Hello You

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Where innovation starts

Processing: After the course

- Use the processing environment and:
- - create programs … that run
- - … that draw pictures
- - … that display animations
- - … that display interactive animations
- - … that animate interactive objects

- last but not least: make all of these work together as you like … great freedom to create

After 1st lesson: What should you understand ?

- Why processing (and programming in general) is interesting and important for you as a designer
- What syntax is ?
- What expressions are?
- What types are ?
- What semantics is ? How to look it up?
- How to think about programs. (a little)

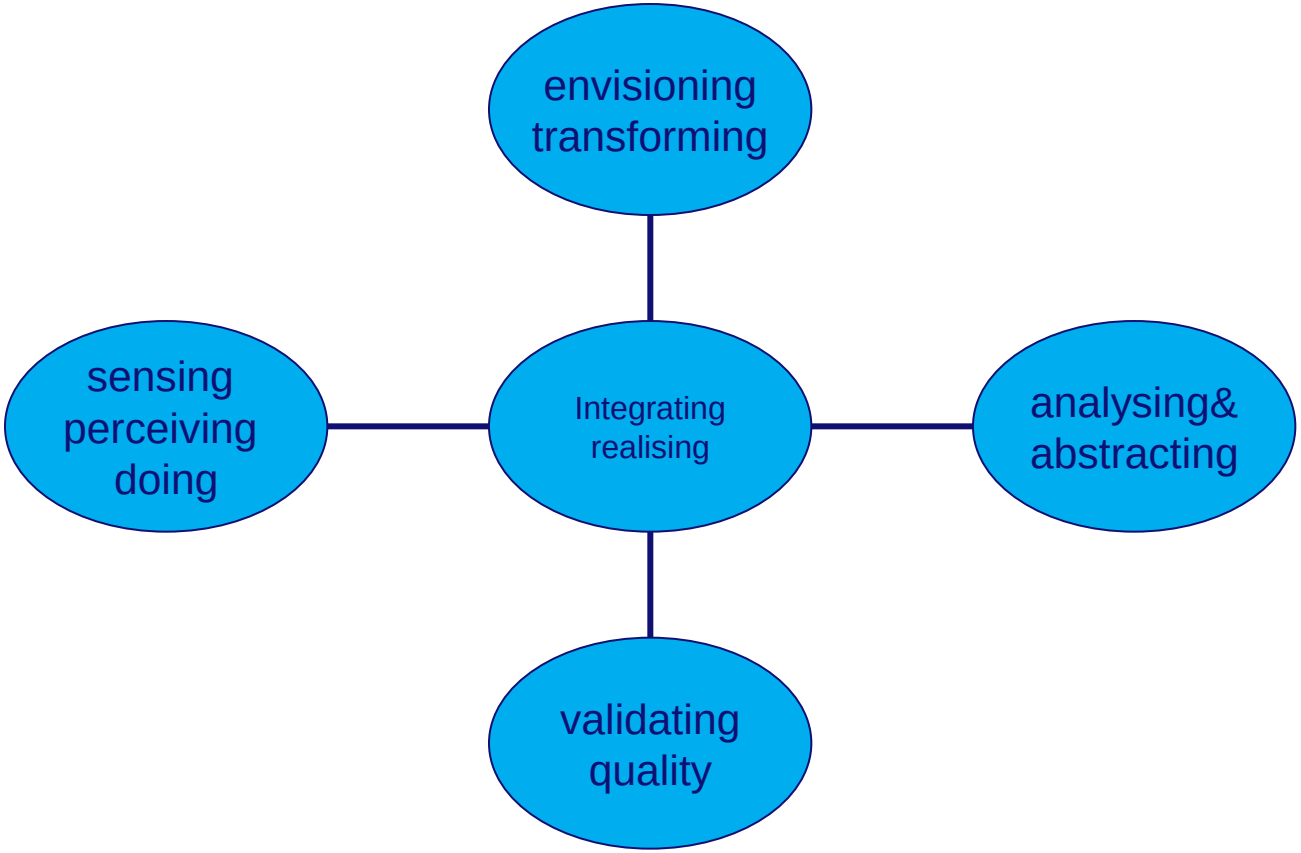
Before you start …
Experience some Examples

- Open menu:
- File | Examples | 3D and OpenGL | Form |

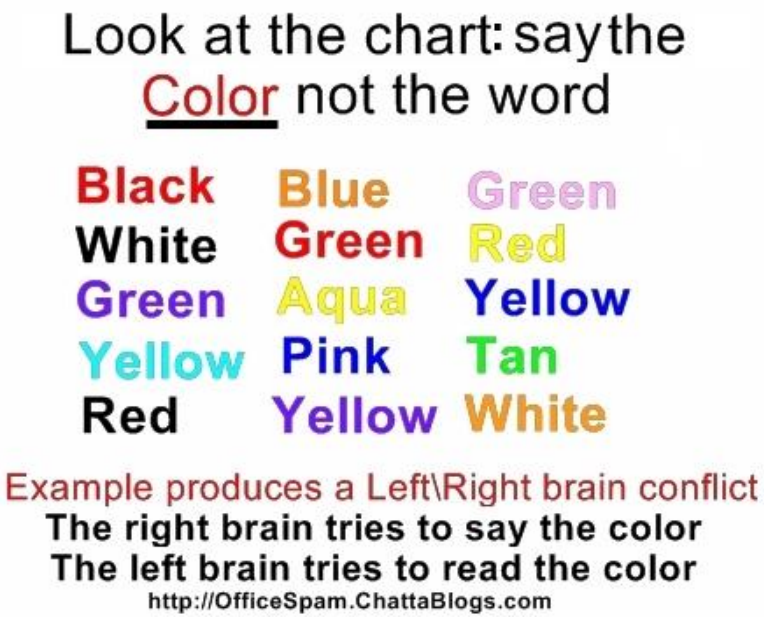
- run: CubicGrid

- Open menu:
- File|Examples|Topics|Interaction|
- run: follow 1
- run: follow 2
- run: follow 3

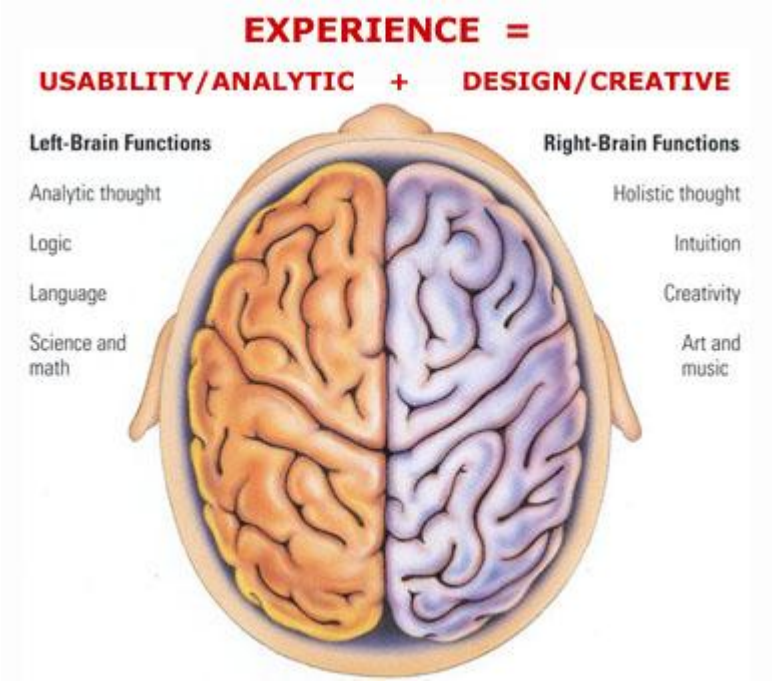
Design Process: integrate various skills



A little experiment …



Need to integrate Left & Right brain



Left versus Right

- **abstract objects that are represented in language are easy to change and to duplicate but are not immediately graspable or visible, and cannot be placed in the relevant context**

- **concrete objects that are created in matter can be inspected and manipulated easier, but are more difficult to change and to duplicate.**

We want best of both worlds

- **define and create objects through language**
- **grasp and inspect objects through senses.**
- **Processing can execute abstract instructions in a computer language and translate these into something that you can experience through the senses.**

Programming languages : How does it work?

- **processing is an imperative language: that means you use the language to give commands**
- **The computer creates the application by executing the commands one after the other … it is a sequential language**
- **compare with written music : parallel (orchestra)**
- **can also be done in programs …very difficult.**

Lets Start …

- **Click on the processing icon …**
- **Window opens with: run, stop and new,open,save,export. export makes applets.**

First program “Hello you”

- print(“hello you”);

- print(“hello ”);
- print(“you”);

- print(5*3);

- print(“We count”+ 2+1+5+10 + “characters”);
- print(“We count”+ (2+1+5+10) + “characters”);

Correctness : 3 Levels

- **Syntax (language form) : wellformed grammatical expressions: orders of brackets, semicolons, operators, letters and numbers.**
- **Types (kinds of things) : distinghuish apples from oranges**
- **Semantics (meaning) : does the program do what you want ?**

Syntax : wellformed or not ?
Try some examples …

- print(“hhhh ggg”);
- print(“a”) ; print(“b”) ;
- print(8); {print(8) ; } ; {{{print(8); }}} ;
- print(“hello you)” ;

- // this is just a comment …..

- print(“ jjjhhh) ”)) ➔ syntax error: semi expected found)
-
- print(“a”) print(“b”) ➔ syntax error: semicolon missing …

- commands can contain expressions ….

Expressions can be nested …

- 3*4
- sin(3*4)
- sin(3* tan(5) / exp(sin(cos(0.45454))))
- “abcd”+”efgh”
- “abcd” + (“ef” + “gh”)

Types

- String “hhhheeeee” “aaa”+ “nnbn99 bnb”
- int 8 9* 97978787 1-9988989
- float 2333.5555
- sin(-3 * 5677.455)
- 3.4e+38
- (to be continued ..)

SEMANTICS

- **The meaning of the command; this may depend on type.**

- **print(8 + 8);**
- **print(“ 8 + 8 “);**
- **print(“ Hello”);**

- **print(“I count”+ 1+1+5+10 + “characters”);**
- **print(“I count”+ (1+1+5+10) + “characters”);**

- **(to be continued)**

How to think about commands:

- setting up a picture, or later a stage, using predefined primitives

- first start with a static picture:
- create empty picture with command “size”:

- size(200,200);
- Next: specify what you put where:
- you can use various standard primitives with parameters:

- point(20,45)
- line(0,0,100,150)

Example …

- **go to menu:**

- **Example|Basics|Form|**
- **run: PointsLines**

- **what is semantics (meaning)**
- **of : stroke(153) ?**
- **: background(0) ?**

Semantics

- To find the meaning look for the (informal) specifications ..

- doubleclick on “stroke” to find out …
- choose : find in reference

- doubleclick on “background” to find out …

- these commands specify drawing parameters

Specify drawing parameters …

- stroke(255) 255 = white 0 = black in between are shade of gray ..
- background(200,23,130) ; (e.g. you can also use color)
- nostroke() …etc various primitives
-

Also two dimensional shapes are possible …

- **rect(20,20,60,120);**
- **ellipse(50,50,30,99);**

- **Example|Basics|Form|**
- **run: ShapePrimitives**

Interactive drawings …

- create a stage with :
- void setup() {
- size(200, 200);
- }

- the you can draw … continuously …with the draw command ..
- For example …

Interactive drawings …

```
void setup() {
  size(200, 200);
  smooth();            // makes forms smoother
  strokeWeight(2);  //how thick lines are
  stroke(255);         //color of lines (white)
}
void draw() {
    background(mouseX,mouseY, 80);  // background color
    line(200, 0, mouseX, mouseY);
    line(mouseX,mouseY, 0, 200);
}
```

Final remark : Style …

-
- proper indentation
- comprehensible comments
- (using autoformat in Tools menu?)

- balanced pictures …
- beautiful movements …