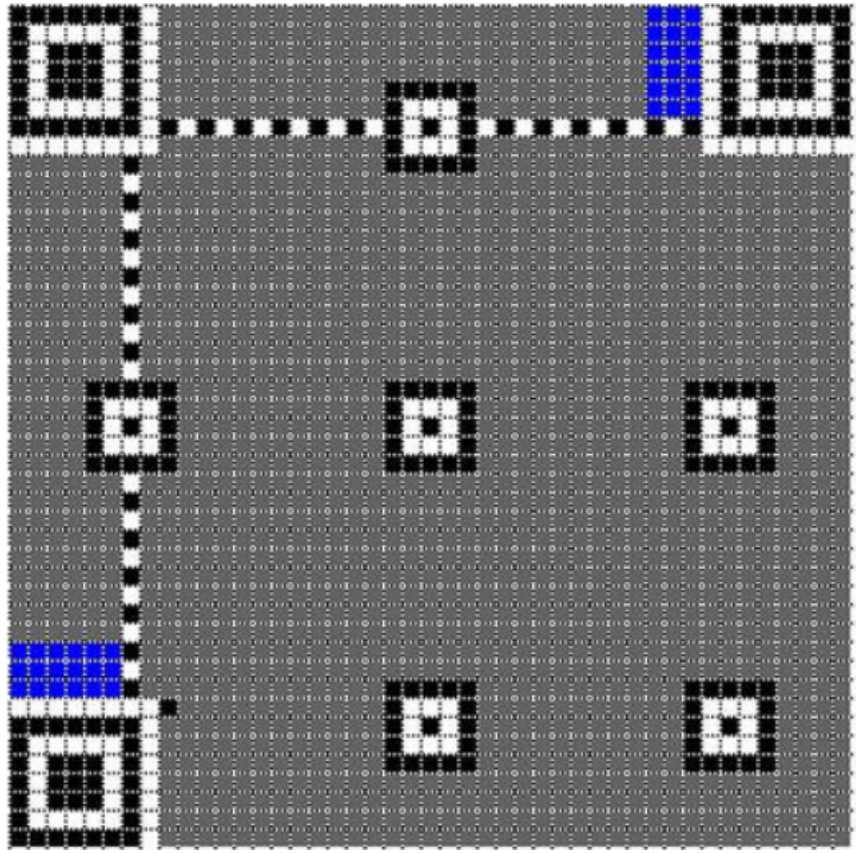
Step 5
Version Information



Only for above Version 7

Generating QR Code

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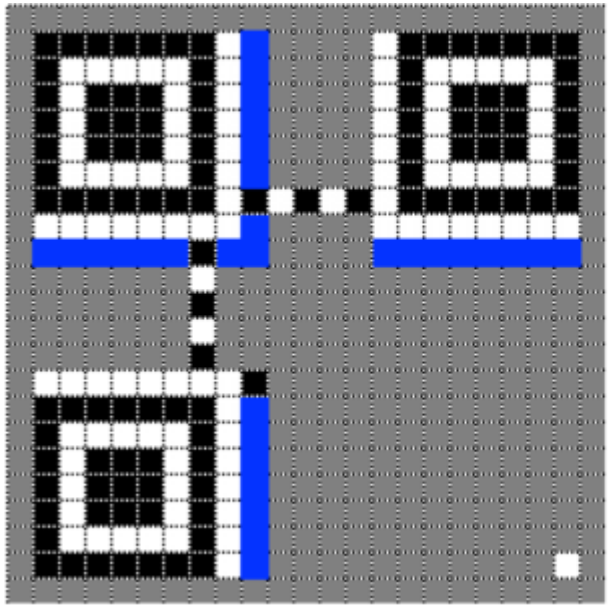
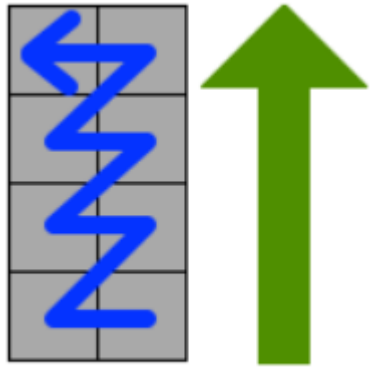
Step 6
Data Fill



Fill from right bottom



Fill way

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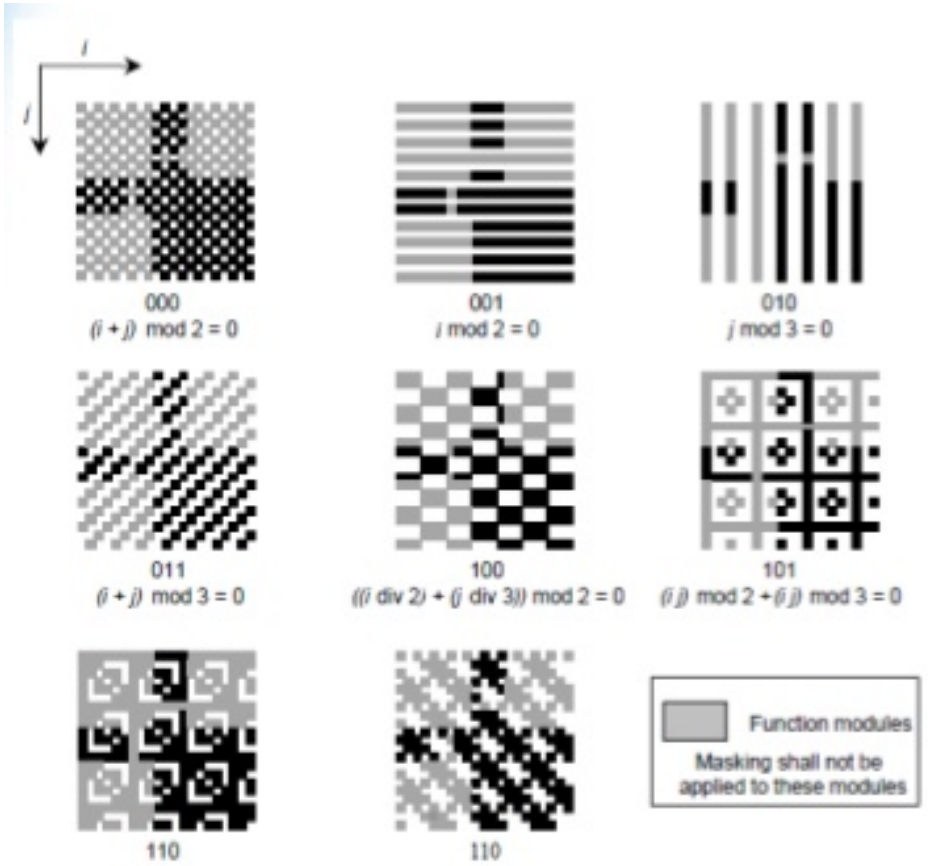
Step 7
Masking Pattern



To reduce the same color blocks

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