Hello You

The Middle Path

Technische Universiteit
Eindhoven
University of Technology

Where innovation starts

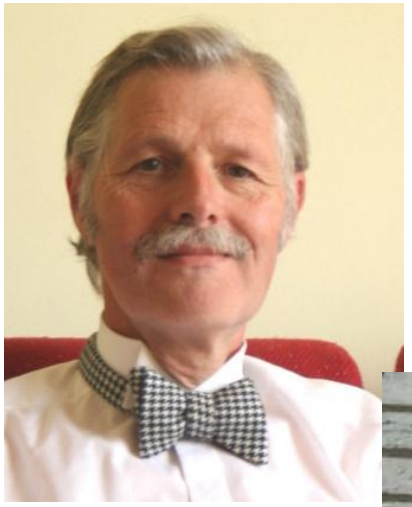
Processing: After the course

- 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

Assignors

Peter Peters



Loe Feijs

Mathias Funk

Jun Hu

Technische Universiteit Eindhoven University of Technology

After this 1st lesson: what can you do

- Start processing.
- run your first program in processing
- write programs that create various static objects i.e. “pictures”
- change these programs to change the pictures.
- understand how the pictures change when you change the program.
- have a first idea about creating interactive objects.

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 (basic) types and variables are ?
- what semantics is ? How to look it up?
- how to think about programs. (a little)

Downloading processing…

Go to wiki created for the assignment:

- **http://wiki.id.tue.nl/creapro**

- **go there and click on:**
- **Prepare your computer for the assignment**
- **then click on the link:**
- **Download processing. (a** stable **release)**
- **create a directory "Programs" on the C: disk, in the root. If "C:\Programs" exists already, skip this step.**
- **extract the entire directory to C:\Programs (note, not "C:\Program Files"). if you are reinstalling Processing, remove the entire processing directory first.**

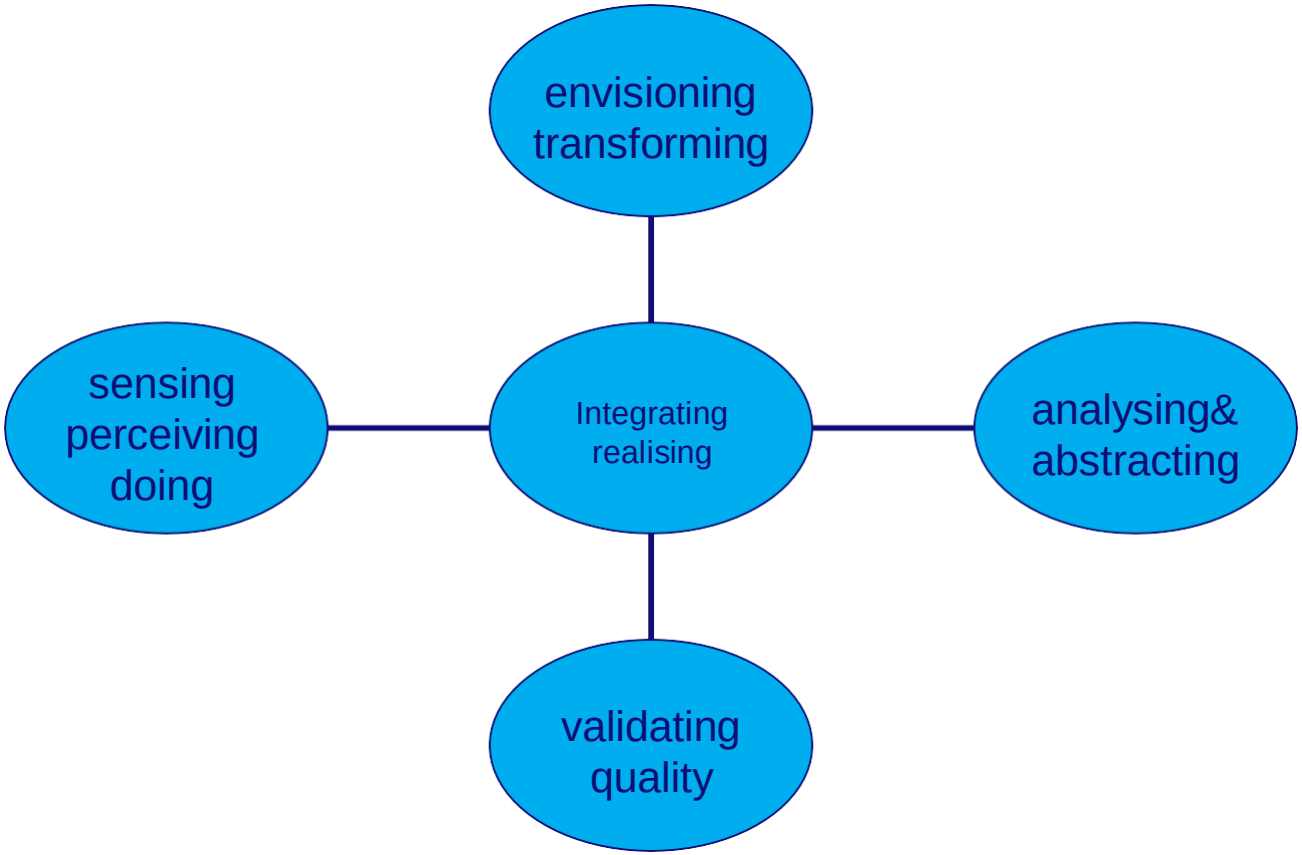
Before you start …
Experience some Examples

- **Open menu:**
- **File | Examples | Basics | Transform |**

- **run: Rotate**

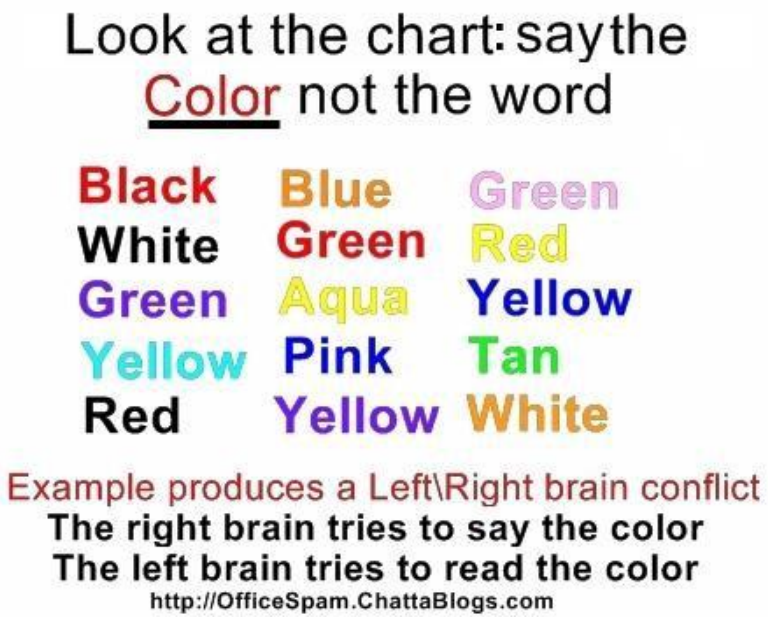
- **Open menu:**
- **File|Examples|Topics|Interaction|**
- **run: Follow 1**
- **run: Follow 2**
- **run: Follow 3**

Design Process: integrate various skills

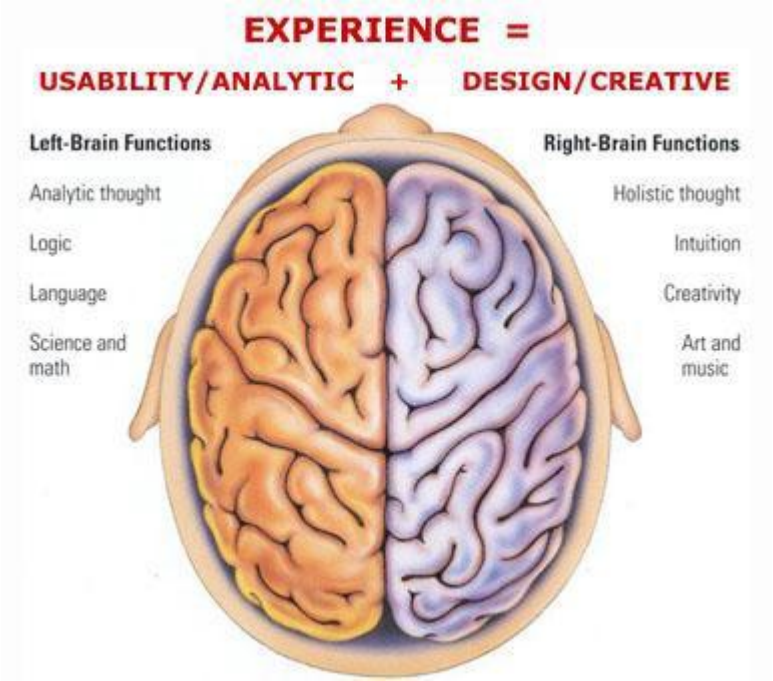


Hummels & Frens: Reflective Transformational Design model

A little experiment …



Need to integrate Left & Right brain



Source: http://www.tunghai74.org/letters/Brain-left-right.htm

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

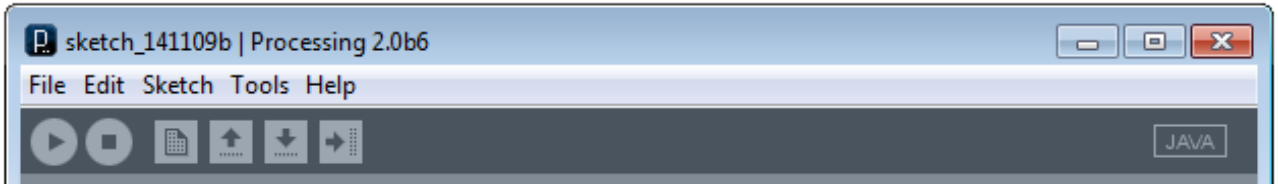
- **define and create objects through language**
- **grasp and inspect objects through senses.**
- **Processing can execute abstract instructions in a computer language and translate these into something that you can experience through the senses.**

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 Programming…

- **Click on the processing icon …**
- **Window opens with: Run, Stop, New, Open, Save,Export Application (makes applets).**



First program “Hello you”

- print(“hello you”);

- print(“hello ”);
- print(“you”);
- println(“commands are separated by semicolons”);
- 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)” ; ➔ syntax error: expecting RPAREN, found ;
- // this is just a comment …..
- print(“ jjjhhh) ”)) ➔ syntax error: unexpected token: null
-
- print(“a”) print(“b”) ➔ syntax error: maybe a missing semicolon
- 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
- basic types are: String, float,int, boolean, char, byte,
- (to be continued … can do)

variables

- A variable is a named location where a certain type of value can be stored
- declare; initialize, use, scope.
- String anExample;
- anExample = “fghjkl”;
- anExample = anExample + anExample;

Variable 2

- **int multiplier = 5;**
- **multiplier = multiplier + 4;**
- **float pi = 3.1415926535897932;**
- **print(multiplier * pi) ;**

SEMANTICS

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

- **int myAge;**
- **myAge = 8;**
- **print(myAge * 8);**
- **print(“ 8 + 8 “);**

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

- **(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 ..

- Select and right click on “stroke” to find out …
- choose : find in reference

- Idem 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**
- **C:/Programs/processing-2.0b6/modes/java/reference/index.html**

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 …

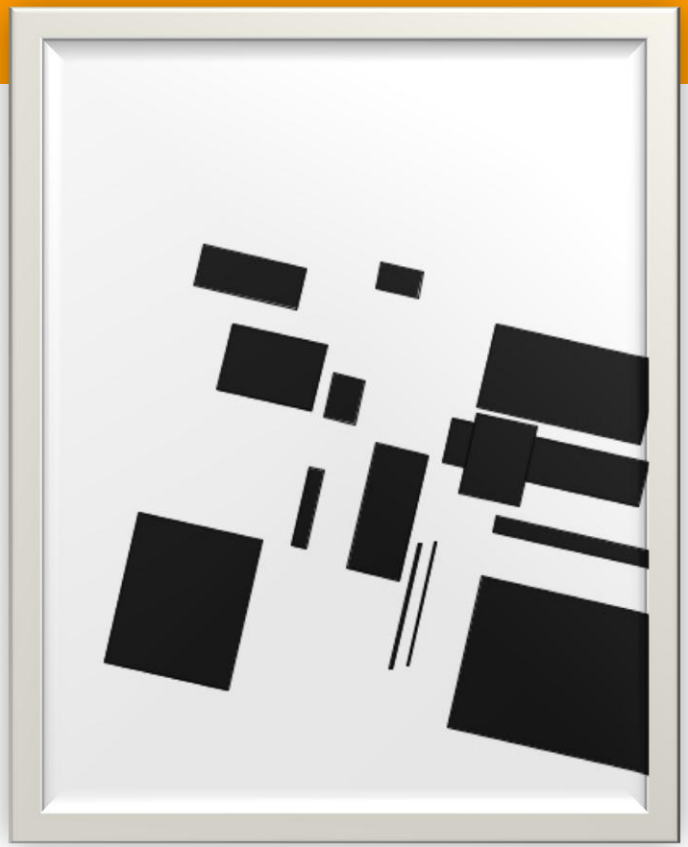
```
void setup() {
    size(200, 200);
    smooth();              // makes forms smoother
    strokeWeight(2);       // how thick lines are
    stroke(255);           // color of lines (white)
  }

  void draw() {
    background(mouseX,mouseY, 80);   // background color
    line(200, 0, mouseX, mouseY);
    line(mouseX,mouseY, 0, 200);
  }
```

Remark on style …

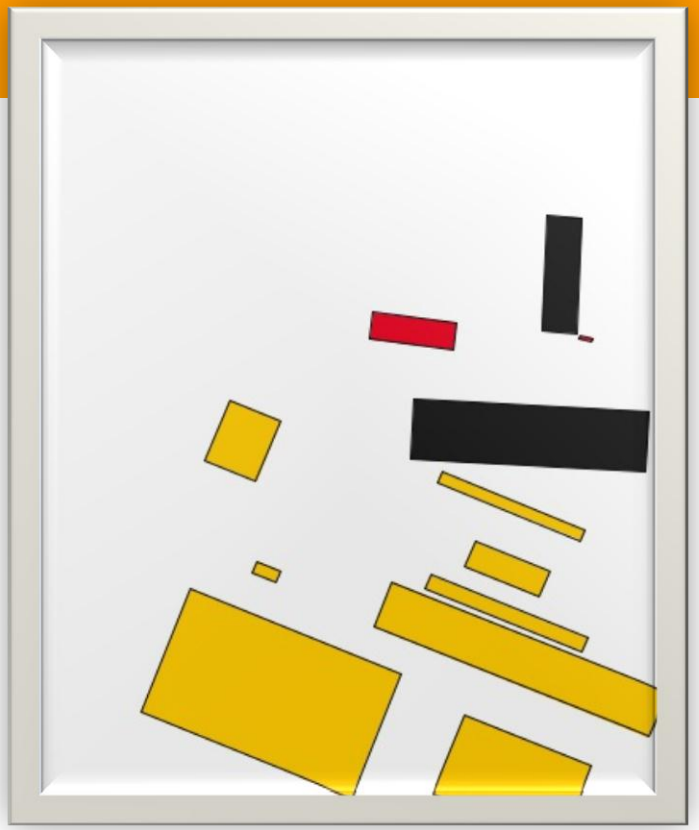
- proper indentation
- comprehensible comments
- (using Auto Format in Tools menu, if you like it, ^T)

- balanced pictures …
- beautiful movements …

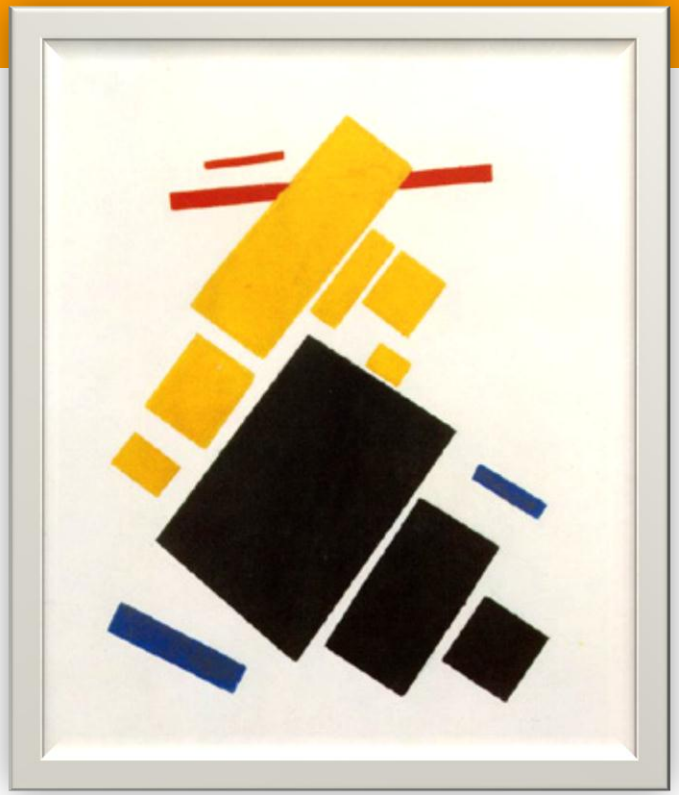
Where we will be in three weeks?



Computer Generated 2012



Computer Generated 2012



Kasimir Malevich, Suprematist Painting: Airlane Flying, 1915.

Kasimir Malevich, Suprematist Painting: eight red rectangles, 1915.

Some getting-started homework for you

Statistics:

- Make a program with variables containing the ages of you and some of your friends
- Let the program calculate the average and the standard deviation and print it orderly using print and println

Geometry:

- Make a program with at least five int or float variables to be used as parameters
- Let the program create an abstract geometric composition using these parameters
- Play with the parameters to optimise aesthetic balance