

TYPE + CODE II: A Code Driven Typography

Yeohyun Ahn, and Ge Jin

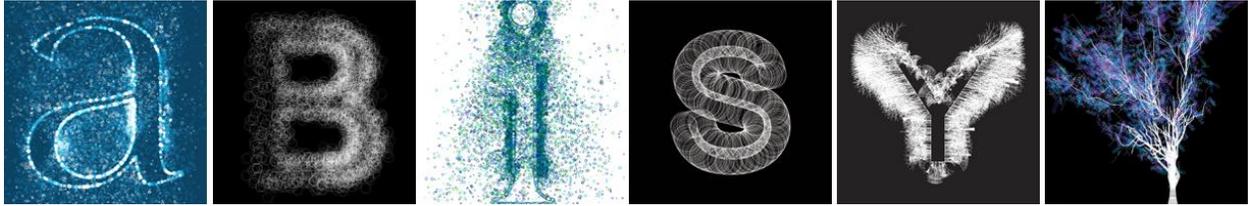


Fig. 1. TYPE + CODE II: A Code Driven Typography.

Abstract—TYPE+CODE II explores the aesthetic of an experimental code driven typography with Processing. It is inspired by calligraphy, graphic art, typography, and computer art. TYPE+CODE II reinterprets the typography by combining traditional hand drawing calligraphy with modern and contemporary code driven typography utilizing mathematic expressions, algorithms, and libraries in Processing.

Index Terms—Calligraphy, Graphic Art, Digital Art, Graphic Design, Typography, Computer Art, Illustration.

1 INTRODUCTION

Traditionally, designers create typeface and typography for specific visual purposes like greeting cards, logos, magazines, advertisings, etc. Visual communication and typography have evolved from a print based to a touch screen based form. Modern typographers are accustomed to design typefaces using commercial software packages through a Graphic User Interface (GUI). Now designers can create new typefaces by clicking, selecting and dragging, similar to the ways of human hand drawing. However, the GUI, as a primary interaction tool, may limit the visual creativity of the designers and the visual outcomes. In addition, the graphic software packages are evolving rapidly and may disappear in the near future.

In this paper, we reinterpreted the typography as an experimental art form, a code driven typography. Basically, it began with a curious question, "If visual designers would directly use programming languages rather than computer graphic software, what kind of visual outputs or visual evolution would unfold?" By adopting new technology, the code driven typography can explore new typographic identities, convey new visual messages, and interact with massive amounts of information and data. The code driven typography was implemented through Processing, an open source programming language built for the electronic art and the visual design community [7, 8]. Former MIT Media Lab members, Casey Reas and Benjamin Fry, pioneered the Processing project in 2001. Processing was designed to ease the code learning process through frequent visual feedbacks. Processing is a simple but deceptively powerful programming language that can generate startling visual effects through the application of basic mathematical concepts. Visual expressions that might take days to create by hand can be generated in seconds using random processes and rule-based systems.

The typographic artworks in the TYPE+CODE II project are inspired by nature, ecology, emotion and religion. They are also complying with the design principles and functions such as grid,

layout, texture, pattern, hierarchy, and color by using basic visual elements.

2 METHODS

The typography research project TYPE+CODE II is a graphic manifestation of 'cybernetic ecology', in which the artist explores the letter formations and the alternative typographic solutions through coding to achieve highly contemporary end results [1]. We investigated the formal expressions of typeface with calligraphy, graphic design, computer science and information design to create abstractions of roman characters, recalling components of natural and religious themes. TYPE+CODE II explored the aesthetic of experimental, code-driven typography through the Processing. Firstly, we used Adobe Illustrator, Photoshop and InDesign before working with Processing. But we noticed these limitations and constraints in GUI based design using graphic software packages.

An experimental typography was explored with binary tree algorithm, L-system algorithm, Geomerative library and Caligraft created by Richard Marxer Piñón [4, 5]. The TYPE+CODE II project adopted the traditionally popular fonts such as Arial, Times, Helvetica and a modern font, Stanford by Jennifer Dickert as the foundation of the artwork. We experimented with universal design principles such as duplicating, repeating, overlaying, rotating, randomizing, inverting, and cutting in Processing. Finally, the visual output was converted from programming code to a PDF file to create high resolution images.

2.1 Binary Tree Algorithm

Binary Tree is a basic data structure in which each node spawns two descendants. We defined a binary tree function with six parameters: X1, Y1, X2, Y2, Level and Angle. X1 and Y1 indicate the starting position values of the two descendants from each node. X2 and Y2 show the end position values of the two descendants from each node. Level indicates how many nodes will emerge. Angle represents the value of the angle that spreads out from each node. Distinct visual patterns can be created by logically duplicating, rotating and overlapping six parameters. This visual pattern would be extremely labor intensive to be created in graphic software packages such as Adobe Photoshop.

• Yeohyun Ahn is with Chicago State University and The School of Art Institute of Chicago. E-mail: yeoahn@gmail.com

• Ge Jin is with Purdue University Calumet. E-mail: ge.jin@purduecal.edu

Manuscript received 31 March 2013; accepted 1 August 2013; posted online 13 October 2013; mailed on 4 October 2013.

For information on obtaining reprints of this article, please send e-mail to: tvcg@computer.org.

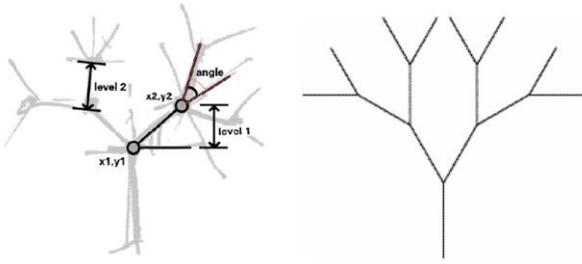


Fig. 2. Binary Tree Algorithm.

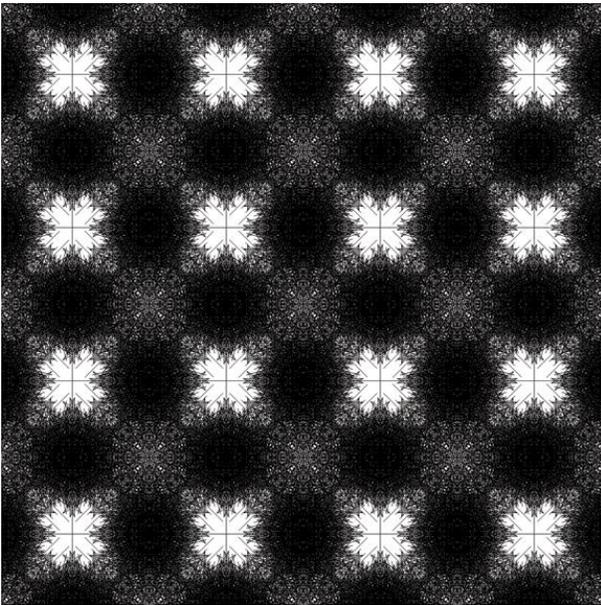


Fig. 3. Pattern Design Generated by Binary Tree Algorithm.

2.2 L-System Algorithm

L-system is a type of formal grammar to model the growth processes of plant and the morphology of a variety of organisms [9]. L-system was introduced by Aristid Lindenmayer, a Hungarian biologist and botanist, in 1968 [6]. The recursive nature of the L-system leads to self-similarity and fractal-like forms. By increasing the recursion level, a variety of plant models, natural-looking organisms and artificial life forms can be easily defined and generated.



Fig. 4. Artificial Tree Generated by L-System Algorithm (Programmed by Jer Thorp).

2.3 Geomerative Library and Caligraft

Caligraft is a crafting computational calligraphy tool based on the Geomerative library in Processing. Geomerative library enables user to convert a font into a vector shape. It allows artist to create figurative and generative typography by using calculus and computation. Geomerative library is constructed with public fonts such as Arial and Times as “seed” fonts. Caligraft has several variables and functions to change the font styles, the string of the letters, the speed of deformation, the variation of ink, the precision, and the drawing function. Also, we can add our own variables and functions directly. Initially, Caligraft was referenced to explore how traditional hand drawing based calligraphy can be innovated to a new dimension of textural typography in computation with the basic visual elements such as line, circle, and curve.

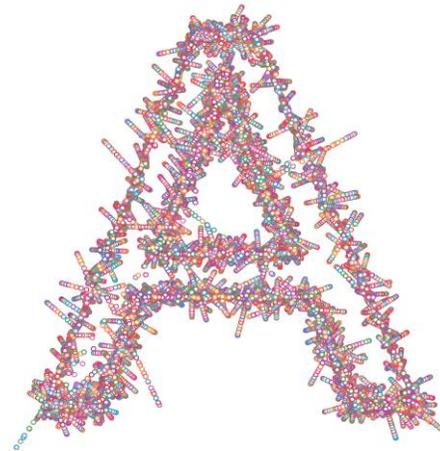


Fig. 5. Letter 'A' Generated with Geomerative Library and Caligraft.

3 EXPERIMENTAL TYPOGRAPHY

In this section, we will introduce three word based typographic artworks, and seven letter form of typographic artworks. We will briefly describe the motivation of the work, as well as the techniques and the visual elements used to generate the visual outcome. The ideas for the artworks encompass emotion, eroticism, religion, environment and ecology.

3.1 Title: Y: Womb

The idea of “Y: Womb” explores an experimental typographic form to express womb with the letter Y. The author decided to use the letter Y because it is a part of her first name. She had drawn the numerous tree forms by using Binary Tree algorithm along the outlines of the letter Y. Binary Tree algorithm was used to generate the abstract tree forms, and the Caligraft was adopted to plant the abstract tree forms along the outline of the letter Y. The Arial font was used to reference the outline information of the letter shape. In a dark space, the letter Y is visually transformed into a meaningful and vibrant visual form representing the womb, a major female reproductive sex organ.

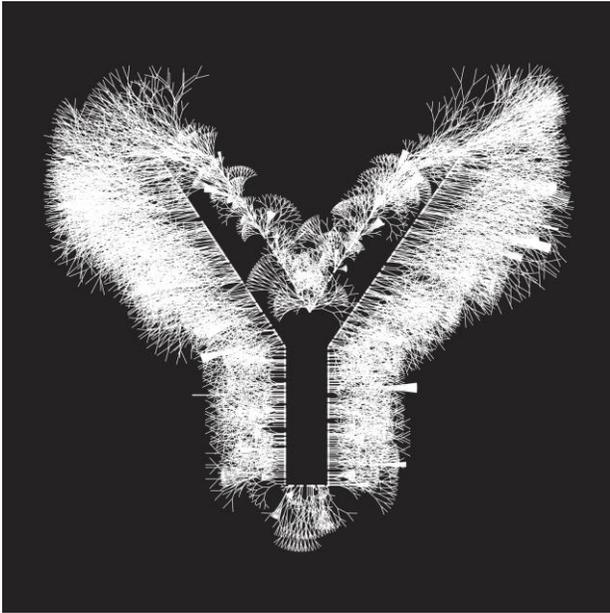


Fig. 6. Y: Womb (2010, Print on Canvas, 30X30X1.5 Inch).

3.2 Title: Green

"Green Design" is an environmental movement to encourage people to use sustainable design products by utilizing recycled, renewable and environment-friendly materials. It is a typographic experiment articulating the meaning of "Green Design" with the word, GREEN. The author experimented with numerous tree forms using Binary Tree algorithm on the plain and inanimate outline of the letter forms, GREEN. Applying green color palettes to the tree forms and animating them, we evoke the green environment. Through this process, the inanimate word, GREEN, is visually transformed into a meaningful form to deliver a visual message about the "Green Design."

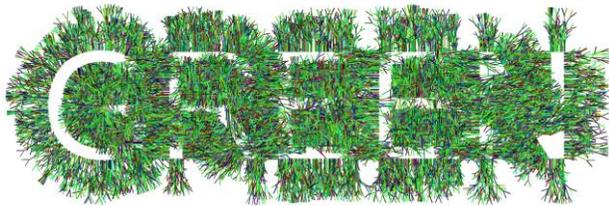


Fig. 7. Green (2009, Print on Canvas, 30X10X0.75 Inch).

3.3 Title: Life

"Life" is a kinetic typography inspired by the scripture in Ecclesiastes 3:1, "To everything there is a season." The author believes that life has seasons; spring, summer, fall, winter and then, spring again in a cycle. The animation begins with winter and then moves to spring, summer, fall and winter again in a loop. Each repeated season is not the same. The branches and leaves will grow up at random positions as if every season is always new for us.

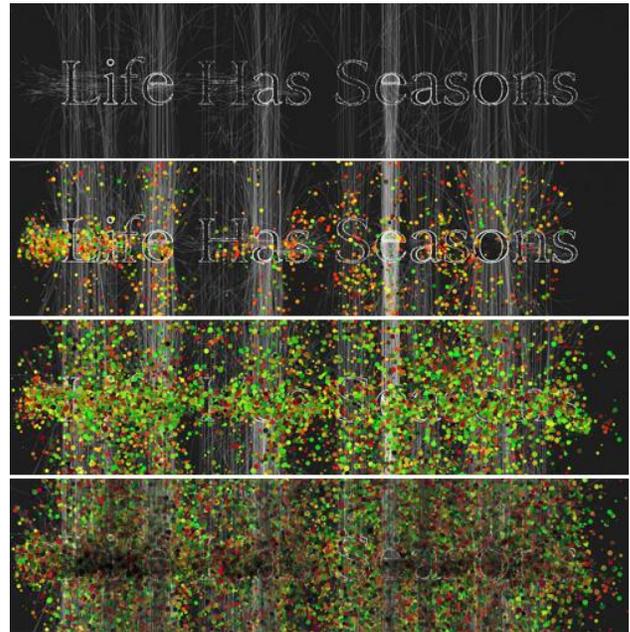


Fig. 8. Life (2012, Screen, 1000X250 Pixels).

3.4 Title: TYPE+CODE II

"TYPE+CODE II" was created for cover art of the book: "TYPE+CODE Processing for Designers" [2]. This typography was created with the word, "code", by referencing the L-system algorithm.

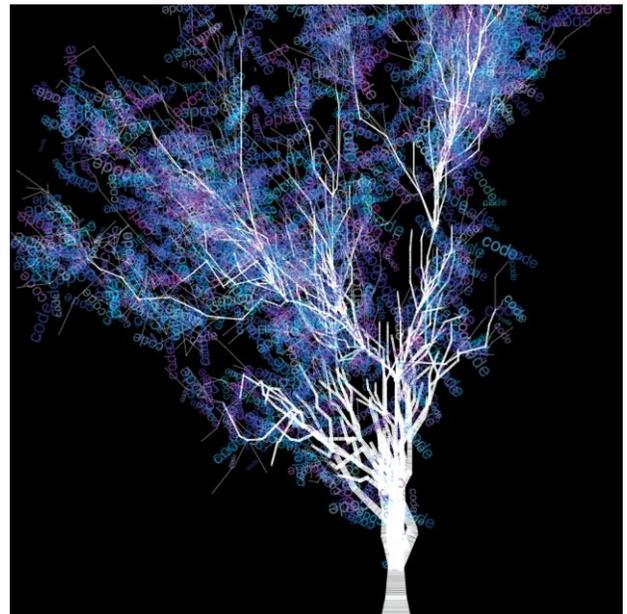


Fig. 9. TYPE+CODE II (2011, Print on Canvas, 30X30X0.75 Inch).

3.5 Typography with Letters

In this sub section, we will briefly describe various typographic artworks using single or multiple letter forms

3.5.1 Title: A: Birth

"A: Birth" is a typographic experiment representing birth. The letter a gradually emerges and is constructed from the universe by radiating lights from circles.



Fig. 10. A: Birth (2011, Print on Canvas, 30X30X0.75 Inch).

3.5.2 Title: B: Death

“B: Death” expresses death. The author created this work by overlapping numerous lifeless circles on a void black background.

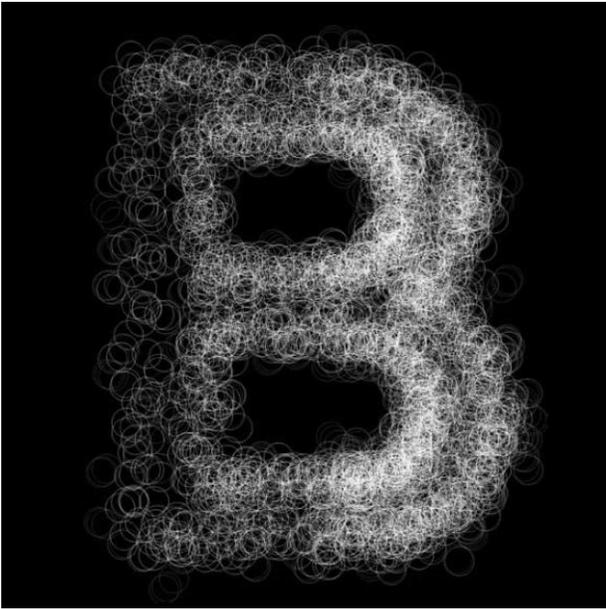


Fig. 11. B: Death (2011, Print on Canvas, 30X30X0.75 Inch).

3.5.3 Title: i: Life

From a scientific perspective, life first started from the ocean. “i: Life” is based on the author’s visual imagination, depicting how a letter ‘i’ is born and formed inside the ocean with the life force.

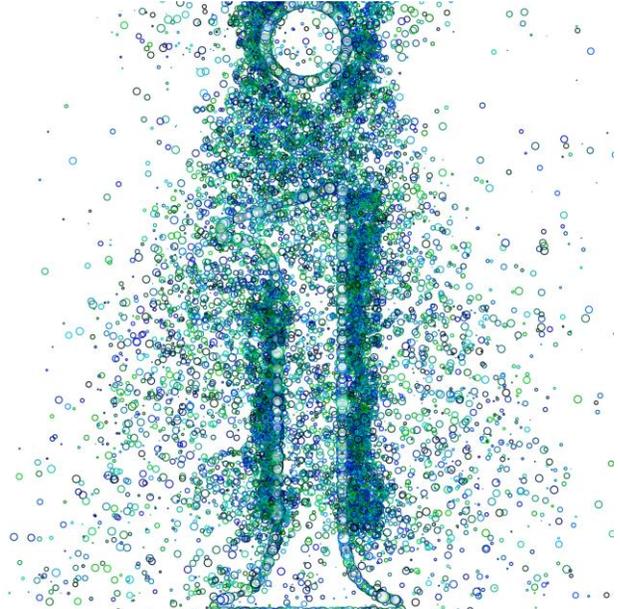


Fig. 12. i: Life (2011, Print on Canvas, 30X30X0.75 Inch).

3.5.4 Title: S

Initially it was created as a part of TYPE+CODE, MFA thesis of the author at the Maryland Institute College of Arts in 2007. It was included as a tutorial chapter of the book, “TYPE+CODE Processing for Designers”, in 2010. It shows how the letter from, S, can be renewed and evolved into a new, experimental, inventive, and innovative letter by using the codes rather than the traditional hand drawings.

Later, the typography, 'S,' was invited to be the cover art of Letter Arts Review magazine, an international magazine for letter arts and calligraphy, in 2010.

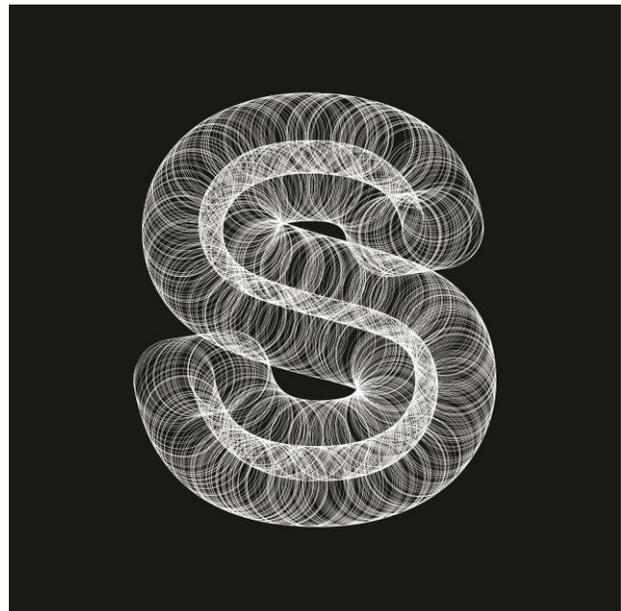


Fig. 13. S (2007, Print on Canvas, 30X30X0.75 Inch).

3.5.5 Title: Erotica A to Z

“Erotica A to Z” reminds certain areas of the male body. The author created this work through repeating and overlapping numerous ellipses around letters. This work received Honorable Mention from the National Juried Competition 2012: Digital Works at Long Beach Island Foundation of the Arts and Sciences.

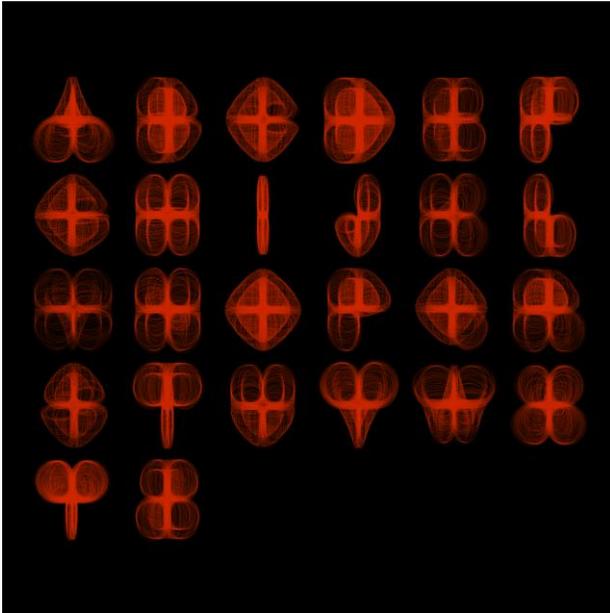


Fig. 14. Erotica A to Z (2012, Print on Canvas, 30X30X0.75 Inch).

3.5.6 Title: Light A to Z

"Light A to Z" was inspired by the scripture, "You are the light of the world: Matthew 5:14." The author designed a full alphabet set from A to Z.

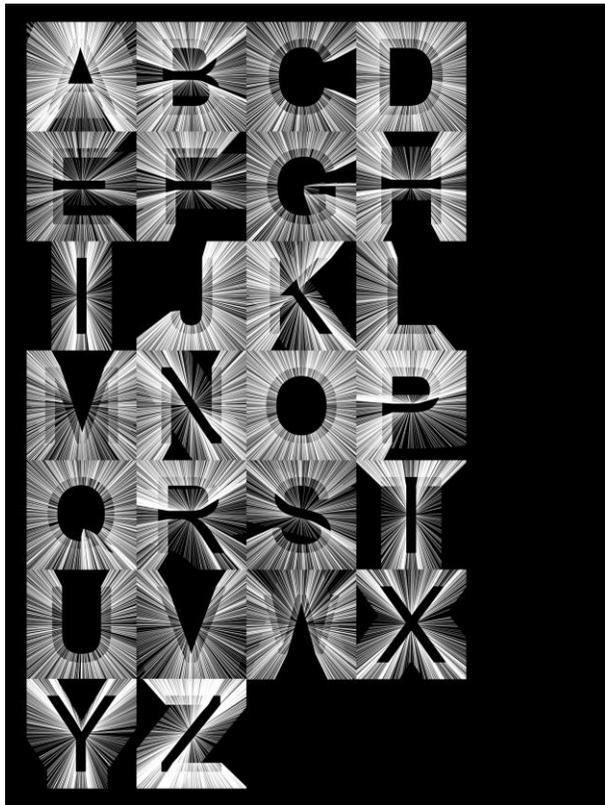


Fig. 15. Light A to Z (2010, Print on Canvas, 44X32X0.75 Inch).

4 CONCLUSION

The TYPE+CODE II research was initially born as a part of a graphic design book, "Graphic Design: The New Basics," written by Ellen Lupton and Jennifer Cole Phillips [3]. This book shows a study of the fundamentals of forms and ideas in a critical, logical way,

inspired by contemporary media, theory and software system. This research explored experimental typographies and graphic design with direct coding. Code driven typography is an alternative way of a creative process for artists and designers. TYPE+CODE II reinterpreted traditional and culturally oriented calligraphy into modern and contemporary typography with the computer codes. The authors used letter forms, words, phrases, and sentences to explore innovative typography and solutions with basic visual elements. They convey diversified visual messages inspired by nature, addressing environmental issues, healing through Arts, exploring philosophical and religious interpretation regarding life, death and love.

Using computational typography to drive data sets and convert them into print applications is still in a territory to be explored for the designers. The usage of code driven typography celebrates a multi-disciplinary design approach, combining interests in advanced mathematics, algorithms and computer generated graphics. Experimental art and code driven typography is necessary for the new generation of graphic designers, typographers and artists who want to go beyond their visual expectations.

ACKNOWLEDGMENTS

The authors wish to thank Ellen Lupton, Byungkwon Oh, Jennifer Cole Phillips, John Bowser, Geoffrey Alan Rhodes, Lillian Dawson, Renate Goki, and Eileen Pender for their support and advices.

REFERENCES

- [1] Y. Ahn, "Code Driven Typography," <http://designboom.com>, Milan, Italy, February, 2012.
- [2] Y. Ahn and V. Cordova, *Type + Code: Processing for Designers*. Baltimore, Maryland, Maryland Institute College of Art Press, May, 2009.
- [3] E. Lupton and J.C. Phillips, *Graphic Design: The New Basics*. New York, New York, Princeton Architectural Press, March, 2008.
- [4] R.M. Piñón, "Caligraft," <http://www.caligraft.com/>, 2012.
- [5] R.M. Piñón, "Geomerative Library," <http://www.ricardmarxer.com/geomerative/>, 2012.
- [6] P. Prusinkiewicz and A. Lindenmayer, *The Algorithmic Beauty of Plants*. New York, New York, Springer-Verlag New York, Inc., October, 1991.
- [7] C. Reas and B. Fry, "Processing: a Learning Environment for Creating Interactive Web Graphics," Proceedings of the SIGGRAPH 2003 Conference on Web Graphics (San Diego, California, July 27–31, 2003), ACM Press, July 2003.
- [8] C. Reas and B. Fry, "Processing: Programming for Media Arts," *AI & Society*, vol. 20, no 4, pp. 526-538, September 2006.
- [9] G. Rozenberg and A. Salomaa, *The Mathematical Theory of L Systems*. New York, New York, Academic Press, 1980.