FUNDAMENTALS OF SITUATED INTERACTION - 28 SEPTEMBER 2018

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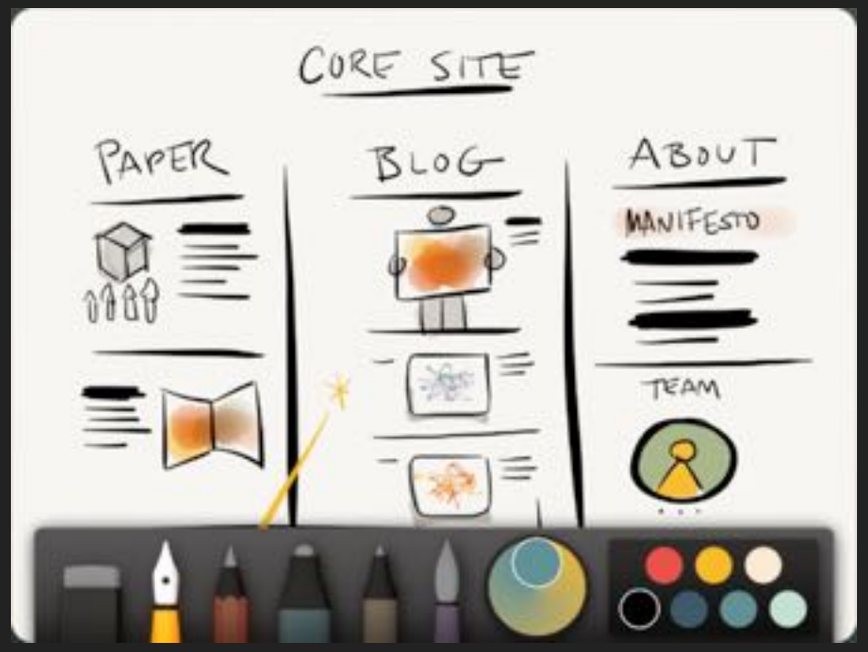
UNIVERSITÉ PARIS-SUD & INSTITUT UNIVERSITAIRE DE FRANCE

INFORMATION SUBSTRATES

INSTRUMENTAL INTERFACES

- To create and edit content

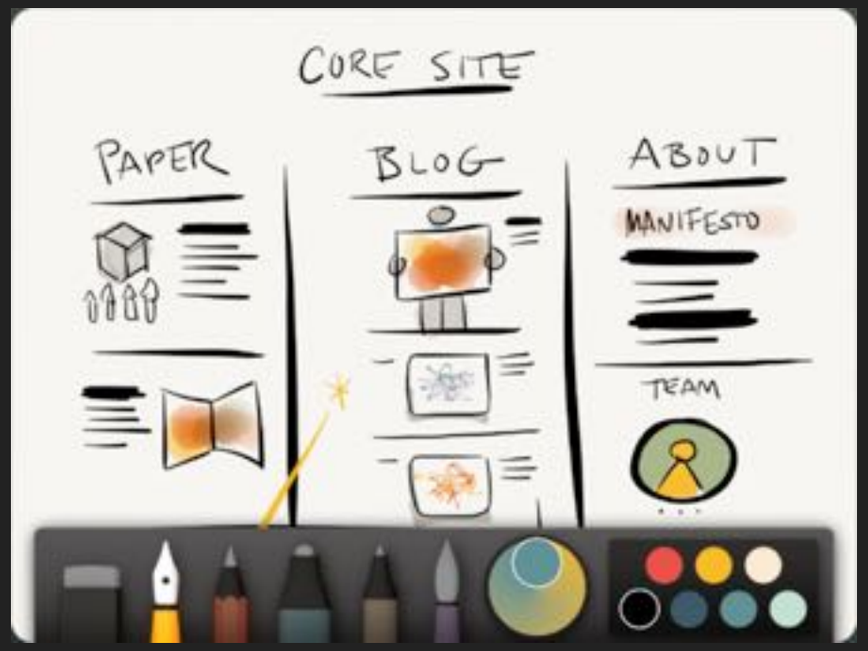


Paper

iPhoto

INSTRUMENTAL INTERFACES

- BUT limited:
- How to use the pen from the “Paper” app to write on a photo in the “iPhoto” app?



Paper

iPhoto

INFORMATION SUBSTRATES

- Data does not exist in a vacuum

INFORMATION SUBSTRATES

- Data does not exist in a vacuum
- It is part of a substrate that provides context for interpreting data and constraints for presenting and interacting with it
- Examples: musical score, spreadsheet, page layout, graph…

PHYSICAL SUBSTRATES

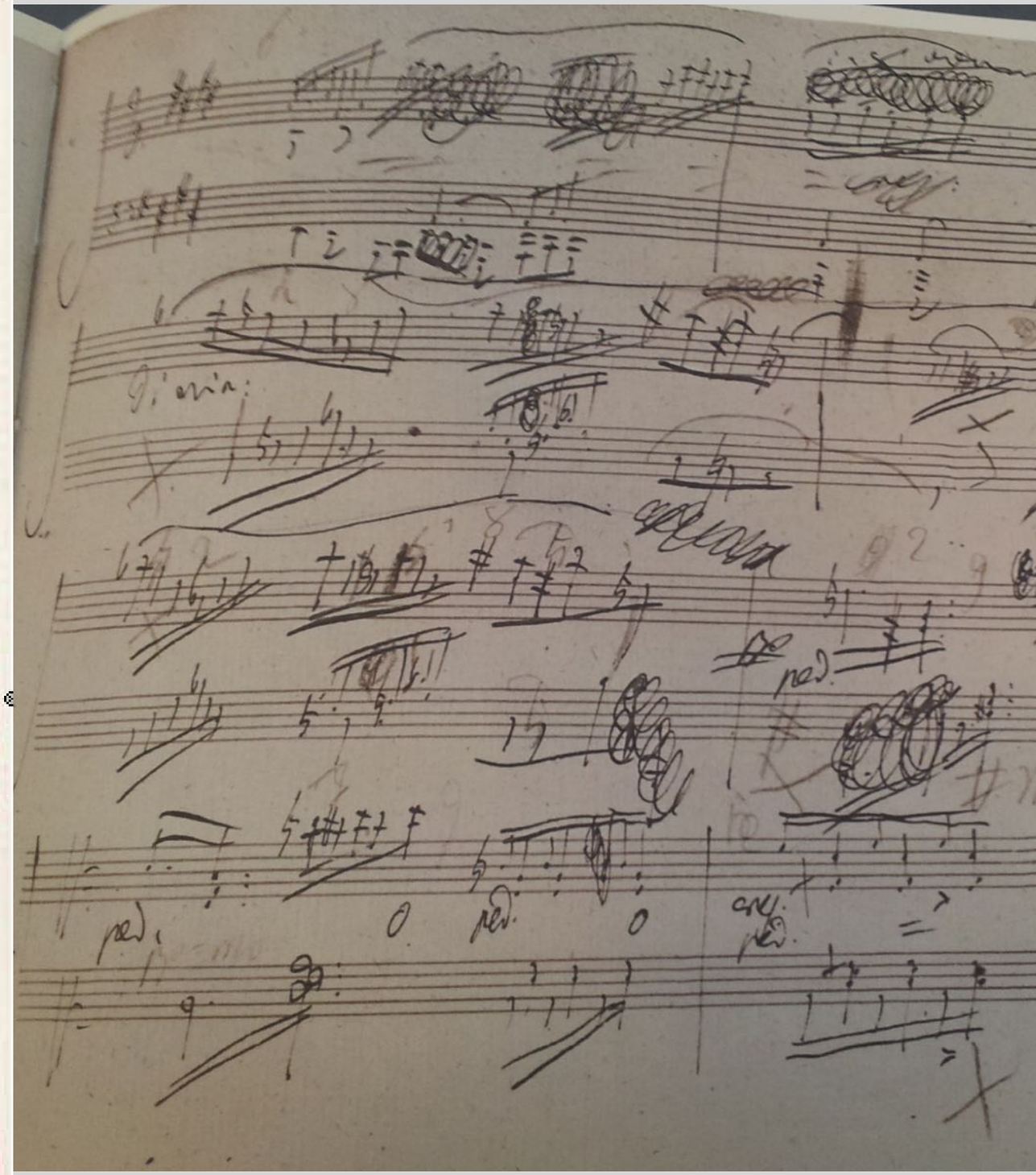
INFORMATION SUBSTRATES

24 Diciembre XXXV.

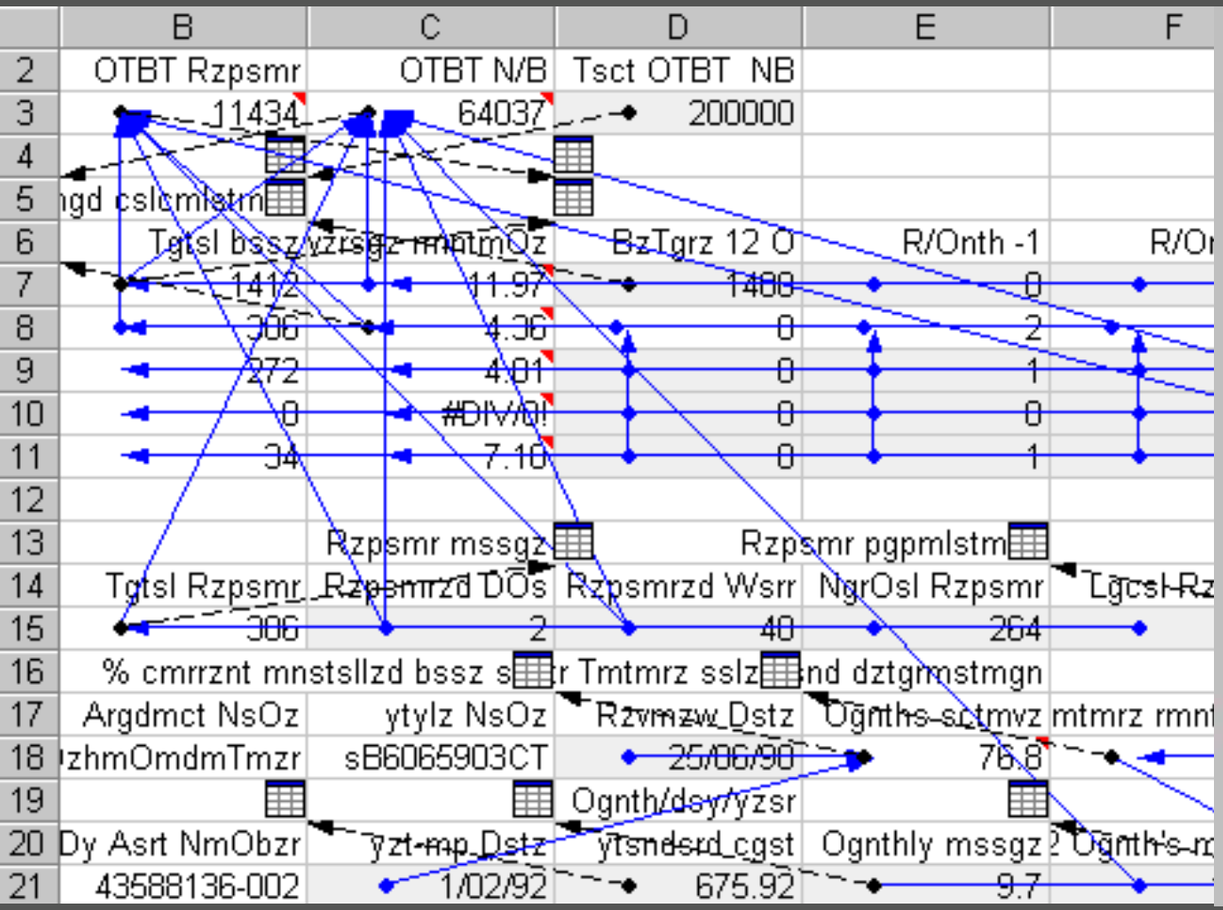
28 noviembre 1935
5 diciembre 1935
6 Diciembre XXXV

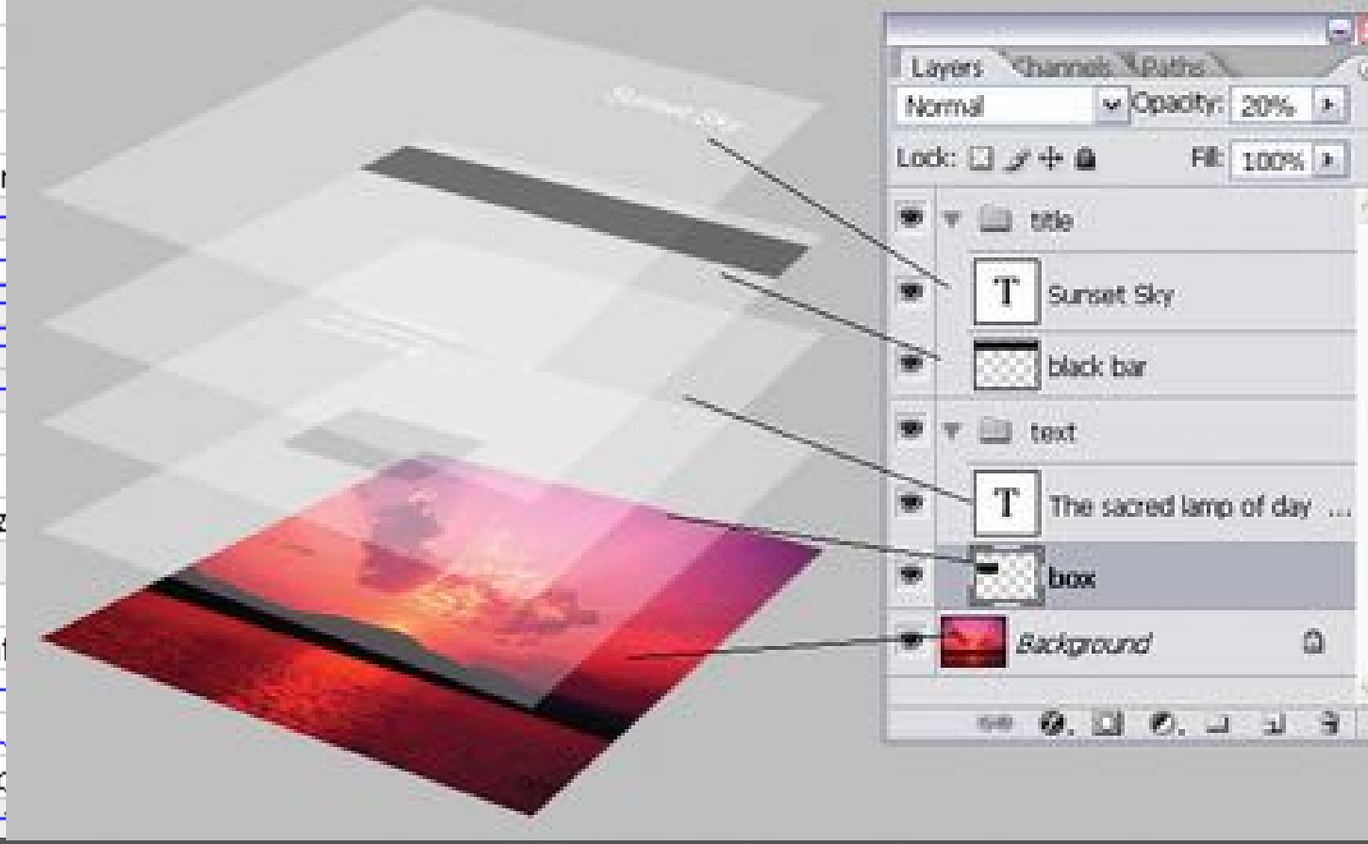
lengua que hace su cama cuando ya no se le importa un pito que
el rocío que le pega la jaca
haciendo su arroz con pollo en la sartén
y organiza en el amor la noche con sus guantes de risas
pero sí al rededor de la línea de fuego
más de lo que parece ofendido y tan pálido se mueve
de ver como jamón no huele y queso se estremece
y el pájaro que canta retuerce la cortina
que abanica su cara y la corta
en la nieve
que cuece sus cintas de todos los colores
en la flauta la copa
que cantándole
como si cantar pudiese la calavera
que le muerde la mano
y se la lleva suspendida por el anillo
envuelto en el ruido de las alas de las moscas
que la nota que sostiene el violín no deja respirar
apretándole el cuello con sus tenazas
roe la puñalada
que hincha en el globo atado con longanizas estremeñas
la razón perentoria del azul tan gracioso
que sentado en su silla curula
y arreglándose las faldas a cada momentito
cuando pasa la flecha tan veloz
le echa pimienta y sale
y lee el porvenir en el ojo del toro
puchero roto cuchara hecha de boj y reloj de pulsera
orégano laurel y aljofaina de plata

Caracoles



INFORMATION SUBSTRATES





Sales Data - Microsoft Excel

Sheet | Insert | Page Layout | Formulas | Data | Review | View

PivotTable | Table | Column | Line | Pie | Bar | Area | X Y (Scatter) | Other Charts | Picture | IGX Graphic | Shapes | Hyperlink | Text Box | Header & Footer | WordArt | Signature Line | Object | Symbol

Tables | Charts | Illustrations | Links | Text

H18

Total Sales by Store

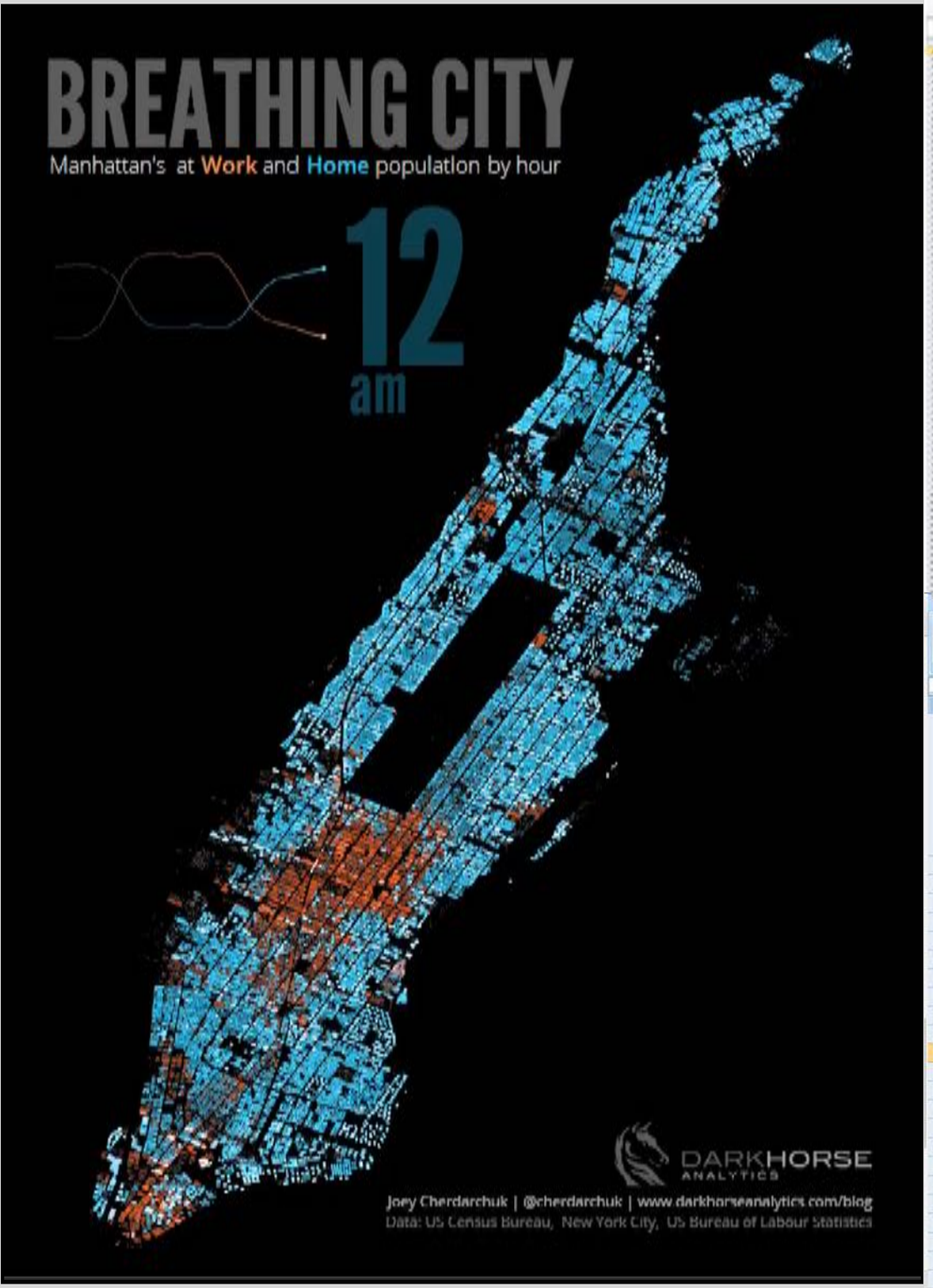
Store	Sales
Store 1	$ 313,765
Store 2	$ 107,160
Store 3	$ 351,751
Store 4	$ 131,047
Store 5	$ 252,136
Store 6	$ 167,462
Store 7	$ 210,073
Store 8	$ 308,092
Store 9	$ 97,492
Store 10	$ 393,484
Store 11	$ 396,891
Store 12	$ 151,168
Store 13	$ 251,390
Store 14	$ 392,776
Store 15	$ 259,654
Store 16	$ 225,184
Store 17	$ 335,785

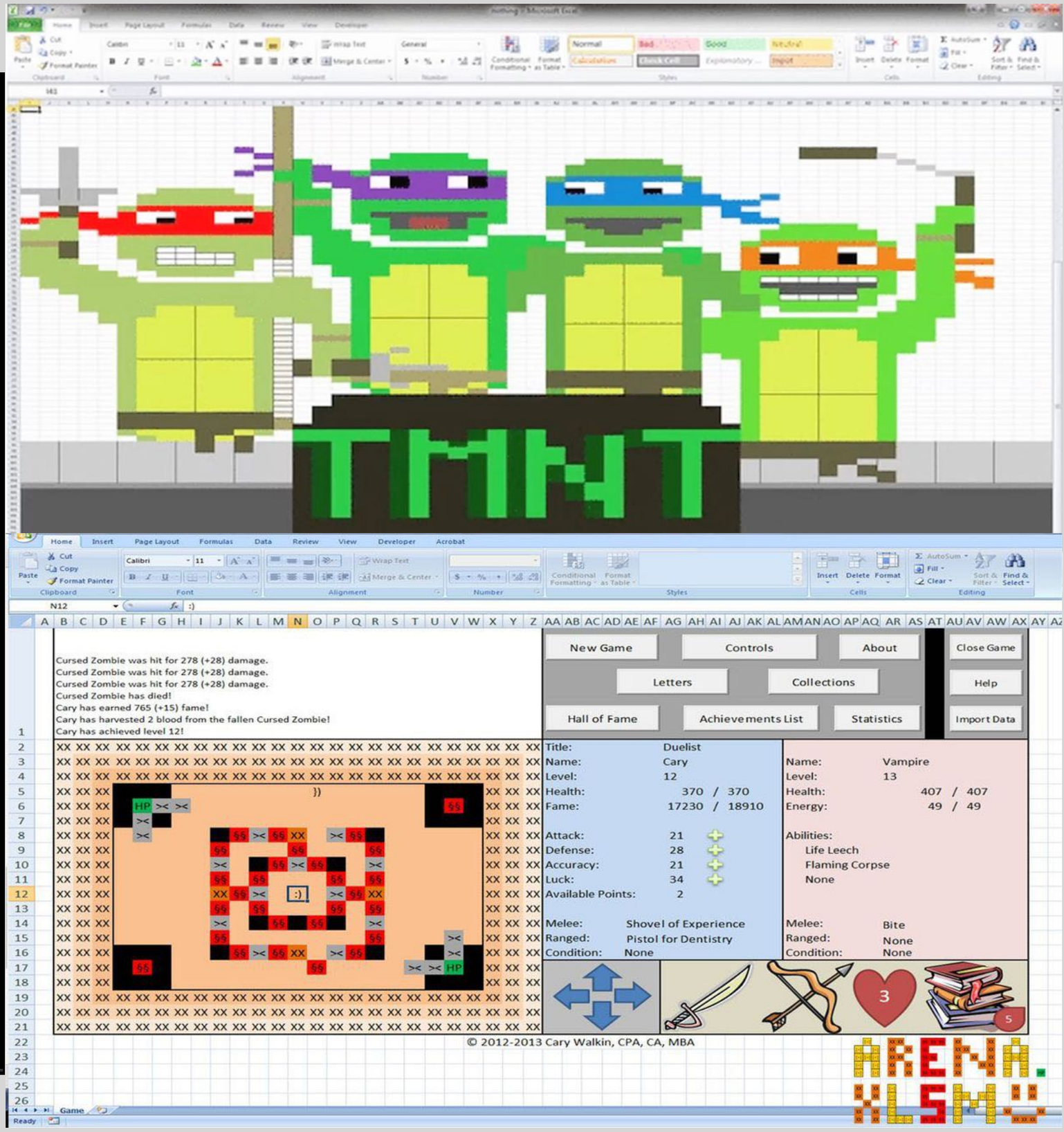
Total Sales by Region

Region	Sales
West	$ 1,718,258
South	$ 534,389
Midwest	$ 1,009,268
East	$ 900,431
Total	**$ 4,162,346**

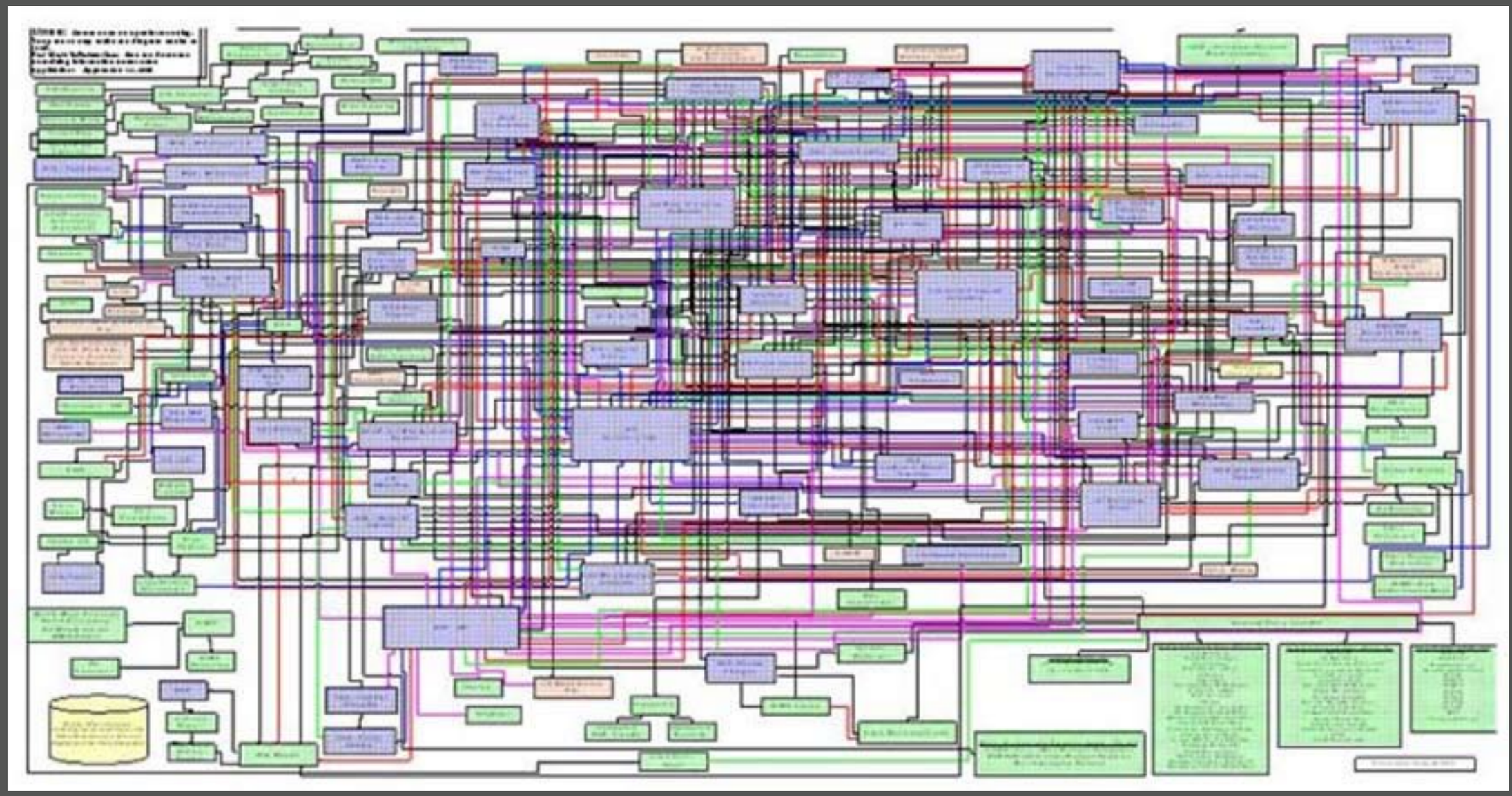
Total Sales by Category

Category	Sales
Automotive	$ 86,285
Gardening	$ 52,048
Electronics	$ 83,026
Jewelry	$ 93,035
Sporting	$ 50,016
Houseware	$ 19,149
Books	$ 42,247
Games	$ 18,420


BREATHING CITY
Manhattan's at Work and Home population by hour
12
am
DARKHORSE
ANALYTICS
Joey Cherdarchuk | @cherdarchuk | www.darkhorseanalytics.com/blog
Data: US Census Bureau, New York City, US Bureau of Labour Statistics


Cursed Zombie was hit for 278 (+28) damage.
Cursed Zombie was hit for 278 (+28) damage.
Cursed Zombie was hit for 278 (+28) damage.
Cursed Zombie has died!
Cary has earned 765 (+15) fame!
Cary has harvested 2 blood from the fallen Cursed Zombie!
Cary has achieved level 12!
New Game
Controls
About
Close Game
Letters
Collections
Help
Hall of Fame
Achievements List
Statistics
Import Data
Title: Duelist
Name: Cary
Level: 12
Health: 370 / 370
Fame: 17230 / 18910
Attack: 21
Defense: 28
Accuracy: 21
Luck: 34
Available Points: 2
Melee: Shovel of Experience
Ranged: Pistol for Dentistry
Condition: None
Name: Vampire
Level: 13
Health: 407 / 407
Energy: 49 / 49
Abilities:
Life Leech
Flaming Corpse
None
Melee: Bite
Ranged: None
Condition: None
© 2012-2013 Cary Walkin, CPA, CA, MBA
Game
Ready

HOW TO DEFINE INFORMATION SUBSTRATES?



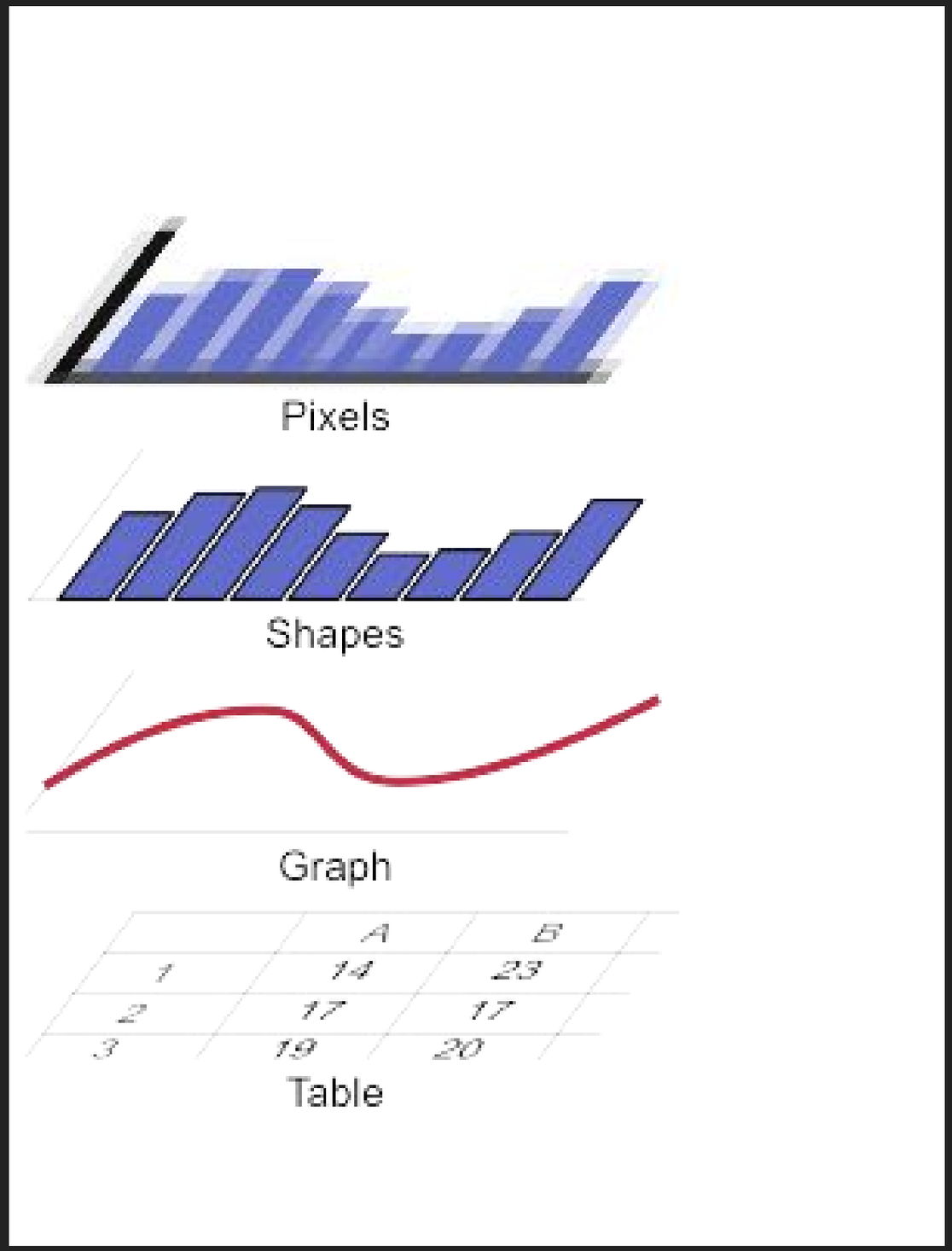
THIS IS NOT A PENCIL

ATOMS
MOLECULES
MATERIAL
OBJECT
TOOL
USE
CULTURE

THIS IS NOT (JUST) A PENCIL

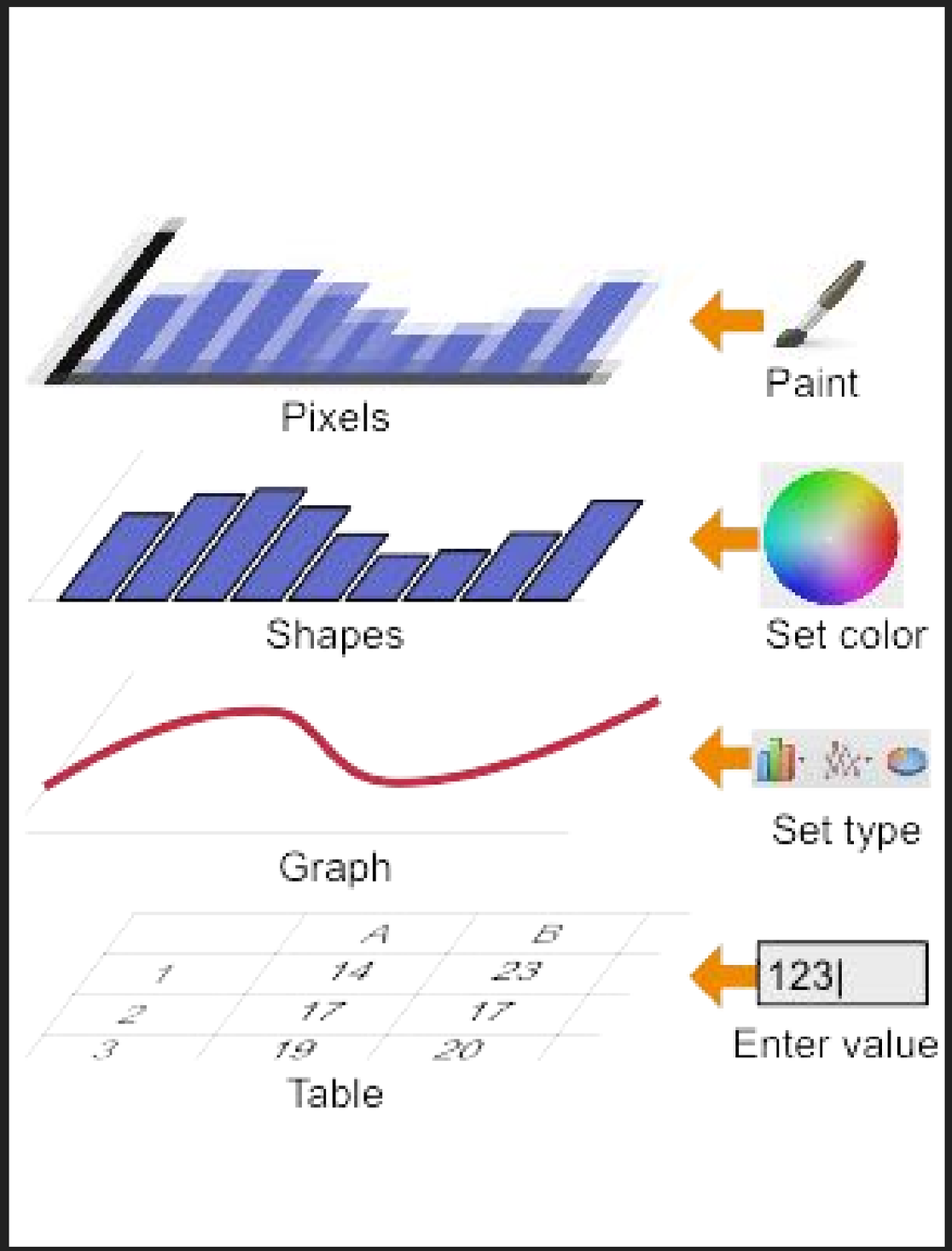
LAYERING SUBSTRATES

- A substrate can represent data in another substrate



LAYERING SUBSTRATES

- A substrate can represent data in another substrate
- Instruments can modify the different substrates in the stack
- Example:
  A table substrate - edit a value
  A graph substrate - set its type
  A histogram - set its color
  An image - paint on it



group list duplicate ungroup count

Constraint Options

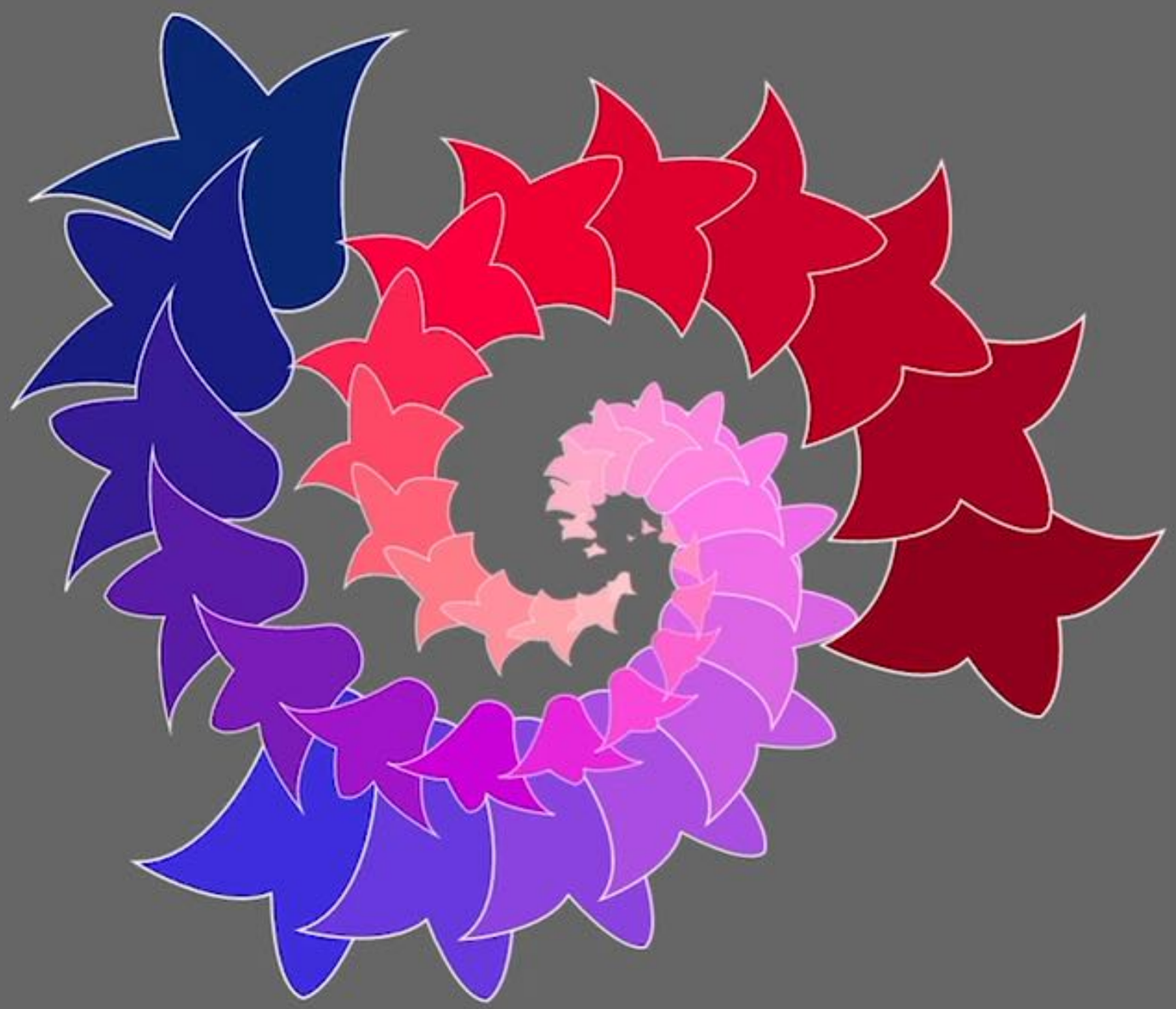
name constraint 4

x y

relative index 1

relative offset -530

interpolate



Layers

Constraints

constraint
constraint
constraint
constraint

Lists

Shapes

duplicator
group
group
group
group
group
group
group
group

Style

Fill #1e0506 Stroke #ffffff

Stroke Weight

Parameters

Save or Load a file

save save as

download file to desktop

upload file from desktop

upload a file No file chosen

Import or Export an SVG

export svg

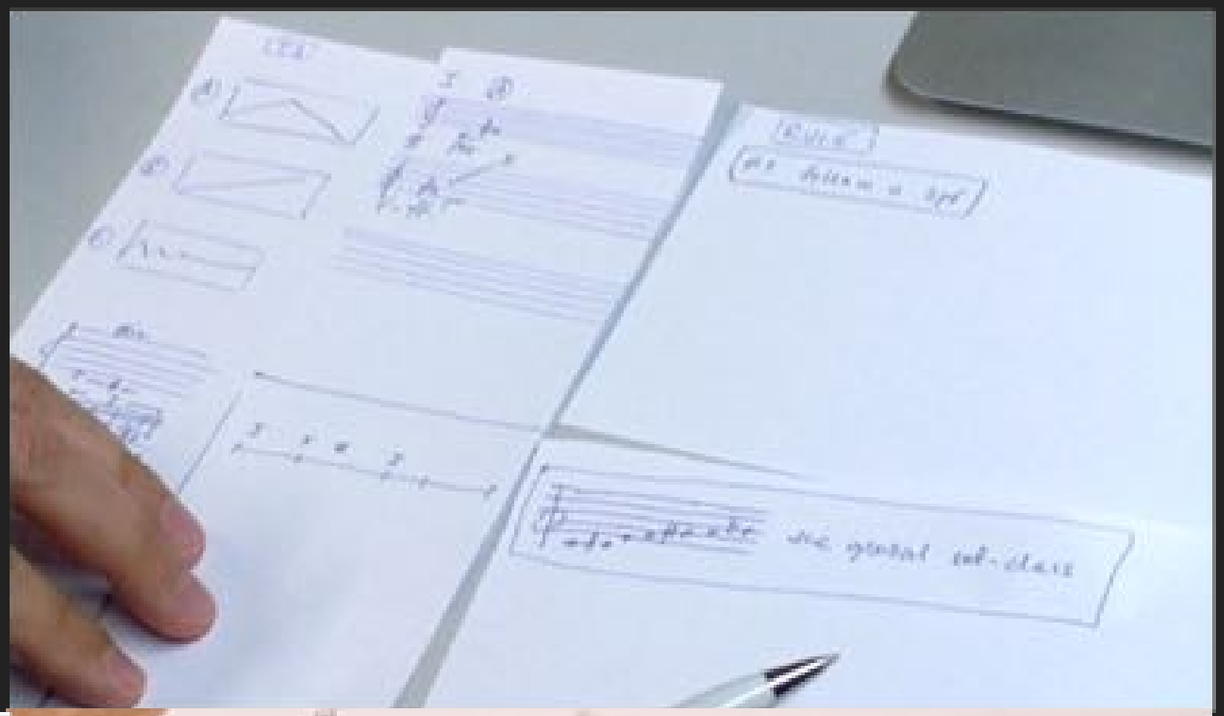
import SVG desktop

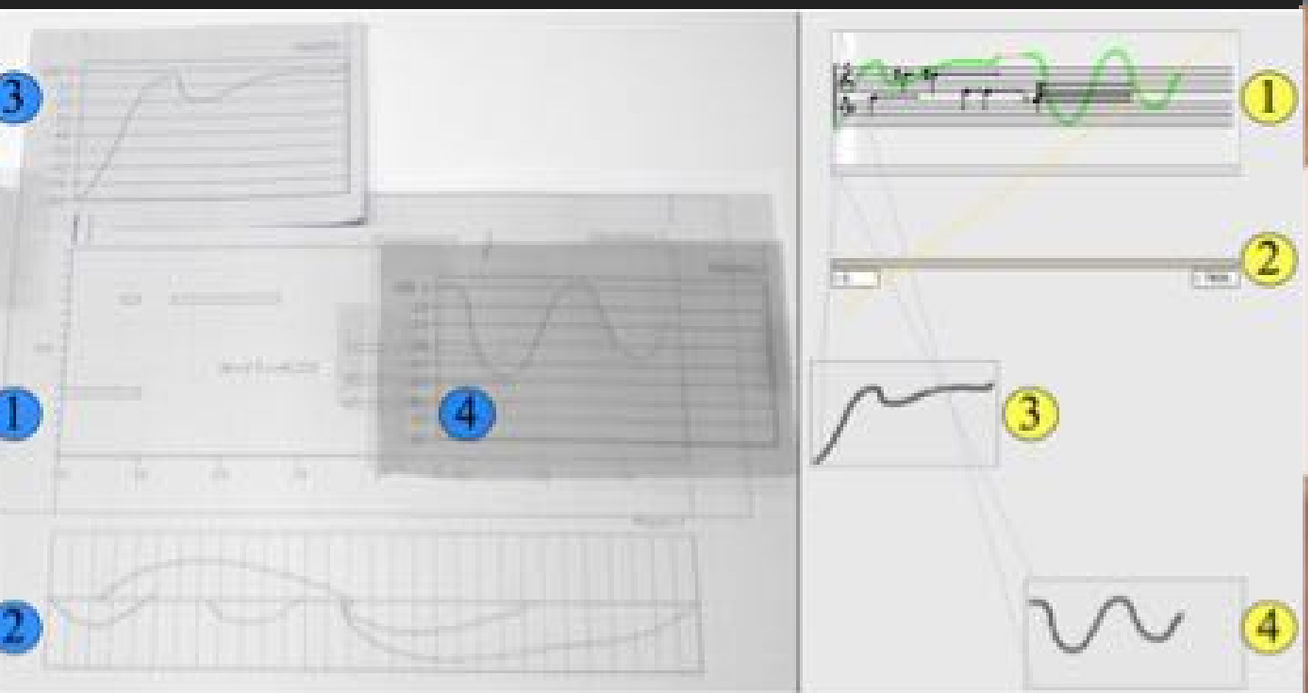
upload a file group_design.svg

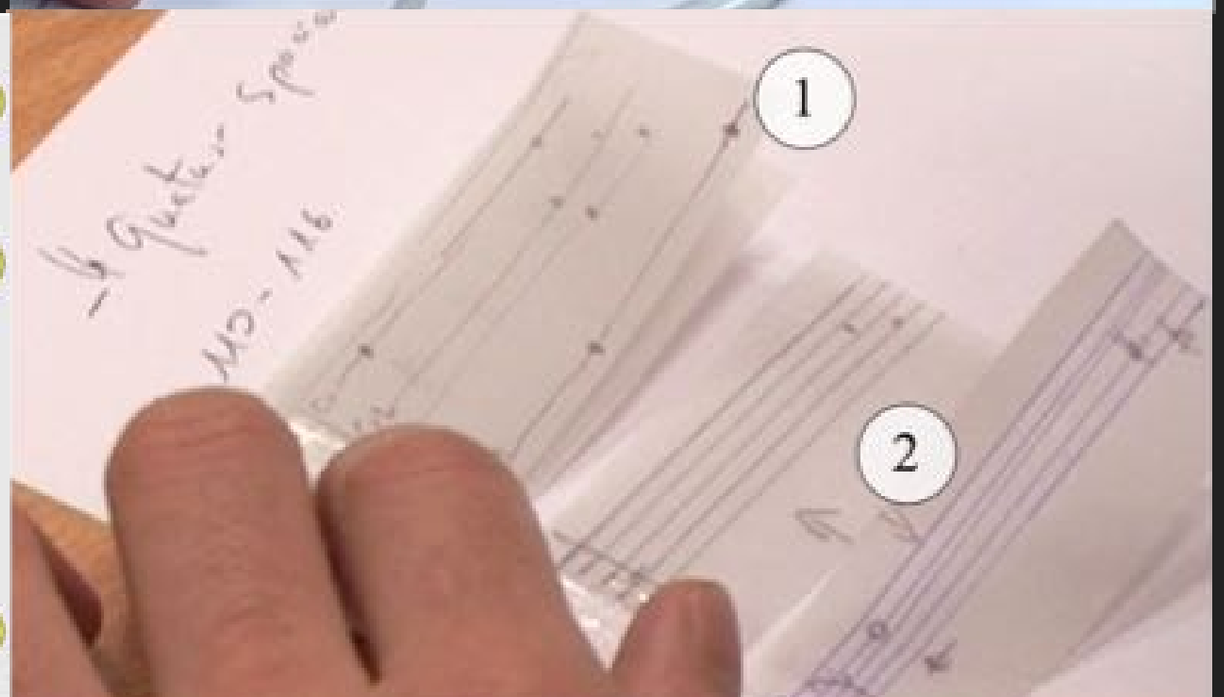
PAPER SUBSTRATES

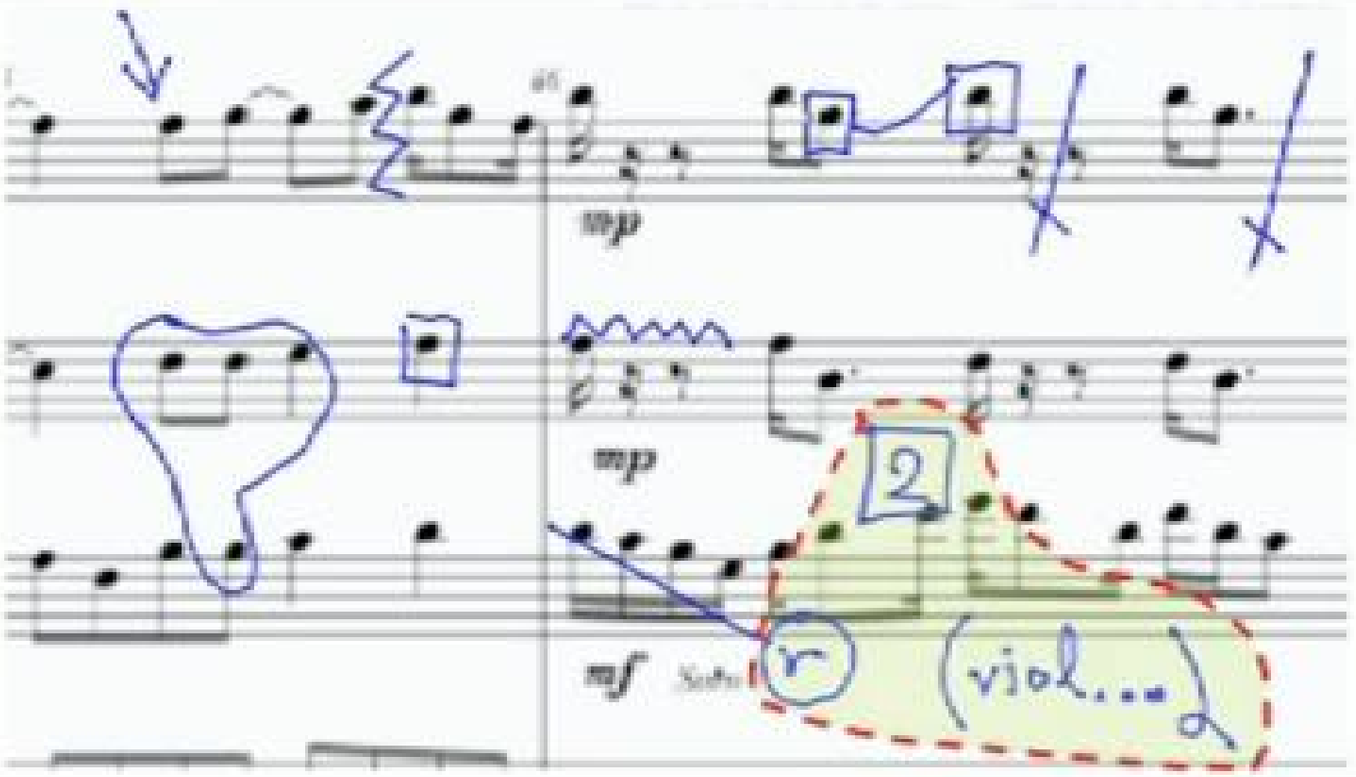
Garcia, Tsandilas, Agon & Mackay, 2012

- Support the music composition process by combining and interpreting notations in various ways









textual & numerical elements

TSANDILAS, LETONDAL, MACK

Prototype demonstrating a simple scenario:
Working on a piece for piano and electronics

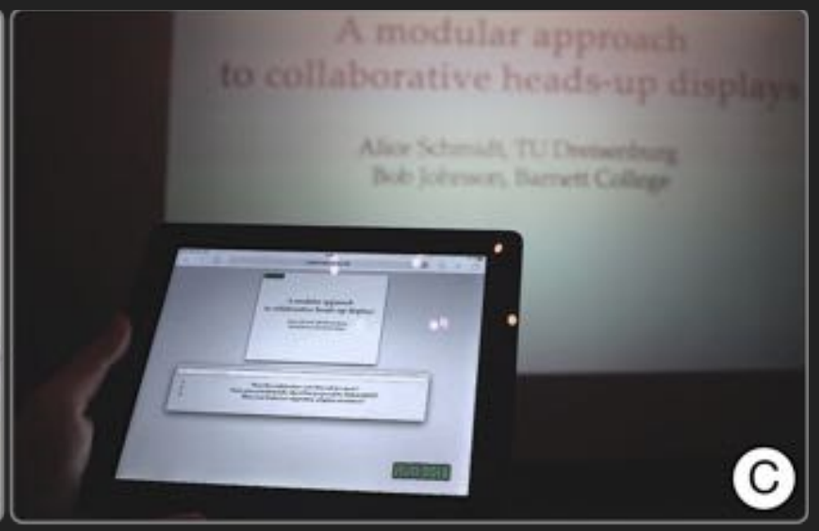
GARCIA, TSANDILAS, AGON, M

QUID SIT MUSICUS?

BY PHILIPPE LEROUX

INSTRUMENTS & SUBSTRATES

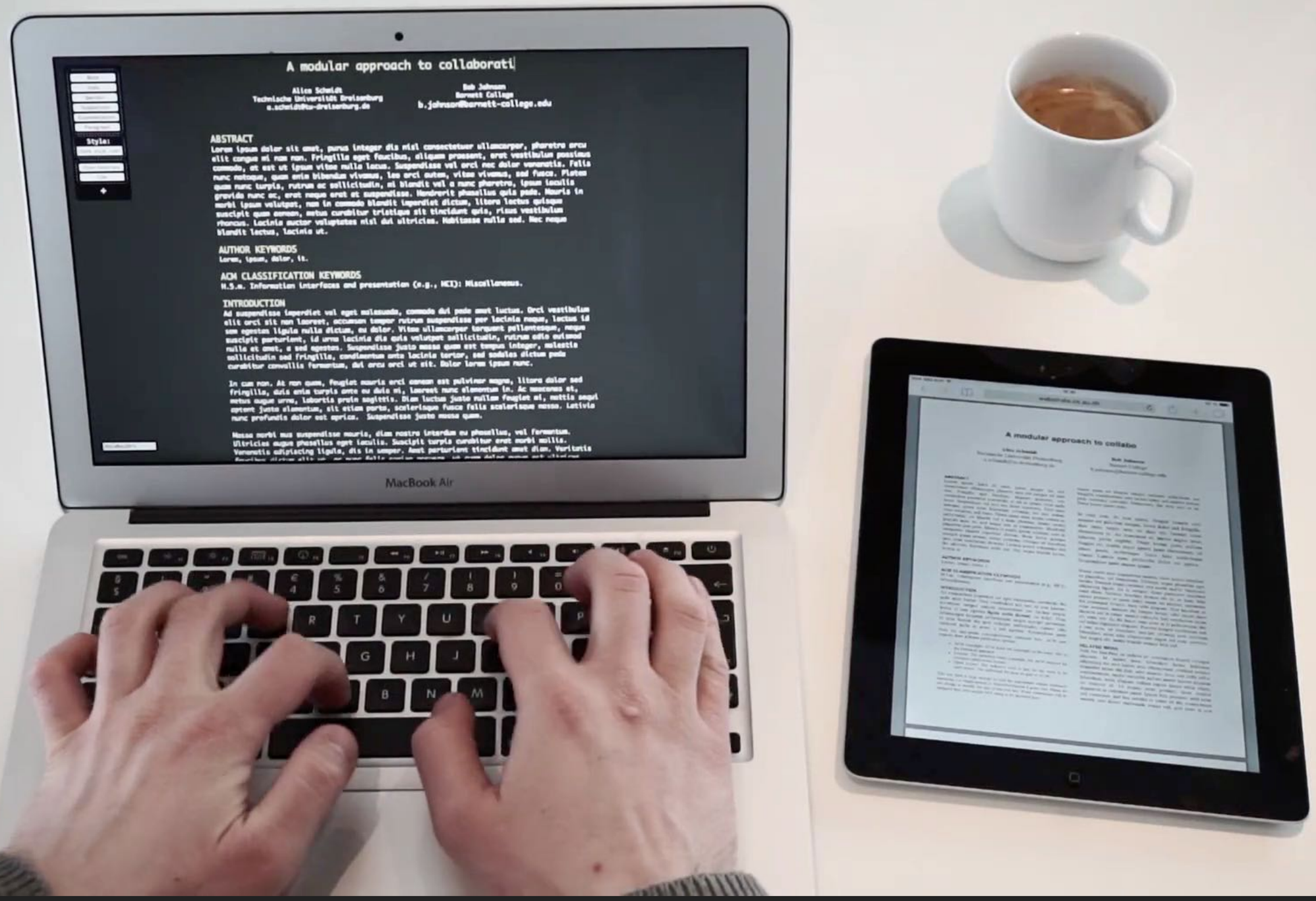
- Instruments can manipulate substrates
- Instruments probe the substrate for specific properties or protocols to decide if they can operate
- Instruments are themselves substrates
- Instruments can be embedded in substrates



WEBSTRATES

C. Klokmose, J. Eagan, S. Baader, W. Mackay , M. Beaudouin-Lafon

http://www.webstrates.net



TEXTLETS

H. Han, M. Renom, W. Mackay , M. Beaudouin-Lafon
https://www.youtube.com/watch?v=kYwHmJ_6inM

Introducing Textlets

B *I* <> Insert Type...

ABSTRACT

Writing technical documents frequently requires following constraints and consistently using domain-specific terms. We interviewed 12 legal professionals and found that they all use a standard word processor, but must rely on their memory to manage dependencies and maintain consistent vocabulary within their documents.

We introduce **Textlets**, interactive objects that reify text selections into persistent items. We show how Textlets help manage consistency and constraints within the document, including selective search and replace, word count, and alternative wording.

Eight participants tested a search-and-replace Textlet as a *technology probe*. All successfully interacted directly with the Textlet to perform advanced tasks; and most (6/8) spontaneously generated a novel replace-all-then-correct strategy. Participants suggested additional ideas, such as supporting collaborative editing over time by embedding a Textlet into the document to flag forbidden words.

We argue that Textlets serve as a generative concept for creating powerful new tools for document editing.

Textlets

Create Basic Textlet

x 12 legal professionals

x Textlets

x technology probe

TEXTLETS

- Reification of text selection
- Add behavior
  - Countlet: counting words
- Variantlet: local variants
- Numberlet: references
- Searchlet:
  search and replace

INTERACTIVE INTERMEDIATE REPRESENTATIONS

C. Gobert,
M. Beaudouin-Lafon

sample-sigconf.tex

acm-template > sample-sigconf.tex

```
539     \sum_{i=0}^{\infty} x + 1
540   \end{displaymath}
541   and follow it with another numbered equation:
542   \begin{equation}
543     \sum_{i=0}^{\infty}x_i=\int_{0}^{\pi+2} f
544   \end{equation}
545   just to demonstrate \LaTeX's able handling of numbering.
546
547   \section{Figures}
548
549   The ``\verb|figure|'' environment should be used for figures. One or
550   more images can be placed within a figure. If your figure contains
551   third-party material, you must clearly identify it as such, as shown
552   in the example below.
553
554   \begin{figure}[h]
555     \centering
556     \ilatex{\includegraphics[width=207px, height=36px, trim=7px 49px
        7px 47px, clip]{../img/instruction.png}}
557
558     \caption{The four parts of a MIPS instruction.}
559     \Description{A MIPS instruction can be split into four sucessive
        parts: OP code, Address 1, Address 2, and Immediate value.}
560   \end{figure}
561
562   Your figures should contain a caption which describes the figure to
563   the reader.
564
565   Figure captions are placed {\itshape below} the figure.
566
567   Every figure should also have a figure description unless it is purely
568   decorative. These descriptions convey what's in the image to someone
569   who cannot see it. They are also used by search engine crawlers for
570   indexing images, and when images cannot be loaded.
571
572   A figure description must be unformatted plain text less than 2000
573   characters long (including spaces).  {\bfseries Figure descriptions
        should not repeat the figure caption – their purpose is to capture
        important information that is not already provided in the caption or
        the main text of the paper.} For figures that convey important and
576
```

iLatex — sample-sigconf.tex

Table 2: Some Typical Commands

Command	A Number	Comments
\author	100	Author
\table	300	For tables
\table*	400	For wider tables

Notice how it is formatted somewhat differently in the **displaymath** environment. Now, we'll enter an unnumbered equation:

$$\sum_{i=0}^{\infty} x + 1$$

and follow it with another numbered equation:

$$\sum_{i=0}^{\infty} x_i = \int_{0}^{\pi+2} f \quad (2)$$

just to demonstrate LaTeX's able handling of numbering.

12 FIGURES

The "figure" environment should be used for figures. One or more images can be placed within a figure. If your figure contains third-party material, you must clearly identify it as such, as shown in the example below.

MIPS32 Add Immediate Instruction

001000	00001	00010	0000000101011110
OP Code	Addr 1	Addr 2	Immediate value

Equivalent mnemonic: addi $r1, $r2, 350

Figure 2: The four parts of a MIPS instruction.

Your figures should contain a caption which describes the figure to the reader.

Figure captions are placed *below* the figure.

Every figure should also have a figure description unless it is purely decorative. These descriptions convey what's in the image to someone who cannot see it. They are also used by search engine crawlers for indexing images, and when images cannot be loaded.

A figure description must be unformatted plain text less than 2000 characters long (including spaces). **Figure descriptions should not repeat the figure caption – their purpose is to capture important information that is not already provided in the caption or the main text of the paper.** For figures that convey important and complex new information, a short text description may not be adequate. More complex alternative descriptions can be placed in an appendix and referenced in a short figure description. For example, provide a data table capturing the information in a bar chart, or a structured list representing a graph. For additional information regarding how best to write figure descriptions and why doing this is so important, please see https://www.acm.org/publications/taps/describing-figures/.

12.1 The "Teaser Figure"

13 CITATIONS AND BIBLIOGRAPHIES

The use of BibTeX for the preparation and formatting of one's references is strongly recommended. Authors' names should be complete – use full first names ("Donald E. Knuth") not initials ("D. E. Knuth") – and the salient identifying features of a reference should be included: title, year, volume, number, pages, article DOI, etc.

The bibliography is included in your source document with these two commands, placed just before the \end{document} command:

```
\bibliographystyle{ACM-Reference-Format}
\bibliography{bibfile}
```

where "bibfile" is the name, without the ".bib" suffix, of the BibTeX file.

Citations and references are numbered by default. A small number of ACM publications have citations and references formatted in the "author year" style; for these exceptions, please include this command in the **preamble** (before the command "\begin{document}") of your LaTeX source:

```
\citestyle{acmauthoryear}
```

Some examples. A paginated journal article [2], an enumerated journal article [10], a reference to an entire issue [9], a monograph (whole book) [23], a monograph/whole book in a series (see 2a in spec. document) [17], a divisible-book such as an anthology or compilation [12] followed by the same example, however we only output the series if the volume number is given [13] (so Editor00a's series should NOT be present since it has no vol. no.), a chapter in a divisible book [35], a chapter in a divisible book in a series [11], a multi-volume work as book [22], a couple of articles in a proceedings (of a conference, symposium, workshop for example) (paginated proceedings article) [3, 15], a proceedings article with all possible elements [34], an example of an enumerated proceedings article [14], an informally published work [16], a couple of preprints [6, 7], a doctoral dissertation [8], a master's thesis: [4], an online document / world wide web resource [1, 28, 36], a video game (Case 1) [27] and (Case 2) [26] and [25] and (Case 3) a patent [33], work accepted for publication [30], 'YYYYb'-test for prolific author [31] and [32]. Other cites might contain 'duplicate' DOI and URLs (some SIAM articles) [21]. Boris / Barbara Beeton: multi-volume works as books [19] and [18]. A couple of citations with DOIs: [20, 21]. Online citations: [36–38]. Artifacts: [29] and [5].

14 ACKNOWLEDGMENTS

Identification of funding sources and other support, and thanks to individuals and groups that assisted in the research and the preparation of the work should be included in an acknowledgment section, which is placed just before the reference section in your document.

WHAT'S IN A SUBSTRATE?

- Content
  - Numbers, text, images, … and other substrates
- Structure
  - Record, Sequence, Tree, DAG, Graph, Table, …
- Relationships / Constraints / Rules
  - "spreadsheet formulas"…