DABA CANVAS AND PAINTINGS

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Contents

1. Introduction

Dabanese texts (say, daba statements) are meant to be read just like ordinary texts written in natural languages (e.g. Chinese, English or Polish). Roughly speaking, the daba statements are strings of dabagrams (something like Chinese ideograms). They are presented on a (digital) tape of pixels as graphics; see *daba canvas* (section 2). One writes and reads dabanese from left to right.

Once we know this, there are also several ways to encode a dabanese texts to let a computer understand them in its ways. However, every important daba or dabanese material should exist in the said graphics form, and one such copy should be considered as the original copy.

There are three kinds of dabagrams: the true dabagrams, the six daba syntactic signals, and blanks. The true dabagrams convey meaning. The signals organize the daba statements, and blanks are either place holders which store a syntactic information (if any) in its frame (subsection 6.1), or are simply something like decoration without any daba-legal meaning.

Finally, the daba graphbars are a purely graphic device (for daba syntax and the reader's convenience) which separates dabagrams of daba statements (see section 4)..

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2. Daba statement canvas

A *daba statement canvas* is a 1-bit 2-dimensional array memory of dimension $64 \times n$ where $n > 6$ is a natural number (an integer). Specifically, this memory is indexed as

$$\{0\ \ldots\ 63\} \times \{0\ \ldots\ n{-}1\}$$

The value n varies, it depends on the statement (and on the style of the respective daba writer).

The word *memory* tells us that a canvas is just something like a cotton cloth and not already a *daba painting* which presents a daba statement (see section 3).

3. Daba painting

A daba painting is actually a 1-bit array $64 \times n$, i.e. it is a function

$$\delta\ :\ \{0\ \ldots\ 63\} \times \{0\ \ldots\ n{-}1\} \to \{0\ 1\}$$

where $n > 6$.

Every 1-bit 64-pixel column of a daba painting (there are n of them) is arithmetically represented by an integer from 0 to $2^{64} - 1$.

The above daba painting δ consists of n columns $\gamma_0\ \ldots\ \gamma_{n-1}$, where these columns are related to δ as follows:

$$\gamma_c[r]\ := \delta[r][c]$$

for every $c = 0\ \ldots\ n{-}1$ and $r = 0\ \ldots\ 63$.

4. Daba graphbars

A column of 64 bit-values 1, i.e. arithmetically coded by $2^{64} - 1$, is called a daba graphbar. Daba paintings have to obey certain restrictions. Here is the first restriction:

Graphics Rule 1. *The first and the last column of a daba painting is a daba graphbar (coded by* $2^{64} - 1$*).*

Don't worry much now about the coming graphics rule 2–it will be obvious later:

Graphics Rule 2. *Each daba painting has (at least)* 5 *consecutive columns each of which is not a daba graphbar, and the middle of the* 5 *columns has a bit-value* 0 *among its middle* 60 *pixels.*

The pedantic mathematical description of the column, as in rule 2: let C be the integer which codes the said column. Then the bit-OR $C \wedge (3 \times (2^{31} + 1)$ is not a graphbar, i.e.

$$C \vee (3 \cdot (2^{62} + 1))\ \neq\ 2^{64} - 1$$

This imposes on a daba painting at least one bit-value 0 in (at least one) one of the middle rows (the said 0 cannot occur at the extremal left or right of the painting though).

These initial rules are of course incomplete yet, they do not determine which paintings δ are actually daba paintings. However they already can tell us that many paintings are not daba paintings for sure because they either do not start or not end with a graphbar, or because certain columns inside are missing. E.g. one may run a simple algorithm to point to some non-daba paintings (possibly some misprints or bugs were involved)..

5. Daba-legality of graphbar repetitions

A daba painting allows for variations which affect the esthetic or psychological or some other impact of the daba statement rendition while without changing its daba-legal sense. For instance, changing a positive number of the consecutive graphbars to another positive number does not change the daba-leglity. More formally:

Legality Rule 1. *Consider two daba statements LBR and $LBBR$, where each B is a graphbar, L is the left part of the daba statements (the same one for both of them), and R is the right side of the same statement (again the same in both cases). Then these two daba statements are daba-legally equivalent.*

6. Dabagram canvas and frame, and dabagram painting

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6.1. Dabagram canvas and frame.

A *dabagram canvas* is a 1-bit 2-dimensional array memory of dimension $64 \times d$ where $d > 4$ is a natural number. Specifically, this memory is indexed as

$$\{0 \ \ldots \ 63\} \times \{0 \ \ldots \ d{-}1\}$$

The value d varies, it depends on the dabagram. However, for any fixed dabagram its dimension d is unique, i.e. every dabagram has exactly one canvas.

The subarray memory

$$\{2 \ \ldots \ 61\} \times \{2 \ \ldots \ d{-}3\}$$

is called the *dabagram proper canvas*, and the remaining memory of the dabagram canvas is called its *dabagram frame.* Explicitly, the frame is indexed by:

$$\{0\ 1\ 62\ 63\} \times \{0 \ \ldots \ d{-}1\} \ \cup \ \{0 \ \ldots \ 63\} \times \{0\ \ 1\ \ d{-}2\ \ d{-}1\}$$

WARNING The notion of the dabagram canvas is different from the notion of the daba canvas. While they are somewhat similar, one should not confuse them.

6.2. **Dabagram painting.** Given a dabagram canvas (including its frame), a *dabagram painting* (painted on this frame) is a 1-bit function

$$\epsilon \ : \ \{0 \ \dots \ 63\} \times \{0 \ \dots \ d{-}1\} \ \to \ \{0 \ 1\}$$

The restriction of this painting (function) to:

$$\epsilon_0 \ : \ \{2 \ \dots \ 61\} \times \{2 \ \dots \ d{-}1\} \ \to \ \{0 \ 1\}$$

is called the *proper part of the dabagram* or the *proper dabagram painting*, while the restriction ϕ of ϵ to the frame F:

$$\phi \ : \ F \ \to \ \{0 \ 1\}$$

where

$$F \ := \ \{0 \ 1 \ 62 \ 63\} \times \{0 \ \dots \ d{-}1\} \ \cup \ \{0 \ \dots \ 63\} \times \{0 \ \ 1 \ \ d{-}2 \ \ d{-}1\}$$

is called the *dabagram frame decoration* (see subsection 6.1)–let me repeat, function ϕ is called the dabagram frame decoration.

WARNING The notion of the dabagram painting is different from the notion of the daba painting. While they are somewhat similar, one should not confuse them.

A function $s : \{2 \ \dots \ 61$ which has all bit-values 1 is called a *short graphbar*. Here is another daba restriction: no column of a dabagram painting is a graphbar; moreover, the proper dabagram paintings cannot contain any short graphbar; in other words:

Graphics Rule 3. *Let* $\epsilon \ : \ \{0 \ \dots \ 63\} \times \{0 \ \dots \ d{-}1\} \ \to \ \{0 \ 1\}$ *be an arbitrary dabagram painting. Let* $\gamma_c \ : \{0 \ \dots \ 63\} \to \{0 \ 1\}$ *be the the consecutive c column of* ϵ*, where*

$$\gamma_c[r] \ := \ \epsilon[r][c]$$

for every $c = 0 \ \dots \ d{-}1$ *and* $r = 0 \ \dots \ 63$*. Furthermore, let* Γ_c *be the arithmetic code of* γ_c *(for* $c = 0 \ \dots \ d{-}1$*). Then the following two restrictions hold:*

(1) $\Gamma_c \ \neq \ 2^{64} - 1$ *for* $c \ = \ 0 \ 1 \ d{-}2 \ d{-}1$;
(2) $\Gamma_c \vee (3 \cdot (1 + 2^{61})) \ \neq \ 2^{64} - 1$ *for* $c = 2 \ \dots \ d{-}3$.

Corollary 1. *Dabagram paintings have no graphbars, i.e.* $\Gamma_c \neq 2^{64} - 1$ *for every* $c = 0 \ \dots \ d{-}1$.

7. Shifted dabagrams

Let

$$\delta \ : \ \{0 \ \dots \ 63\} \times \{0 \ \dots \ n{-}1\}$$

be an arbitrary daba paintings. Consider integers $0 < a < b < n$. We say that that the columns $\gamma_a \ \dots \ \gamma_{b-1}$ form a shifted dabagram $\Leftarrow:\Rightarrow$ the following two conditions hold:

(1) columns γ_{a-1} and γ_b are graphbars;
(2) there exists a dabagram $\epsilon : \{0 \ \dots \ 63\} \times \{0 \ \dots \ d{-}1\} \ \to \ \{0 \ 1\}$ such that $d = b{-}a$ and $\delta[r][c] = \epsilon[r][c{-}a]$ for every $r = 2 \ \dots \ 61$ and $c = a{+}2 \ \dots \ b{-}3$.

When this is the case then we say that the subarray of δ of the columns $\gamma_a \ \ldots \ \gamma_{b-1}$ is a shifted dabagram ϵ.

WARNING Only the proper part of the dabagram is shifted while the frame of the (original) dabagram and the frames of different occurences of the shifted copies of the same dabagram can be printed all differently one from another.