SIXMEMOS
OPEN SOURCE CULTURE

# Munari and technology

Between art, teaching and design
The design method and experiences of Bruno Munari today

An Open Method

SIXMEMOS
OPEN SOURCE CULTURE

## Who we are?

A very heterogeneous research group!

## What we deal with?

design methodology, experiential learning activities, cognitive processes and technologies, technology and art

## How we do it?

Research and experimentation workshop activities with children and adults.
Development of cognitive artifacts

# how do we do this?

methodological skills - Techniques - Hardware & Software - measuring the effectiveness capacity

# Benchmarking

Is there any other person who did it? How he/they did it? What can we learn from him/their?

SIXMEMOS
OPEN SOURCE CULTURE

# The areas of our interest in the work of Bruno Munari

Art

Didactics

Design

# IN PARTICULAR

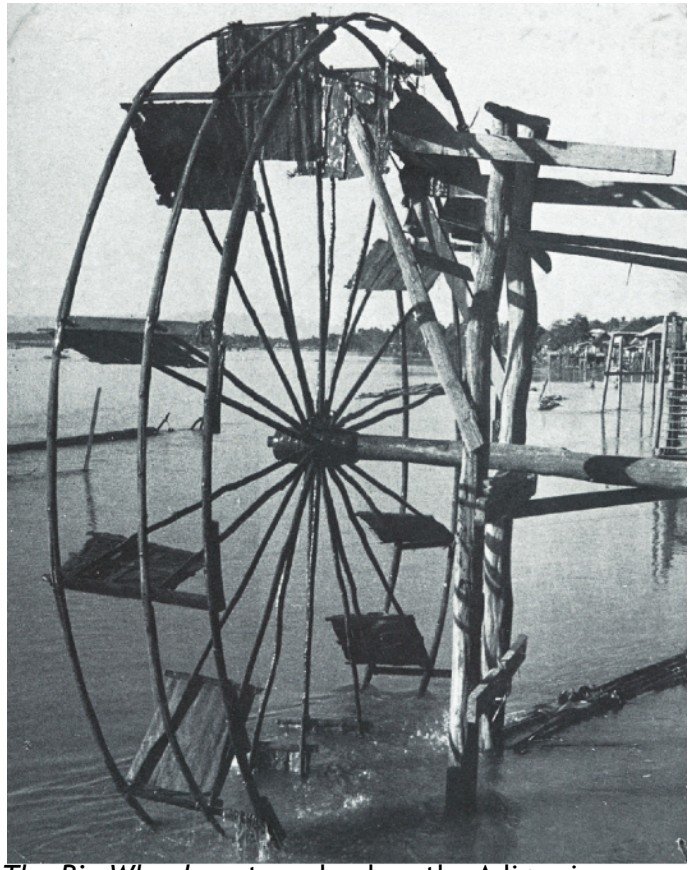
Munari and **machine**

Munari and **technology**

Development of the **creative process**

SIXMEMOS
OPEN SOURCE CULTURE

# Munari
# nature – science - technology



*The Big Wheel*, water-wheel on the Adige river.

# Childhood in nature

He spent his childhood in Badia Polesine, the country life allows him to play with friends on the Adige river. He learn to paint with them, to experience and discover nature, to imitate it and edit it.

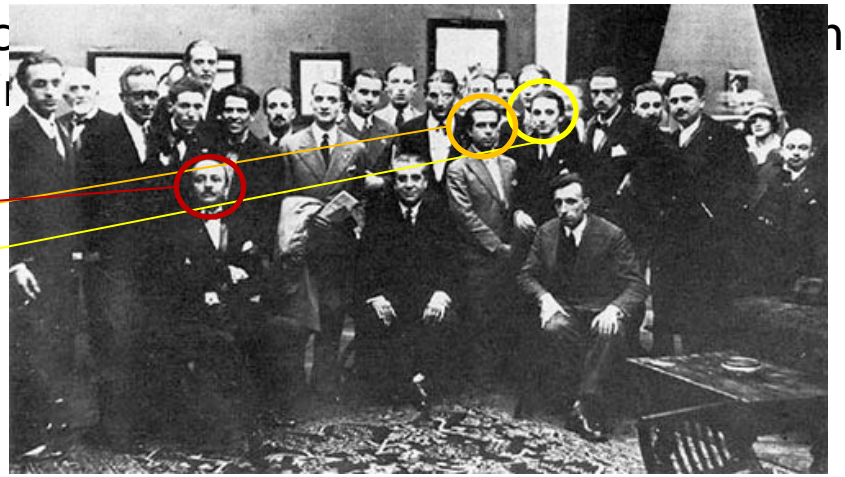
*"As a boy I was an experimenter, even when I was building toys or I built them for my friends, using bamboo poles or other simple materials. I've always been curious to see what you could do with one thing, in addition to what you normally do."*

SIXMEMOS
OPEN SOURCE CULTURE

# The meeting with the futurists

•At eighteen years old he returned to Milan where he began working as a graphic

•It is the beginning of his artistic [illegible]ne ideas of Balla, Depero, Prampoli[illegible]



*1929 - Trentatrè Futuristi.*

Marinetti
Prampolini
Bruno Munari.

Munari has no carries baggage of regular studies but a huge reserve of outstanding natural beauty, which always permeates its whole production.

kinetism– ‘polimaterismo’ - tactilism

SIXMEMOS
OPEN SOURCE CULTURE

# The meeting with the futurists

**MANIFESTO DEL MACCHINISMO**

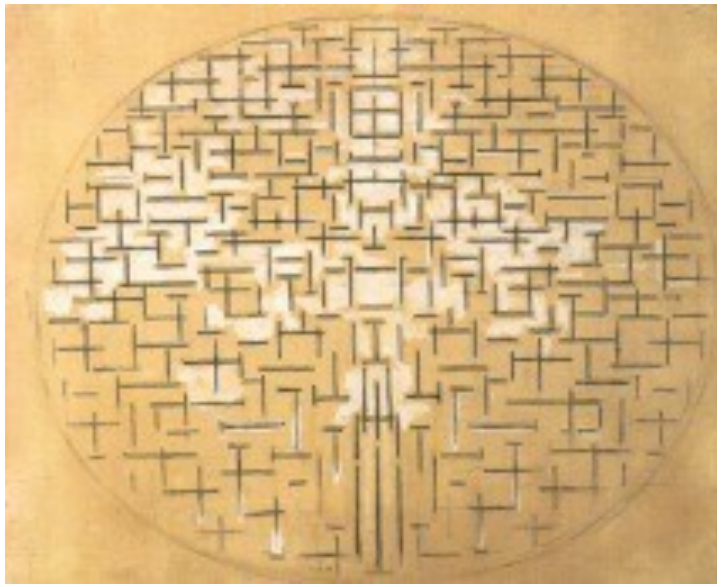
*Il mondo, oggi, è delle macchine.*
*Noi viviamo in mezzo alle macchine, esse ci aiutano a fare ogni cosa, a lavorare e a svagarsi. Ma cosa sappiamo noi dei loro umori, della loro natura, dei loro difetti animali, se non attraverso cognizioni tecniche, aride e pedanti?*
*Le macchine si moltiplicano più rapidamente degli uomini, quasi come gli insetti più prolifici; già ci costringono ad occuparci di loro, a perdere molto tempo per le loro cure, ci hanno viziati, dobbiamo tenerle pulite, dar loro da mangiare e da riposare, visitarle continuamente, non far loro mai mancar nulla. Fra pochi anni saremo i loro piccoli schiavi.*
*Gli artisti sono i soli che possono salvare l'umanità da questo pericolo. Gli artisti devono interessarsi delle macchine, abbandonare i romantici pennelli, la polverosa tavolozza, la tela e il telaio; devono cominciare a conoscere l'anatomia meccanica, il linguaggio meccanico, capire la natura delle macchine, distrarle facendole funzionare in modo irregolare, creare opere d'arte con le stesse macchine, con i loro stessi mezzi.*
*Non più colori a olio ma fiamma ossidrica, reagenti chimici, cromature, ruggine, colorazioni anodiche, alterazioni termiche.*
*Non più tela e telaio ma metalli, materie plastiche, gomme e resine sintetiche.*
*Forme, colori, movimenti, rumori del mondo meccanico non più visti dal di fuori e rifatti a freddo, ma composti armonicamente.*
*La macchina di oggi è un mostro!*
*La macchina deve diventare un'opera d'arte!*
*Noi scopriremo l'arte delle macchine!*
Bruno Munari, *1938*

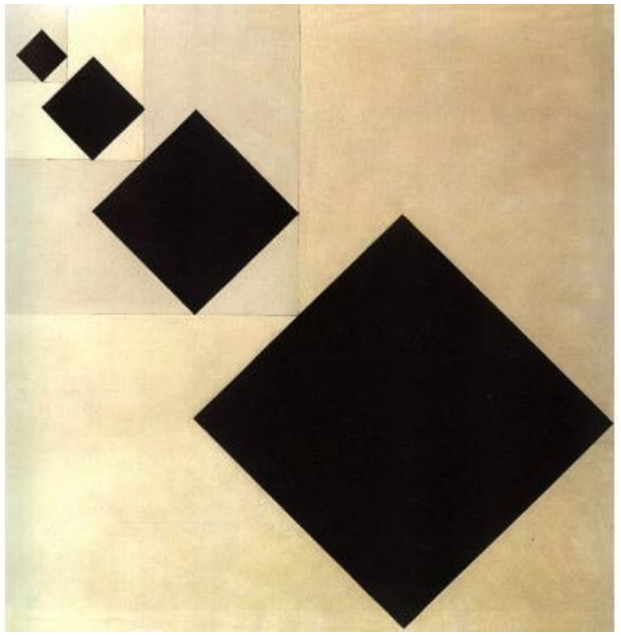
kinetism– 'polimaterismo' - tactilism

# The European context

In the years before the 2nd World War Munari knews

•both experiences abstractionist > including **Neoplasticism** (Mondrian, T. van Doesburg) > art and mathematics





SIXMEMOS
OPEN SOURCE CULTURE

# The European context

•That the **Bauhaus** > art science and technology - whose teachers were reference points for his research (Herbert Bayer > graphics; Albers > properties of materials and their use; Moholy Nagy > studies of light and movement; Max Bill - then the Ulm school - > with which it shares the research on the form-function relationship, the **Concrete Art**)

Art – mathematics - technology

# The European context

The great message that mathematics send between the end of the nineteenth century and the early twentieth century is that the geometry, space, mathematics itself can be the kingdom of freedom and imagination, abstraction and rigor

SIXMEMOS
OPEN SOURCE CULTURE

# Concrete Art

•Evolution of constructivism

*".. We can not establish the boundary between mathematics and art, work of art and a discovery of the technique .."*(Lissitzky e Arp, 1925, p. XI).

•*"Painting and concrete sculpture are the formal structure of what is visually perceptible. Their means are color, space, light and movement. From the elaboration of these elements are born new realities. "*(Max Bill- Staber 1966, p115)

•synthesis of the arts: art, architecture, design

In this movement there is a precise idea of how artists have to use the means of their own time, take the technology to draw something positive

Art – mathematics/topology - technology

SIXMEMOS
OPEN SOURCE CULTURE

# Essentiality

- the synthesis of the arts
- The search for the structure of things > observation of nature
- The scientific rigor > logic
- The technology "... [the computer] can certainly help achieve the simplicity from which we must start to build ..» magazine IBM, 1988

Munari brings the essential, the search for simplicity > desecration of the work of art and functionality identification through a search and a rigorous method

# The mutation and the structure of things

•Constant of reality: the change

•the interest in the observation of nature, of its internal principles and its formal coherence > Munari will try to carry to design.

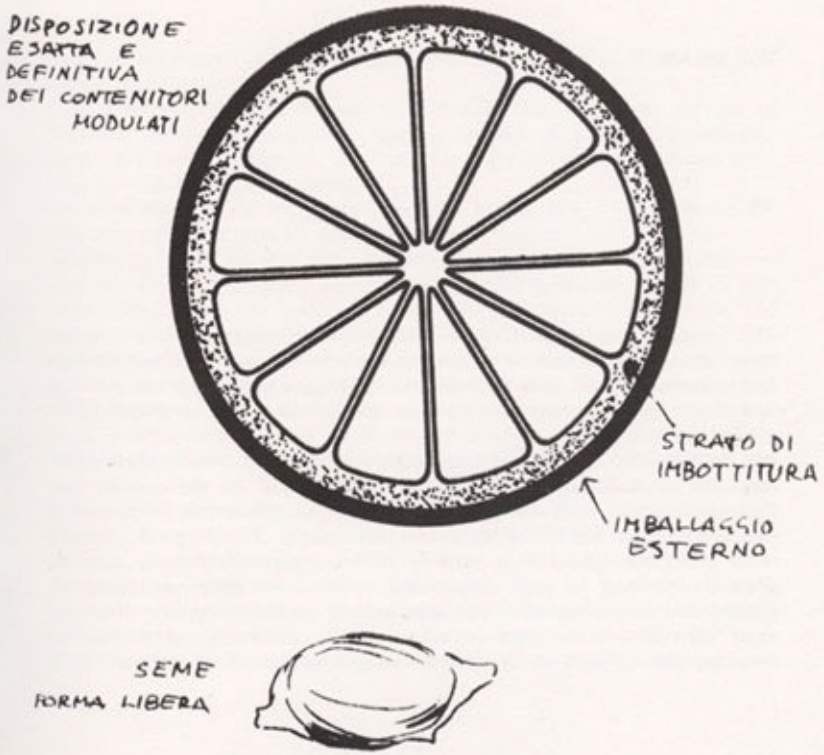
•To get a new one generated by the form of nature: not the forms but the models they imitate, the underlying constitutional principles in the natural elements produce a good design

SIXMEMOS
OPEN SOURCE CULTURE

# nature and formal consistency

consumatore dal complesso di castrazione e stabilisce un rapporto di fiducia autonoma reciproca. Gesto cordiale e signorile, non come certi produttori contemporanei che offrono una mucca a chi compera venticinque grammi di formaggio.
L'arancia quindi è un oggetto quasi perfetto dove si riscontra l'assoluta coerenza tra forma, funzione, consumo. Persino il colore è esatto, in blu sarebbe sbagliato. Tipico oggetto di una produzione veramente di grande serie e a livello internazionale dove l'assenza di qualunque elemento simbolico espressivo legato alla moda dello *styling* o dell'*estétique industrielle*, di qualunque riferimento a figuratività sofisticate, dimostrano una coscienza di progettazione difficile da riscontrare nel livello medio dei designers.
Unica concessione decorativa, se così possiamo dire, si può considerare la ricerca « materica » della superficie dell'imballaggio trattata a « buccia d'arancia ». Forse per ricordare la polpa interna dei contenitori a spicchio, comunque un minimo di decorazione, tantopiù giustificata come in questo caso, dobbiamo ammetterla.

10




Nature - models

SIXMEMOS
OPEN SOURCE CULTURE

# mutation and nature

Questo schema di crescita è così facile che tutti lo possono disegnare. Disegnamolo dunque pur sapendo che è uno schema e che sarà difficile riscontrare in natura un albero disegnato così perfetto. Per crescere in modo così preciso, un albero dovrebbe nascere in un posto senza vento, con il sole fisso in alto, con le piogge sempre uguali, con il nutrimento che viene dalla terra sempre costante.
In quel posto non ci dovrebbero essere fulmini e nemmeno sbalzi di temperatura, niente neve e gelo, mai troppo caldo o secco...
Ma in realtà sappiamo che tutte queste condizioni ambientali non esistono e quindi il nostro schema si trasforma, si adatta, e sembra un altro. Ma se guardate bene potete ritrovarlo ancora.



Se c'è il vento l'albero cresce così.

Se c'è più vento e più spesso, cresce così.

Se c'è sempre tanto vento come in riva al mare,

l'albero si trasforma così. Ma è sempre la stessa struttura.

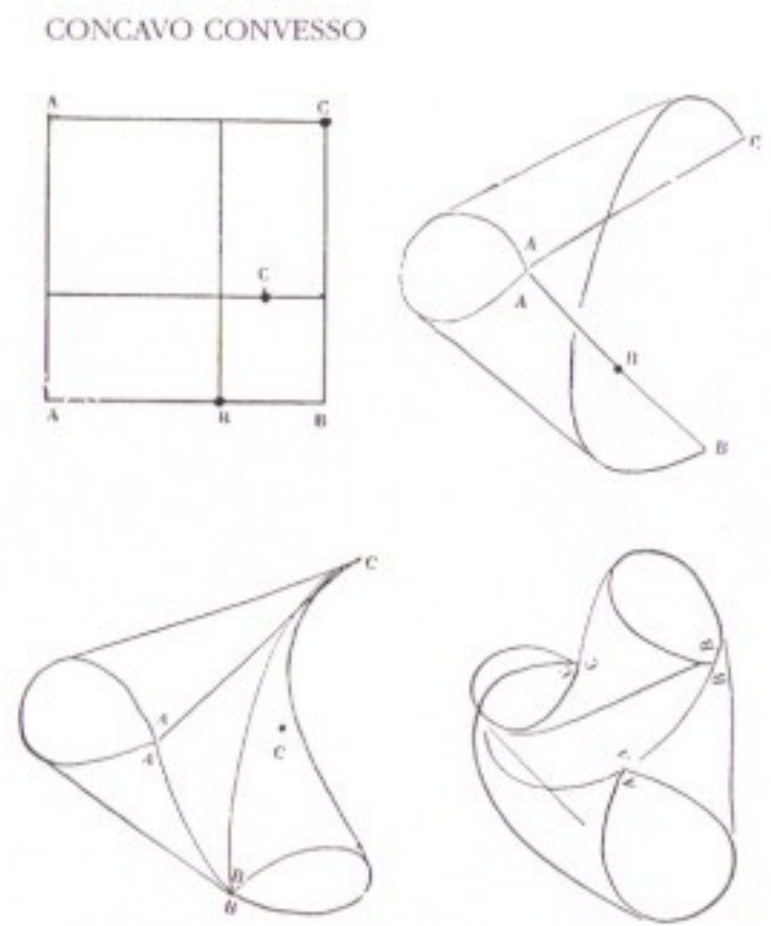


Nature - models

SIXMEMOS
OPEN SOURCE CULTURE

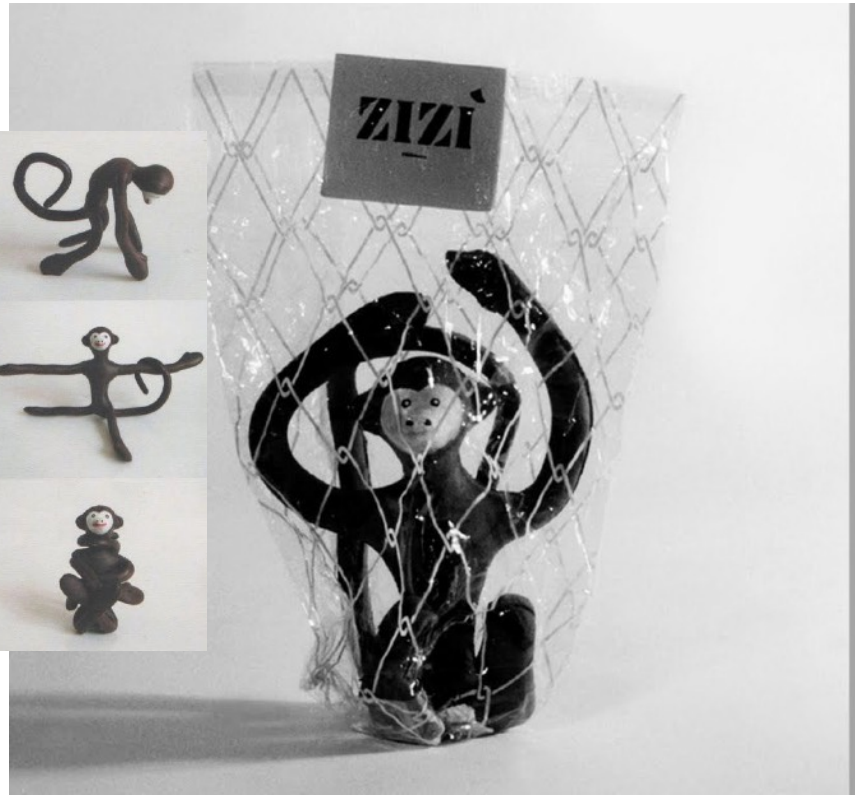
ENVIRONMENT IN SEMI DARKNESS CONCAVE-CONVEX

1946 - *PARIGI*
*SALON DES REALITES NOUVELLES*




Objects designed to alter or change the space

SIXMEMOS
OPEN SOURCE CULTURE




SCIMMIETTA ZIZI'
Bruno Munari 1952 - Riedizione Clac e Galleria del Design e dell'Arredamento: 2001 e 2007
Premio Compasso d'Oro La Rinascente 1954

L'avventura della riedizione di Zizì comincia nel 1997 quando, attraverso il Presidente dell'Associazione Amici dei Musei di Cantù Paolo Minoli, la Galleria del Design e dell'Arredamento acquisisce da Munari stesso un esemplare della scimmietta e i diritti per la sua riproduzione. L'occasione consente anche di avviare una specifica Sezione dedicata all'opera di Munari. Individuato l'interlocutore che avesse la capacità e la sensibilità per la riedizione sono iniziate le verifiche sui materiali e le tecnologie produttive.
Il poliuretano espanso con il quale Zizì viene riprodotta è, fatti salvi i miglioramenti nella durata raggiunti con l'uso di additivi, lo stesso materiale utilizzato da Munari. Questa scelta è stata fatta, scartando materiali più durevoli, per essere il più fedeli possibile alla "resa tattile" cui più volte Munari ha fatto riferimento.
L'armatura, per la quale si è conservata la costruzione a "fili attorcigliati" è stata realizzata in fil di ferro cotto, che non presenta problemi di ossidazioni dannose per il poliuretano.

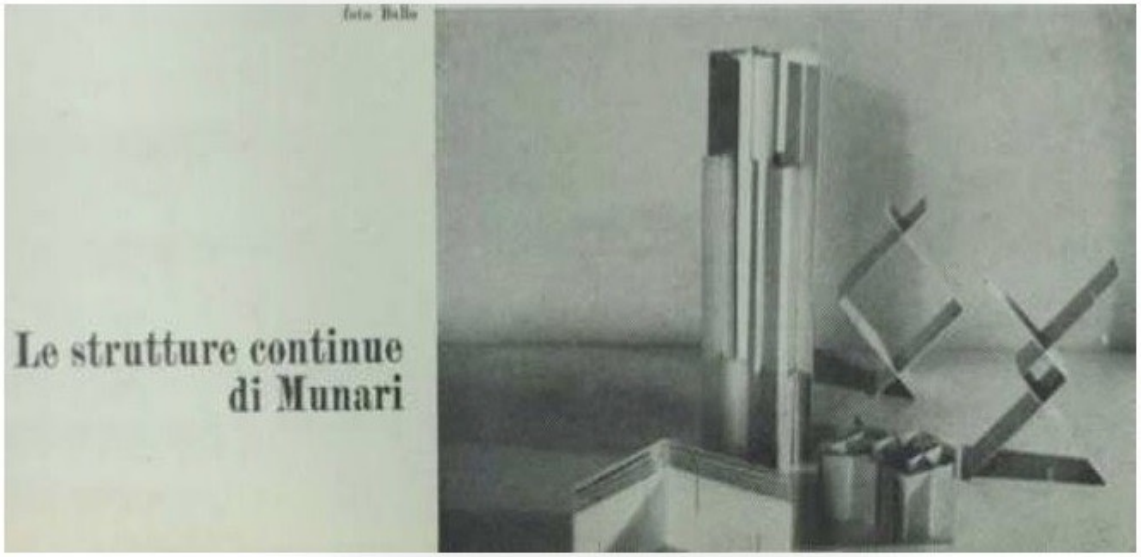
Per quanto riguarda l'imballo si è mantenuto il disegno originale con il motivo a rete su un involucro trasparente; l'apertura riposizionabile vuol sottolineare l'importanza data da Munari al sacchetto come elemento del progetto. Chi lo apre libera la scimmietta dalla gabbia in cui era costretta: un gesto che è l'avvio di un stretta e lunga amicizia con Zizì.
Roberto Rizzi, curatore scientifico Galleria del D esign e dell'Arredamento di Cantù

*"Era nata da poco la gommapiuma con la quale venivano realizzati materassi e imbottiture varie. Un giorno un dirigente della Pirelli mi chiede: - Che cosa si può fare con la gommapiuma oltre che materassi?*
*Mi feci dare alcuni campioni di questo nuovo materiale e cominciai una sperimentazione per capire quali altre cose si potevano progettare in modo che l'oggetto progettato fosse coerente col materiale e con le sue qualità.*
*La qualità più evidente si manifestava attraverso il tatto.*
*Un qualunque pezzo di gommapiuma, manipolato da un bambino, comunica la morbidezza, l'elasticità del materiale che sembra vivo e che, a un bambino, fa venire in mente la stessa sensazione che si prova a tenere in braccio un gattino o un piccolo animaletto. Provai quindi a pensare a dei giocattoli realizzati in gommapiuma e, logicamente mi interessai dell'aspetto tecnologico sul come si fa a costruire oggetti in gommapiuma, come deve essere lo stampo, che cosa si può inserire nel materiale per permettere una eventuale manipolazione dell'oggetto e, perfino, se non era possibile anche dare un odore gradevole al giocattolo.*
da Bruno Munari, "Codice ovvio", Einaudi, Torino 1994

# Objects designed to change

SIXMEMOS
OPEN SOURCE CULTURE

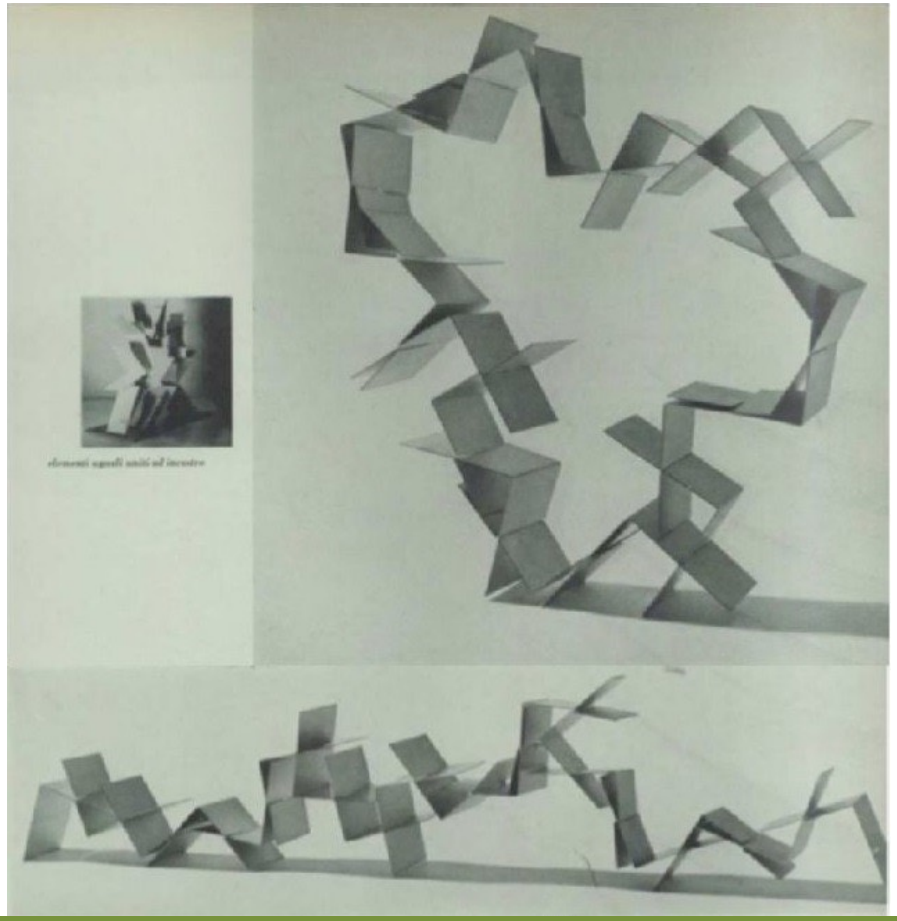
# Continuous structures > Munari > Nature




Queste «strutture continue» son formate ognuna da un certo numero di elementi uguali uniti ad incastro fra di loro. Han l'aspetto di sculture ma sono, in realtà, parti di una struttura che – teoricamente – può continuare all'infinito e, naturalmente, smontarsi e ricomporsi, in modi diversi senza perdere la caratteristica strutturale che la distingue: come in certe formazioni e aggregazioni naturali – si può pensare ai cristalli – riconoscibili dall'elemento unitario che li compone.

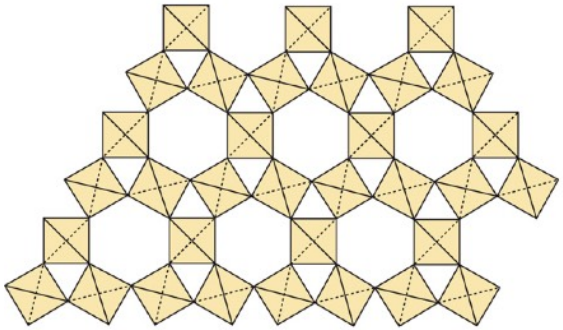
SIXMEMOS
OPEN SOURCE CULTURE

# Continuous structures > Munari > Nature

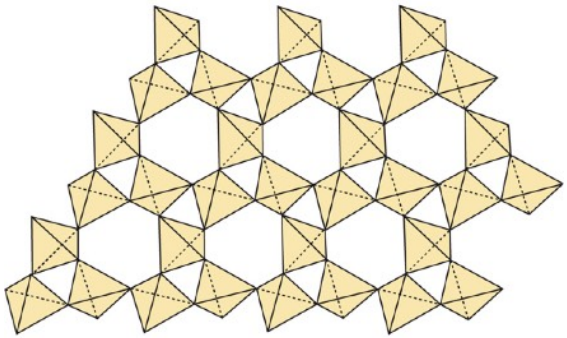


Objects designed to change

# Continuous structures > Nature

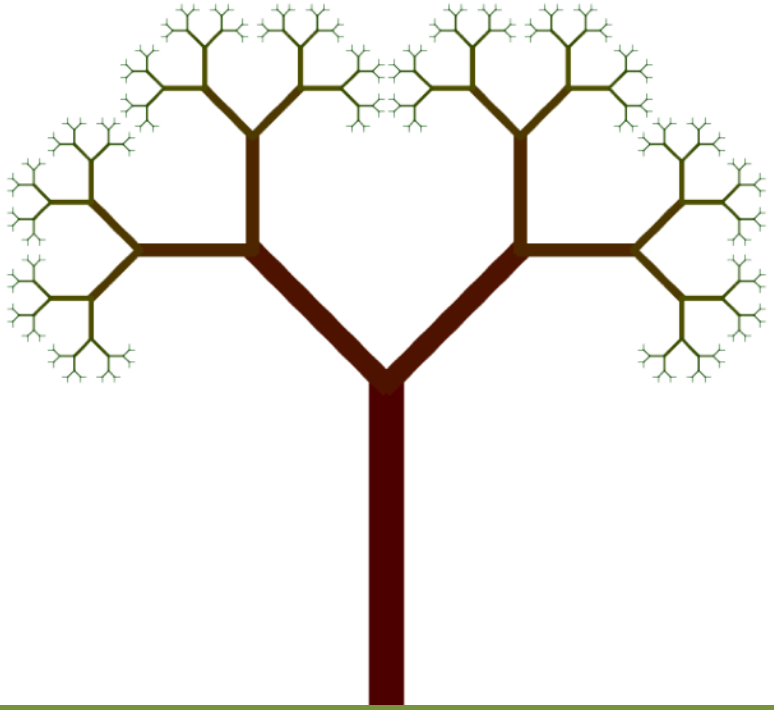


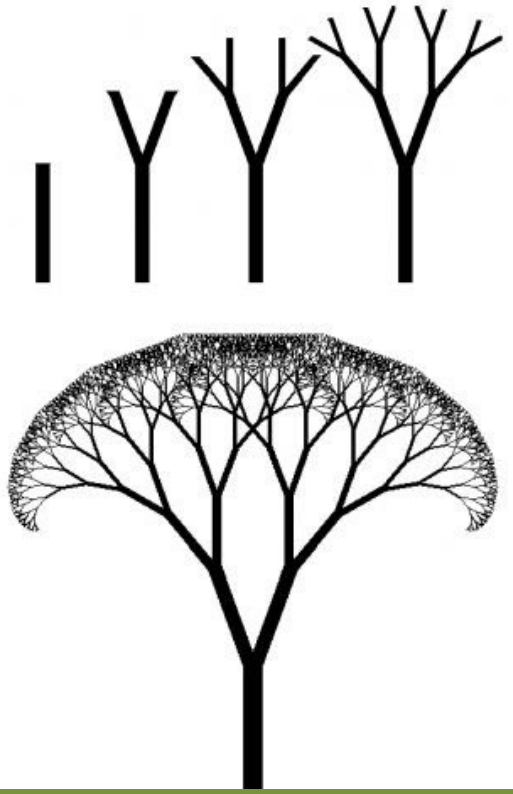
quarzo β (esagonale)



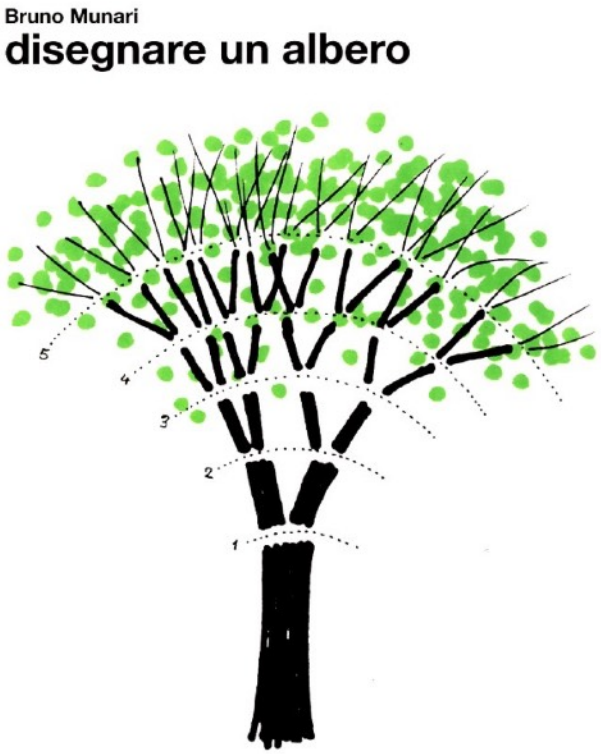
quarzo α (trigonale)

# Nature > Continuous structures > fractal geometry





# Nature > Continuous structures > Munari



# Technology

Technology: compound word; from greek tékne and loghìa, discourse on art - **art** as '**do**' until the seventeenth century, and we now call **technique**.

Talk about technology means not just about displays, software and circuits, but as McLuhan reminds us, can be considered a way of translating a system of knowledge in another system (see G.Porcari, *open method*, p.36)

SIXMEMOS
OPEN SOURCE CULTURE

Munari was a great experimenter of technology, both hardware and software; on several occasions pointed out the futility of an anachronistic approach towards technology

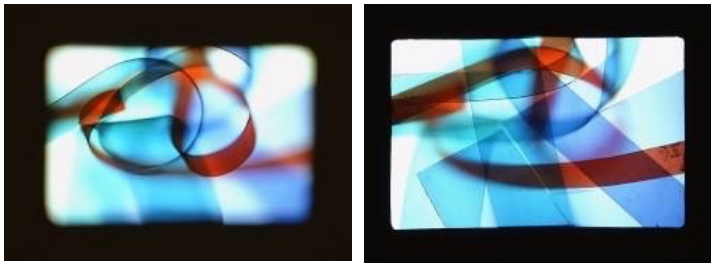
*Those who were once the only means of visual communication, today, in many cases, are inadequate, static, slow. After the invention of the compass, no one does more circles freehand, except to bet or demonstration of skill.*

*Many artists of visual arts, painters, designers, are terrified of the machines. [...] They believe that the machines, one day, will be able to do the artwork and feel already unemployed. [...] (This) only denotes ignorance of the problem, because it is like saying we will have the brush art? Or pencil art? It is indeed sad to see a good classical education coupled with a complete ignorance of modern culture, today, now, here.*

# Munari - technology

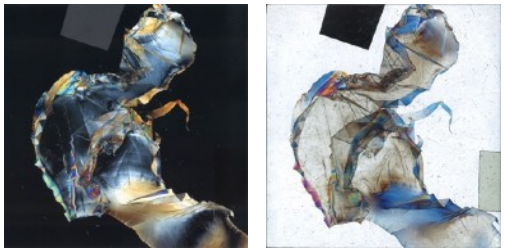
SIXMEMOS
OPEN SOURCE CULTURE

# Technology > Munari > Creativity

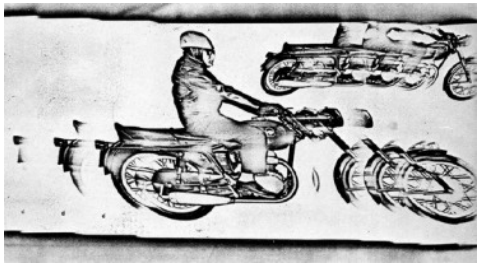


**VETRINO MULTIFOCALE** (1950)

**NELLA NOTTE BUIA** (1956 )



**PROIEZIONE LUCE POLARIZZATA** (1962)



**XEROGRAFIA ORIGINALE** (1963)

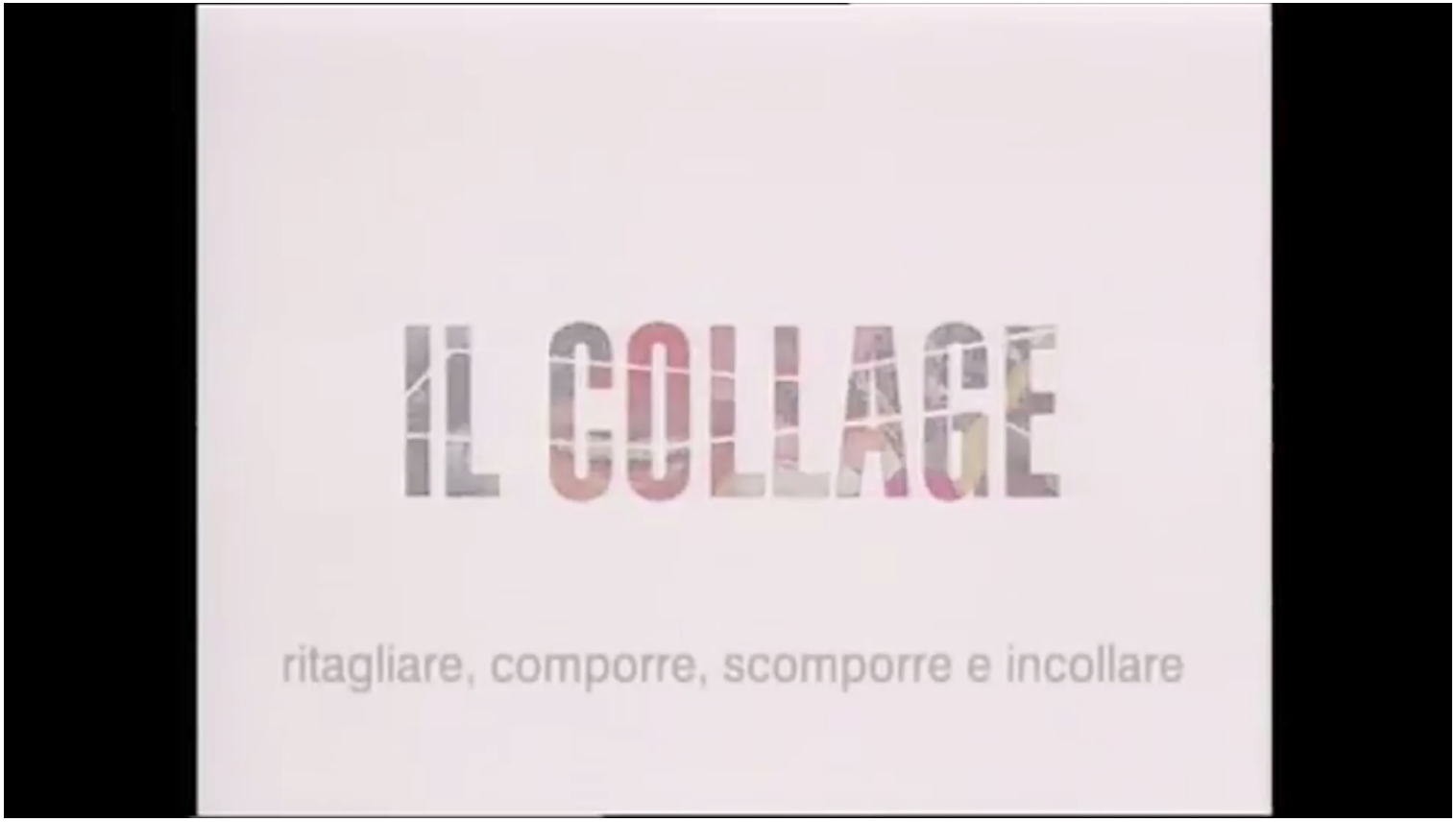
**LAMPADA FALKLAND** (1964)

**TETRACONO** (1965)

hardware experiments

SIXMEMOS
OPEN SOURCE CULTURE

# Technology > Munari > Creativity




software experiments


# Our experiment

SIXMEMOS
OPEN SOURCE CULTURE

WHAT WOULD HAVE DONE MUNARI TODAY?

IN WHICH AREAS OF SPERIMENTATION HE WAS MOVED?

WHICH TECHNOLOGIES HE WOULD HAVE USED?

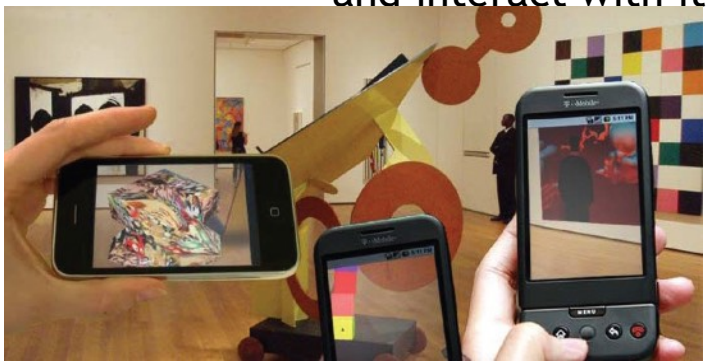
WHICH TECHNOLOGICAL MYTHS HE WOULD HAVE BROKEN?

Augmented Reality – Arduino – tinkering - programming - open source

SIXMEMOS
OPEN SOURCE CULTURE

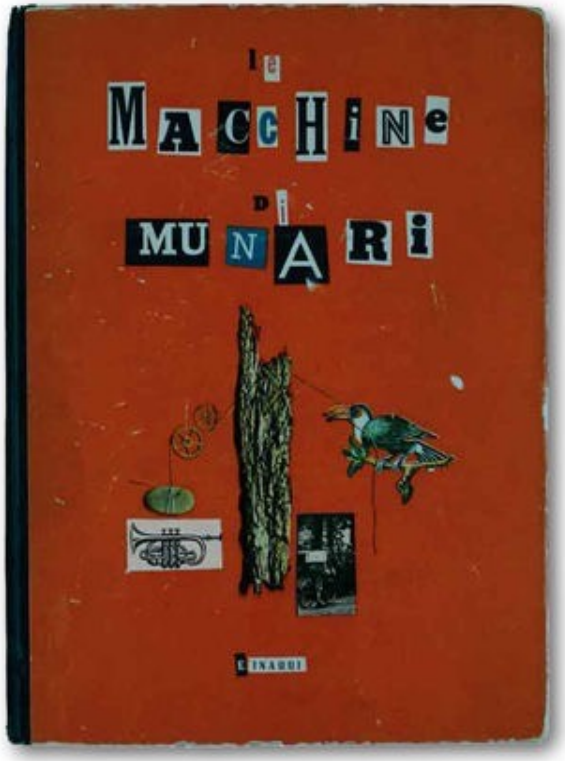
Augmented Reality is the representation of an altered reality in which, to the normal reality perceived through our senses, are superimposed information. The AR adds to the actual reality information layers of different nature. We circumscribe the term AR to a range of technologies that allow 'to strengthen, and extend' the human ability to perceive the world through own senses and interact with it.

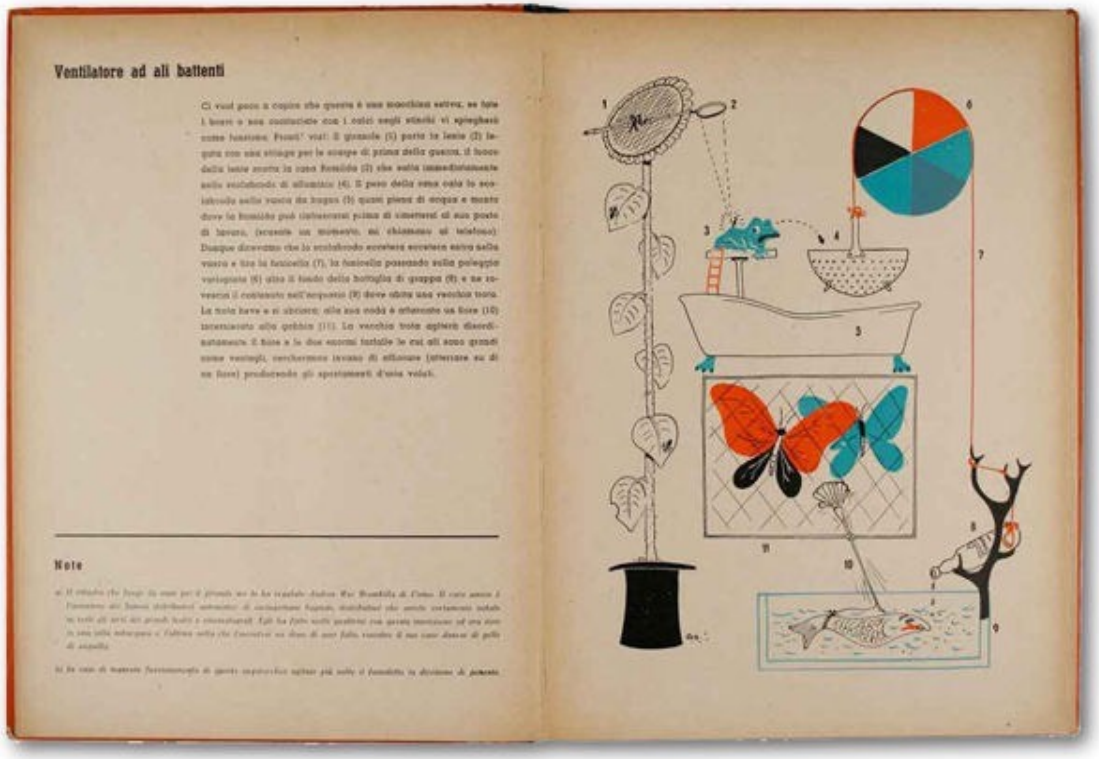
QR Code
AR Tag
Marker
Geolocalizzazione
Video mapping
Layar
Aurasma
AR Media



# Augmented Reality

SIXMEMOS
OPEN SOURCE CULTURE




# Bruno Munari - Augmented Reality

SIXMEMOS
OPEN SOURCE CULTURE

# Bruno Munari - Augmented Reality

SIXMEMOS
OPEN SOURCE CULTURE

SIXMEMOS
OPEN SOURCE CULTURE

Giocare con l'ARte
AUGMENTED STORYTELLING

LA POETICA DI BRUNO MUNARI ALLE PRESE CON LA REALTA' AUMENTATA


With PLAY WITH ART we have experienced the design method of Bruno Munari using current technologies, especially those related to augmented reality. Taking a cue from some research done by Munari, we used his method of education (learning by doing) to conduct meetings with children and adults, supported by some "enabling" technologies in experiential learning processes, relating to the field augmented reality and generative art.

SIXMEMOS
OPEN SOURCE CULTURE

# From Bruno Munari to Massimo Banzi

Bruno Munari

*As a boy I was an experimenter ... curious to see what you could do with one thing, in addition to what you normally do.*

*Train your creativity ... we do with the trial. Creativity work in memory [...] more data there are and more are the connections that you can make [...]*

*[...] Knowing that something can be something else, it is a kind of knowledge linked to the mutation [...]*

Massimo Banzi

*I began to think about the process by which I actually learned the electronic concepts: disassembled all electronic devices that could get my hand. I trick the devices that I had changed and reworked kits and other circuits that I found in the function to change magazines. As a child, I was always intrigued by how things worked for this I disassembled them.*

Bruno Munari and tinkering

SIXMEMOS
OPEN SOURCE CULTURE

# «Tinkering»

Bruno Munari

*... I told them and I often say to not think before doing [...] often preconceived idea causes difficulties [...] not to think before doing means [...] use the intuition*

*Today you are invited to do without thinking, to build something you do not know what it is, but that later turns out to be curious an object that stimulates the imagination*

Massimo Banzi

*[...] Tinkering is what happens when you try to do something that no one knows how to do, guided by whim, imagination and curiosity.*

*Play with technology, exploring different possibilities directly on hardware and software, sometimes without a clearly defined purpose and re-using*

Bruno Munari e tinkering

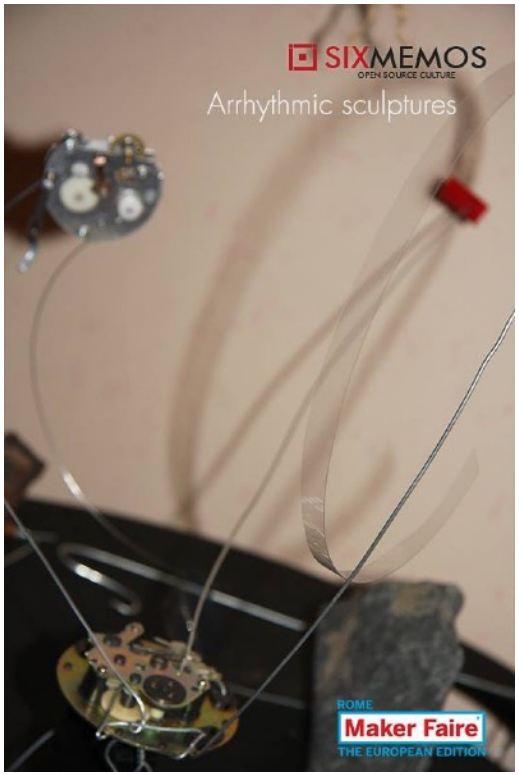
SIXMEMOS
OPEN SOURCE CULTURE

# SIX MEMOS
# Bring Munari among makers

SIXMEMOS
OPEN SOURCE CULTURE

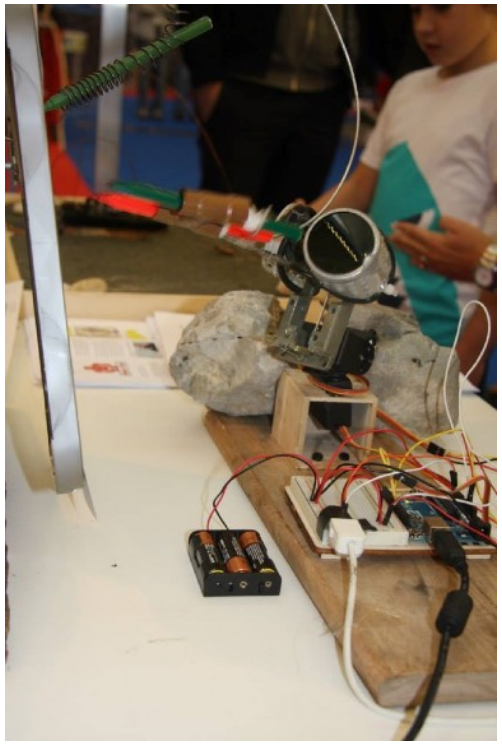
*"A few have accepted as Munari technology and the machine world, and very few like him, have been able to introduce in this his fervent adherence an element of distraction of pure functionality, in order to put emphasis on the component of a free and joyful contemplation-use object. "*

*Aldo Tanchis*



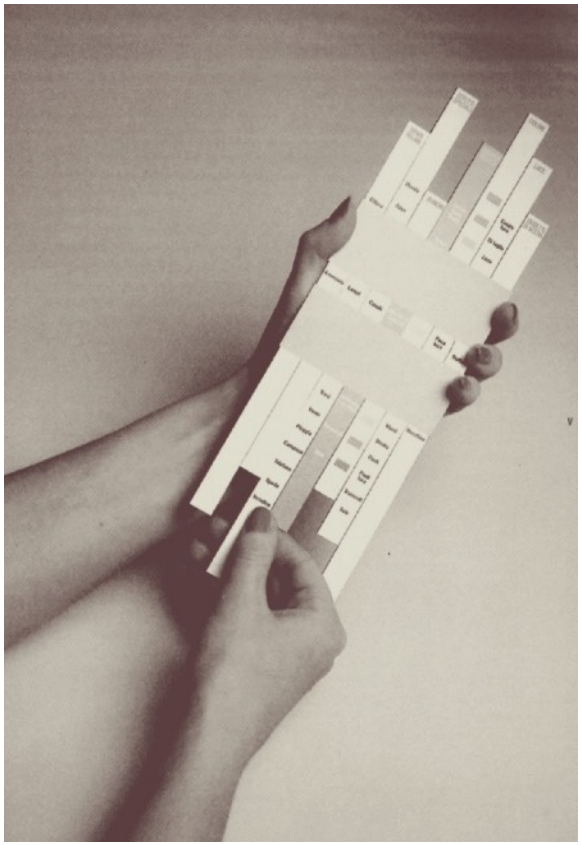

# 2013 - arrhythmic sculptures

SIXMEMOS
OPEN SOURCE CULTURE




# 2013 - arrhythmic sculptures

SIXMEMOS
OPEN SOURCE CULTURE



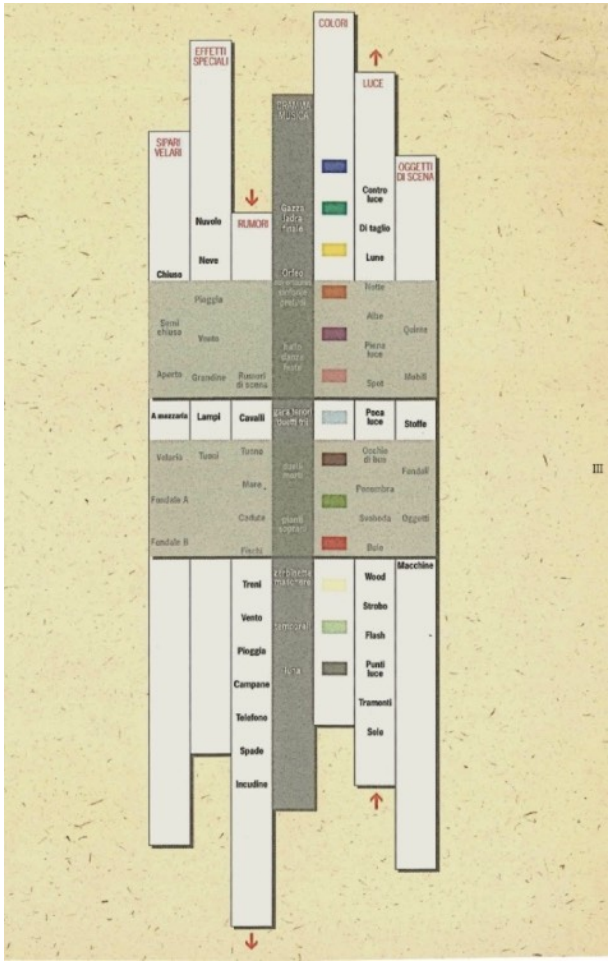
**OPERA ROTTA – Breaking and recognized**

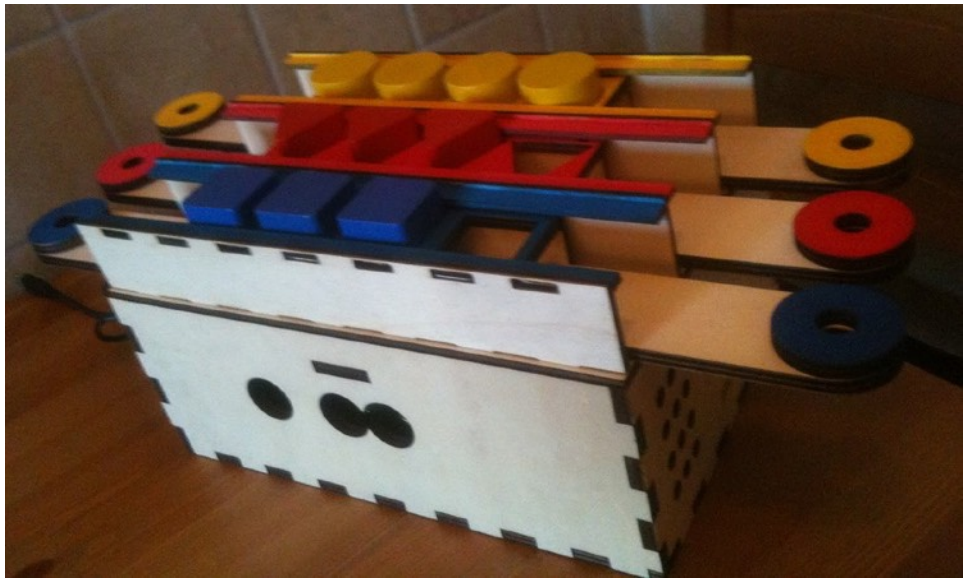
*The children break the toys to see how they are made inside. We, adults, say "break", but in fact the children "open" toys to get other information about the object in their hand (we too "open" a fruit to know the flavor). This game made of curiosity, typical of almost all children, allows indeed the beginning of a process that will reach the knowledge of the object in every detail. We thought to disassemble the known works with this spirit of inquiry and knowledge, breaking them down in the most significant components and then reassemble them in a game of combinations that allow you to discover (and therefore better remember) the elements that make up the structure.*

**Bruno Munari**

# 2014 - from Opera Rotta to Brick Opera

SIXMEMOS
OPEN SOURCE CULTURE

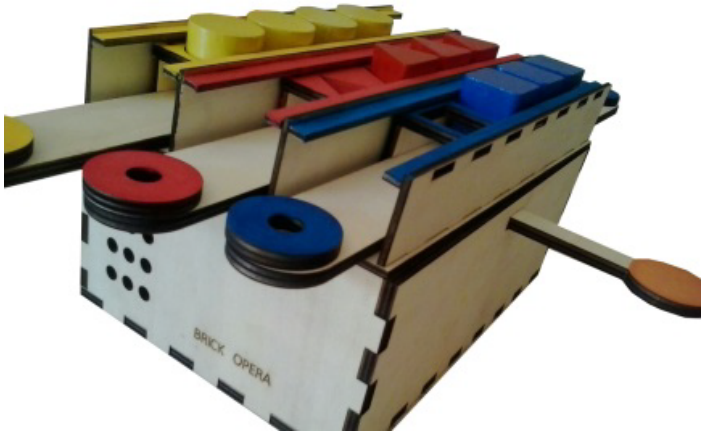


Brick Opera, is the implementation of a "digital heart" based on Arduino for Opera Rotta of Bruno Munari, a "mechanism" created by the artist and commissioned by La Scala in Milan to decompose and recompose the operas to be staged, but that was never realized.

# 2014 - from Opera Rotta to Brick Opera

SIXMEMOS
OPEN SOURCE CULTURE




A mounting machine, an interactive game for children that allows them to invent new stories starting from known fables, using the combinatorial principle "physical / material" of Opera Rotta.


The underlying principle of this project rests on building interactive environments through the use of software and hardware that can communicate with humans and the environment, that is, with the analog world (physical computing), using the approach of learning by doing.

# 2014 - from Opera Rotta to Brick Opera

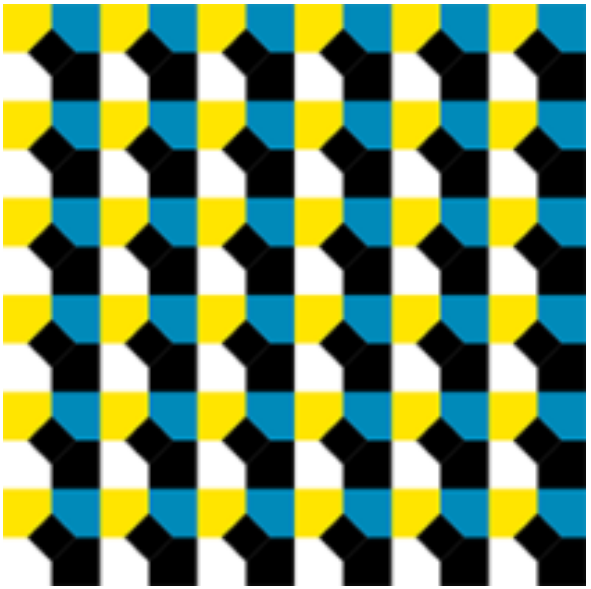
SIXMEMOS
OPEN SOURCE CULTURE

**Perturbazione Cibernetica**

http://www.sixmemos.it/?p=1335

**Curve di Peano**

http://www.sixmemos.it/?p=1438



# Re-program Munari: some exemples

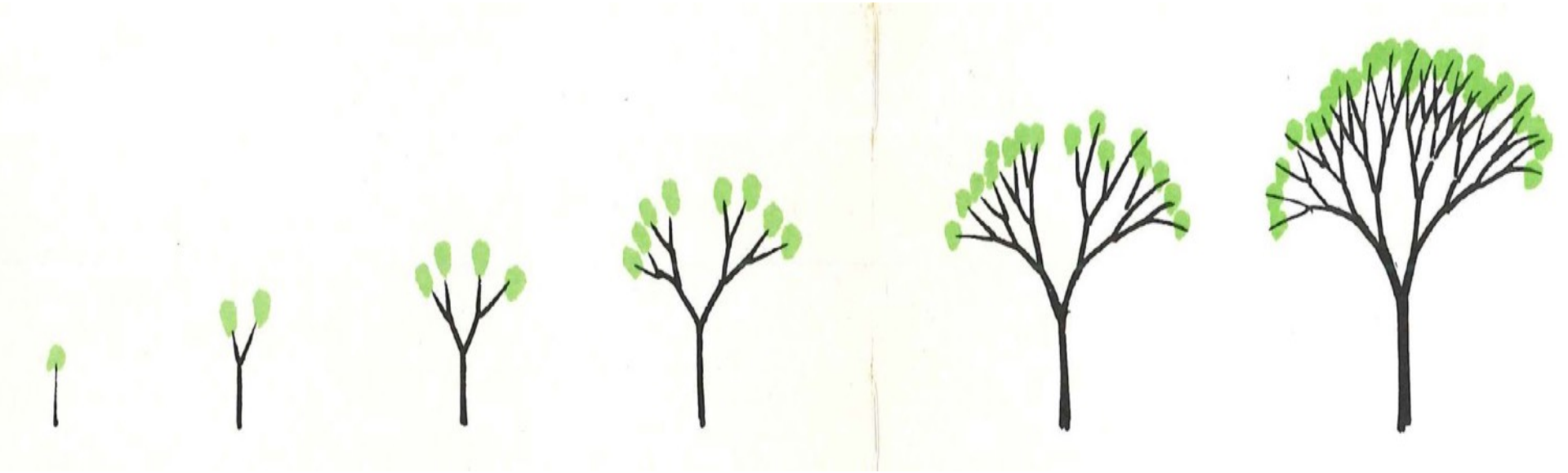
SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree

## WORKSHOP

SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree| workshop



Finalmente l’inverno è finito e dalla terra, dove era caduto un seme , sbuca un filo verticale verde. Il sole comincia a farsi sentire  e il segno verde cresce . È un albero, ma nessuno lo riconosce adesso così piccolo. Man mano  che cresce però, si ramifica , ogni anno gli spunteranno le gemme sui rami, dai rami altre foglie e via di seguito . Dopo qualche anno quel filo verde di prima è diventato un bel tronco pieno di rami. Più avanti ancora avrà costruito una grande ramificazione sulla quale farà sbucare foglie, fiori e frutti; d’autunno spargerà attorno a sé i suoi semi, alcuni cadranno sotto di lui, altri saranno portati lontano dal vento. In quasi ogni posto dove sarà caduto un seme, nascerà un altro albero simile a lui.

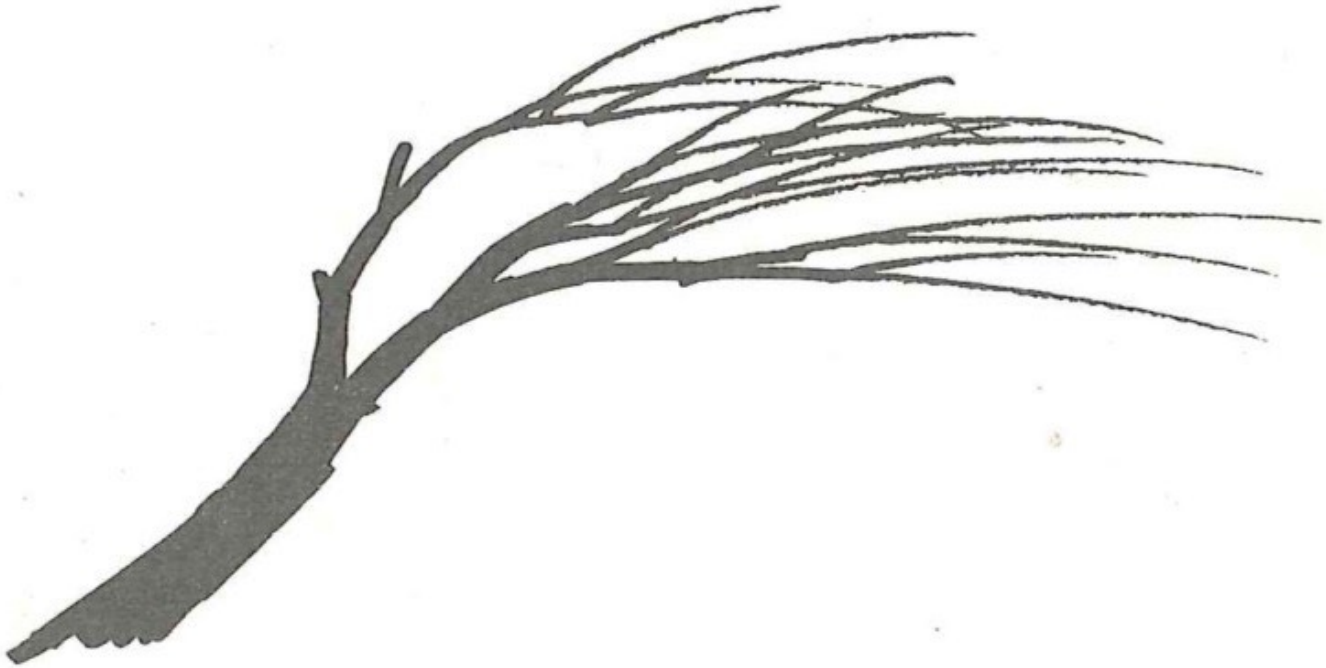
SIXMEMOS
OPEN SOURCE CULTURE

# Disegnare un albero| workshop

SIXMEMOS
OPEN SOURCE CULTURE

# Disegnare un albero| workshop

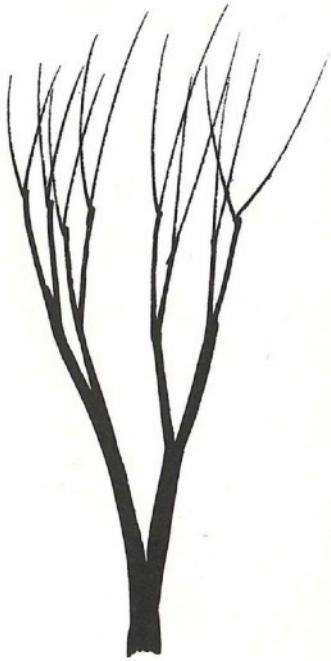
# Disegnare un albero| workshop



Se c'è più vento e più spesso, cresce così.

SIXMEMOS
OPEN SOURCE CULTURE

# Disegnare un albero| workshop



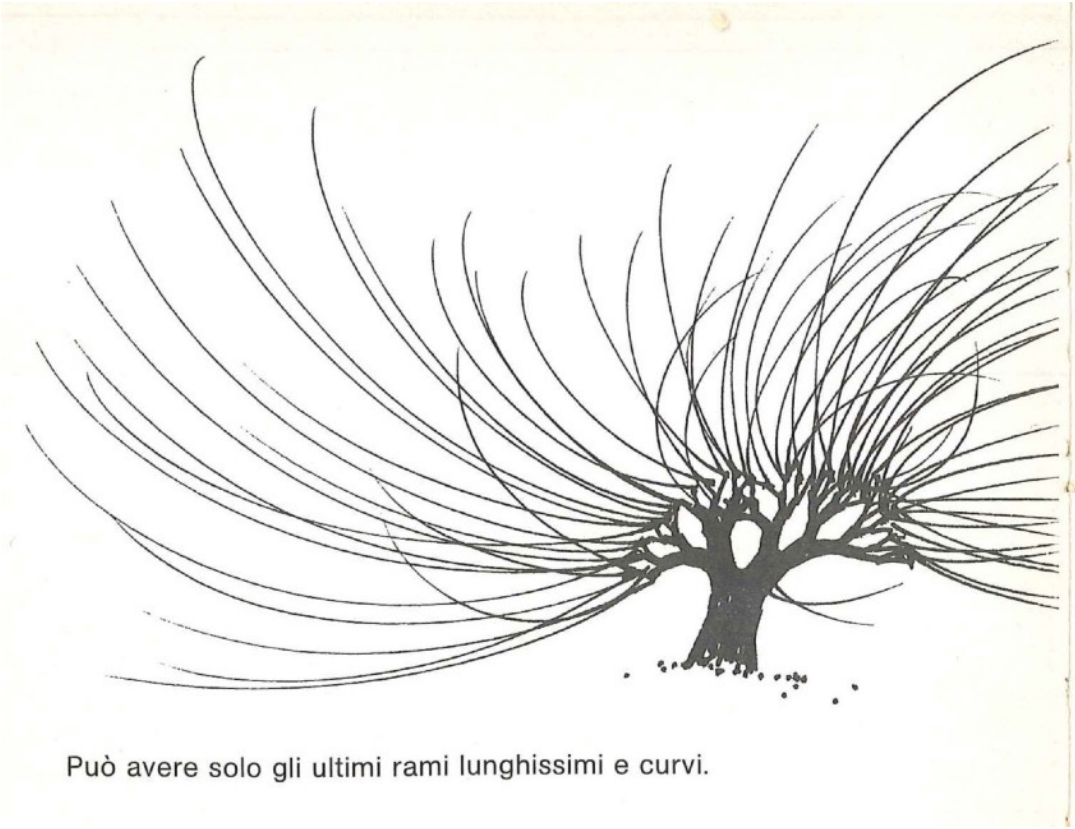
Lo stesso schema può avere il tronco molto lungo e i rami corti. Può avere il tronco corto e i rami lunghi. Può avere il tronco corto e i secondi rami lunghi e gli altri corti. Può essere normale e avere solo gli ultimi rami lunghi.

SIXMEMOS
OPEN SOURCE CULTURE

# Disegnare un albero| workshop

SIXMEMOS
OPEN SOURCE CULTURE

# Disegnare un albero| workshop



Può avere solo gli ultimi rami lunghissimi e curvi.

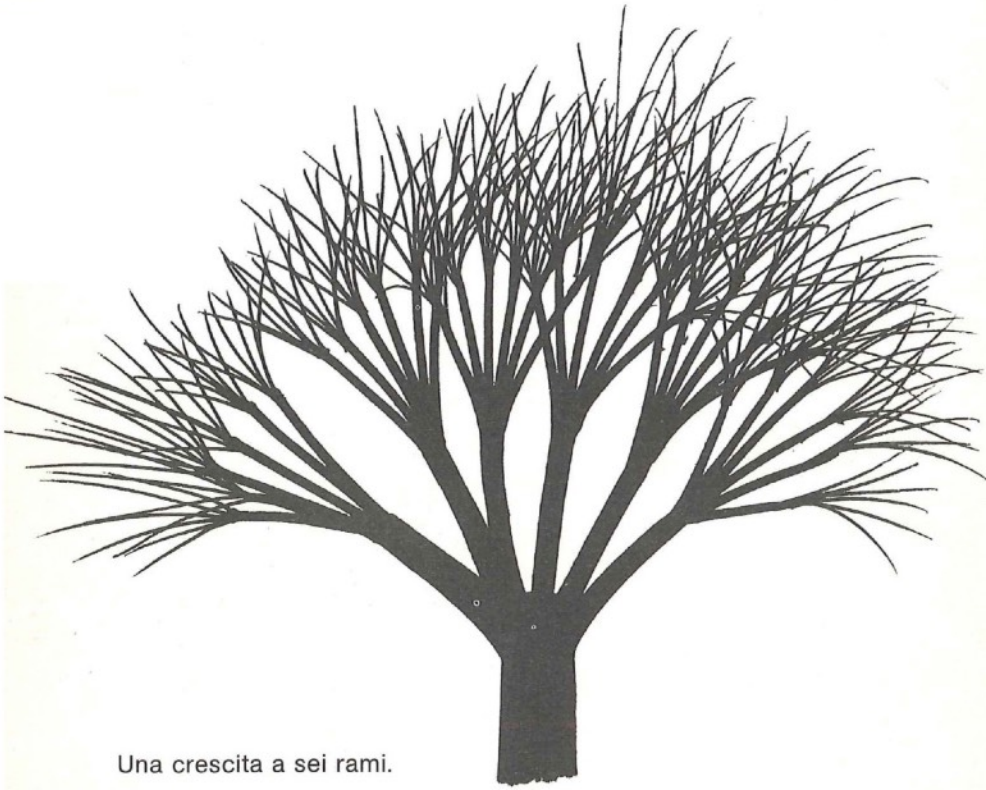
SIXMEMOS
OPEN SOURCE CULTURE

# Disegnare un albero| workshop

SIXMEMOS
OPEN SOURCE CULTURE

# Disegnare un albero| workshop

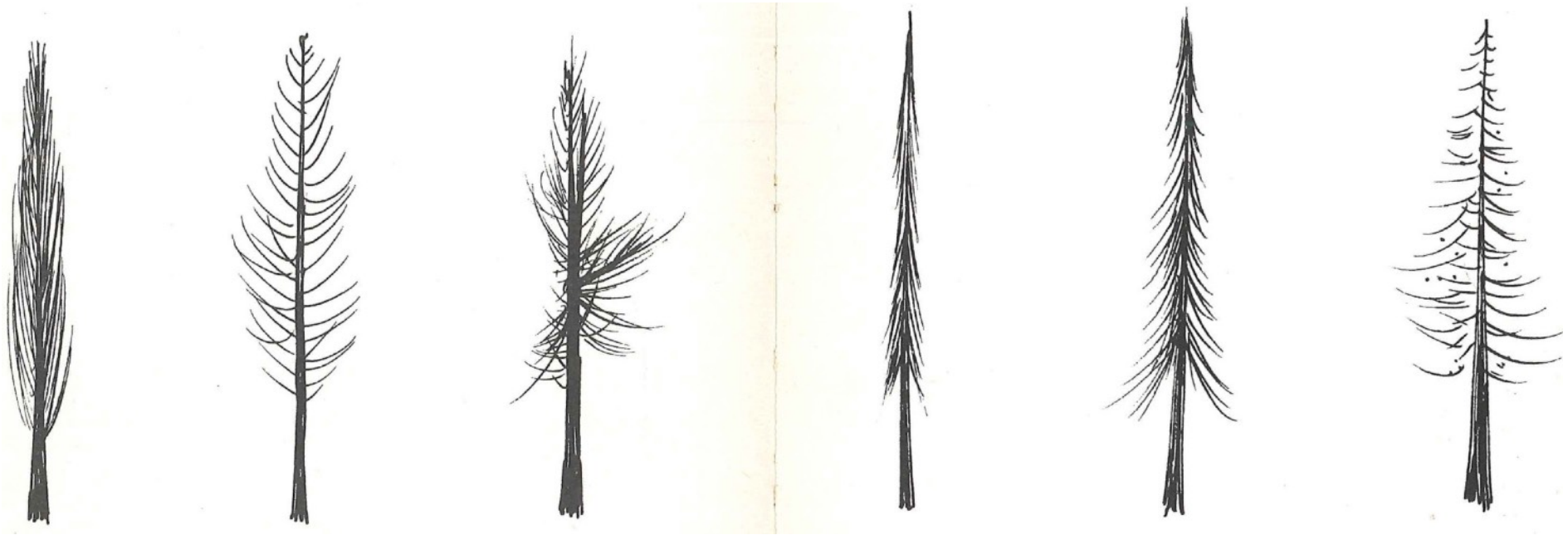
Crescita a quattro.



Una crescita a sei rami.

SIXMEMOS
OPEN SOURCE CULTURE

# Disegnare un albero| workshop



# Realize a tree

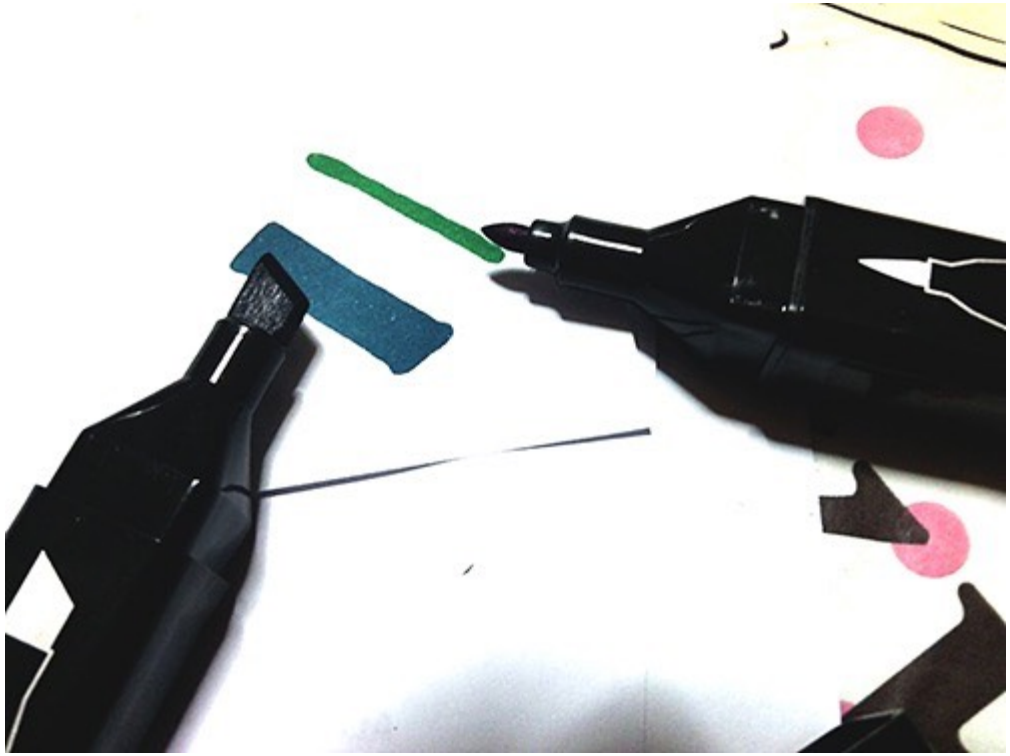
1. with marker 10 min.
2. With pieces of paper 15 min.
3. With wire 20 min.
4. With the programming 40 min.

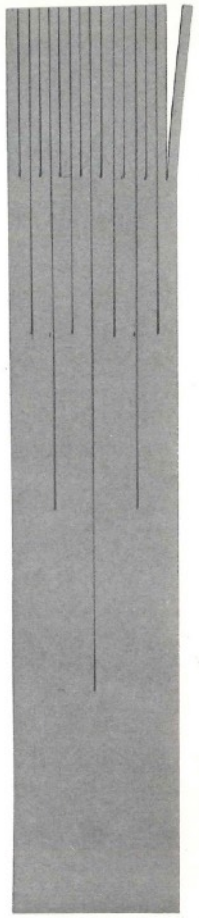
## Remember:

The branch that follows is always smaller than the one that precedes it!

# 1. With marker

**15 min.**

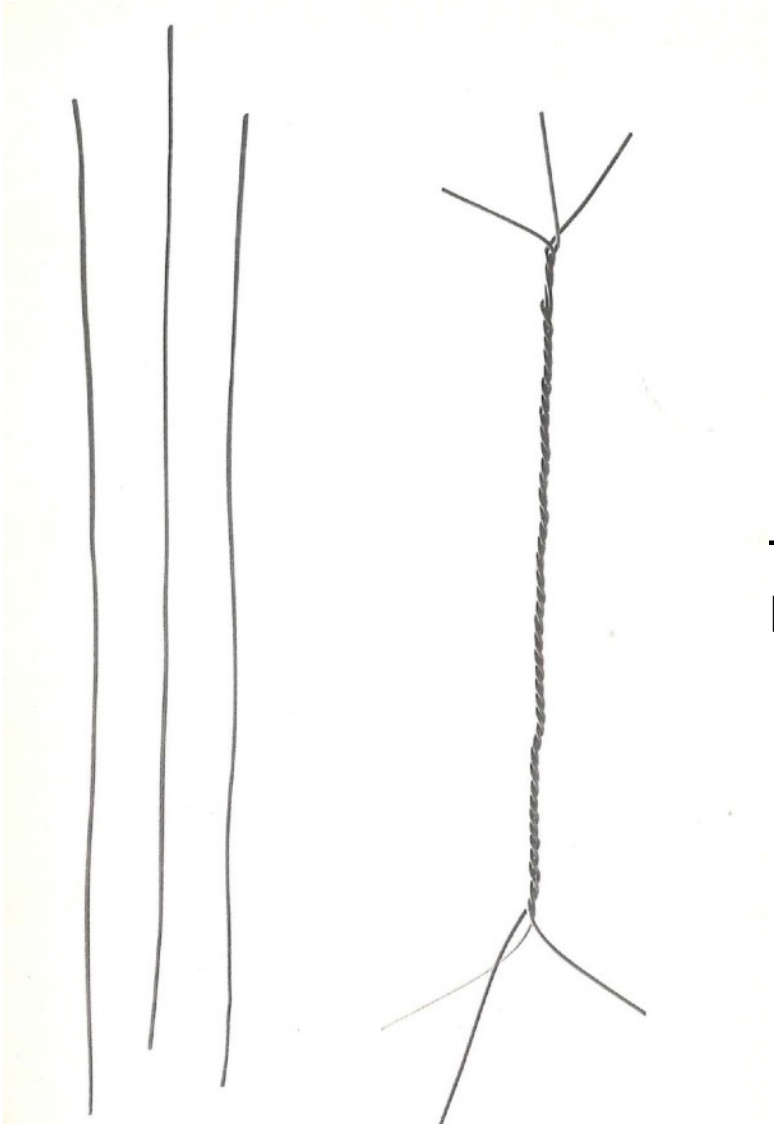




# 2. With paper

**15 min.**

Cut or tear along the lines and build the tree



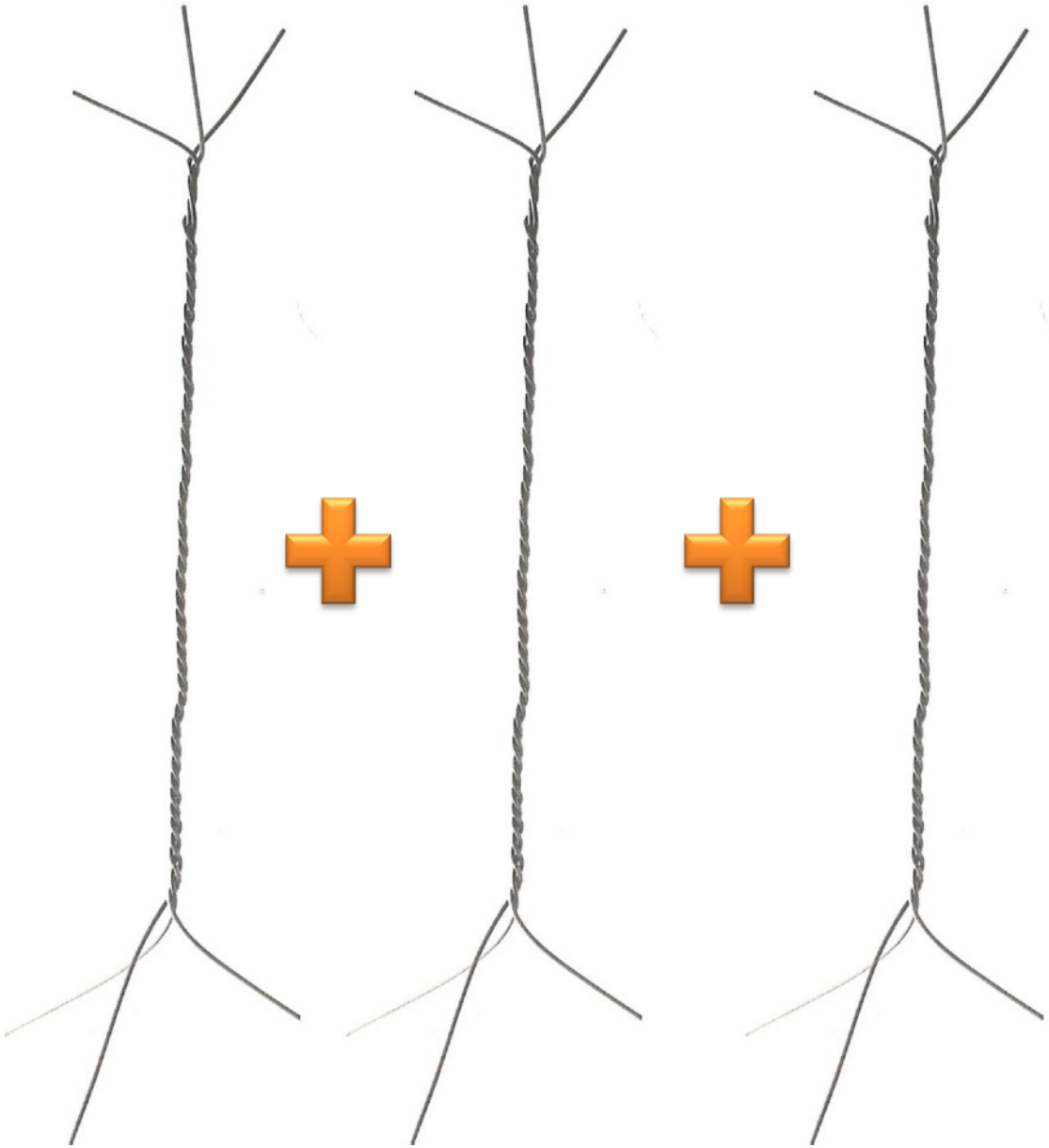
# 3. With wire

**15 min.**

18 pcs wire
Twist 3 3 all wires leaving 2-3 cm of space
bove and below so you have 9 pcs twisted

SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree| workshop

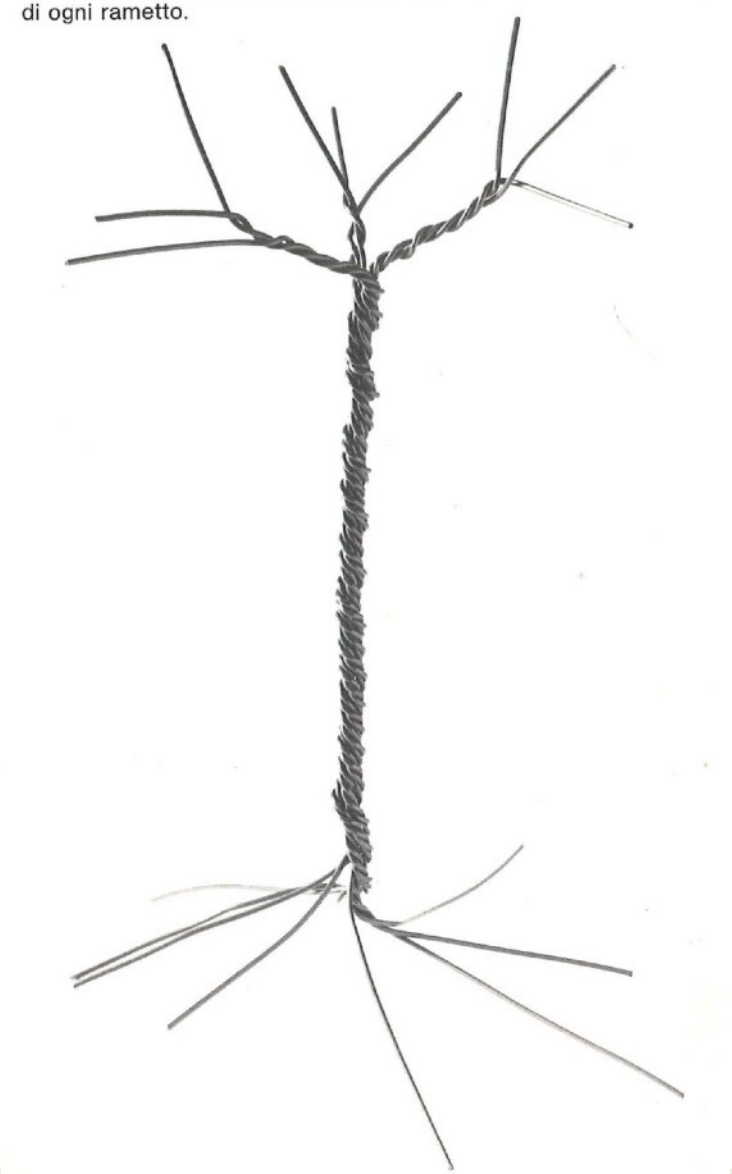


- Take 3 pcs twisted and wrap each other yet always leaving a few cm above and below

SIXMEMOS
OPEN SOURCE CULTURE

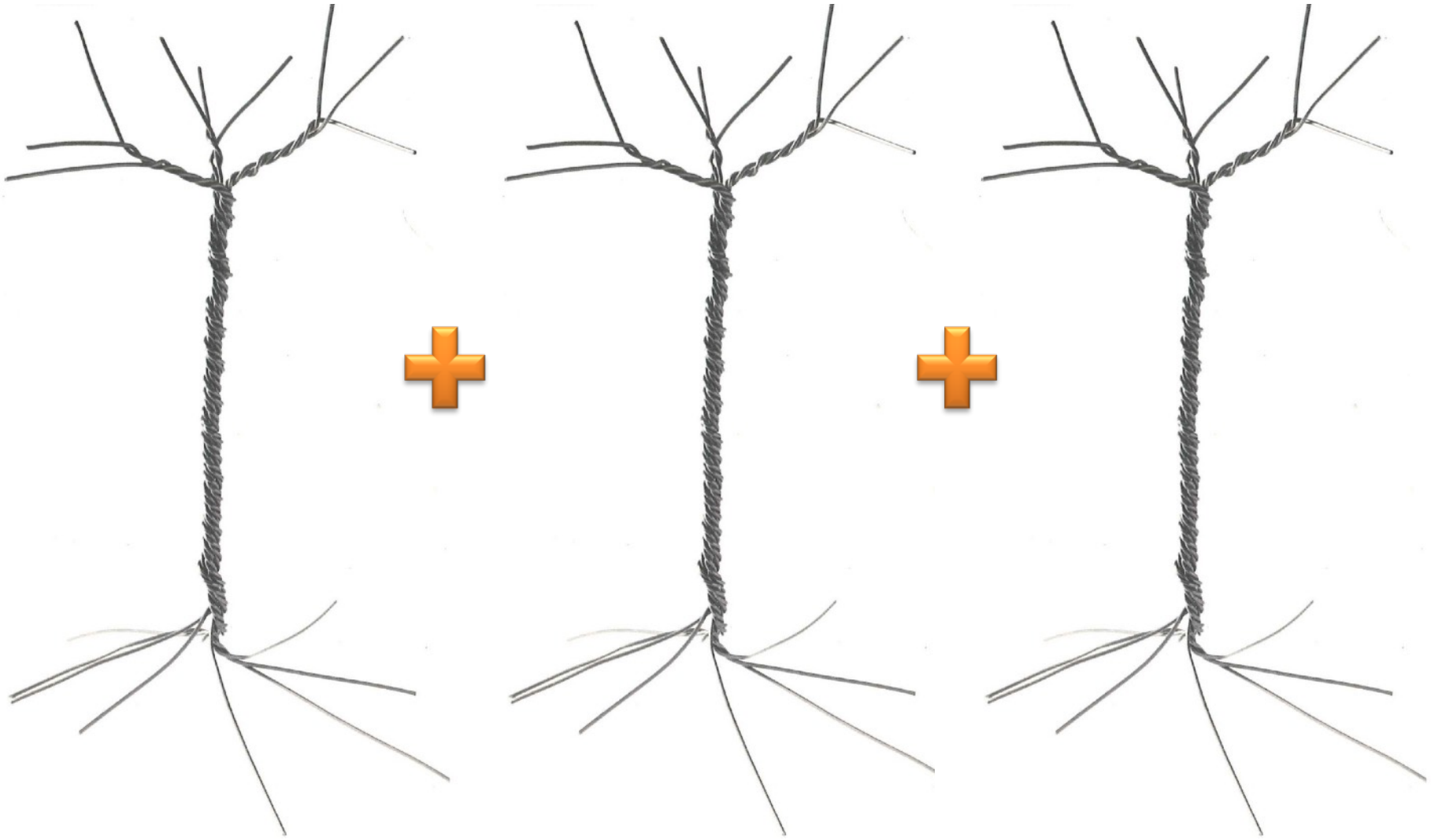
# Draw a tree| workshop

Facciamo tre di questi cosi così, e poi li attorcigliamo tutti e tre assieme, lasciando fuori, anche qui, due o tre centimetri di ogni rametto.



SIXMEMOS
OPEN SOURCE CULTURE

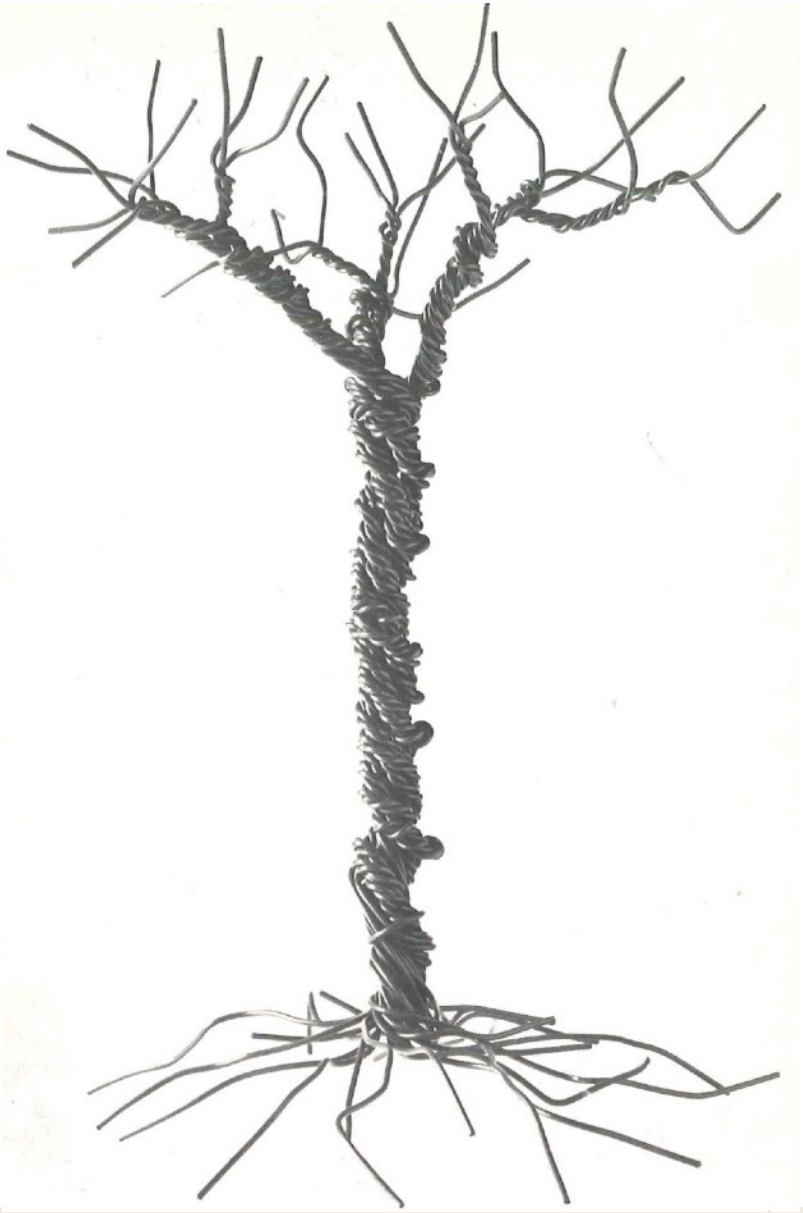
# Draw a tree| workshop



SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop

=



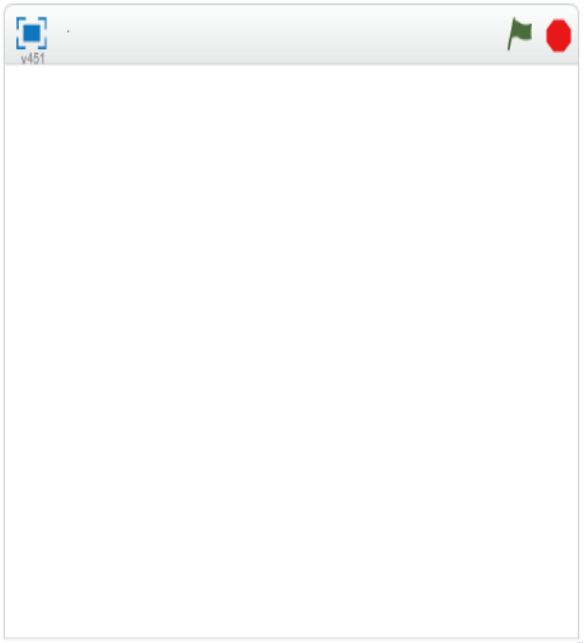
# With the programming

# FRACTAL TREE WITH SCRATCH

SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop

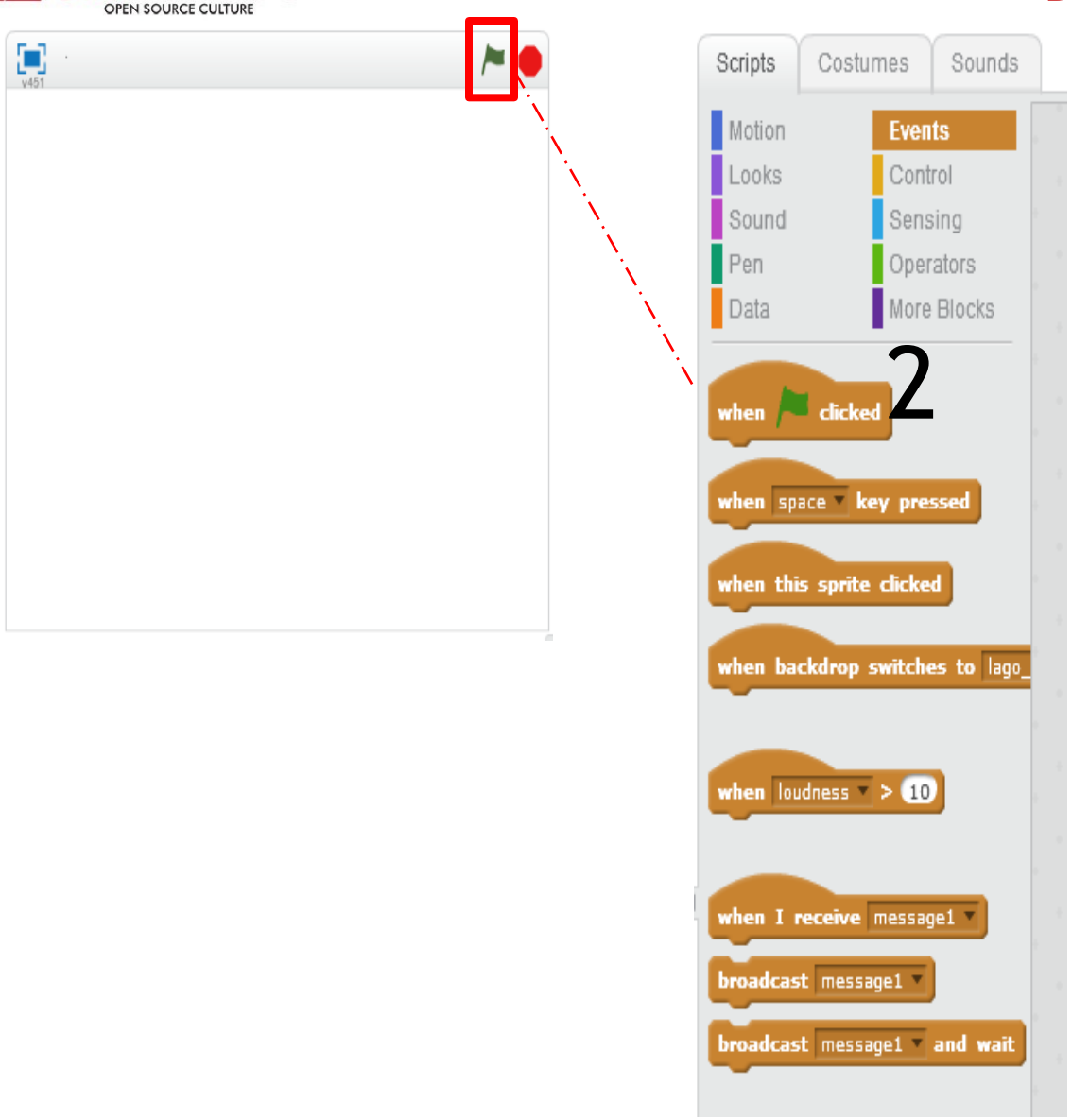
# 1




1… Quando deve accadere qualcosa? Eventi

SIXMEMOS
OPEN SOURCE CULTURE

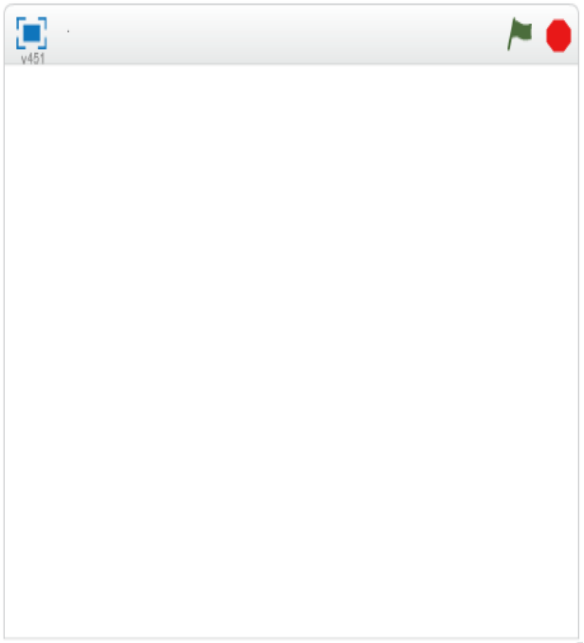
# Draw a tree | workshop

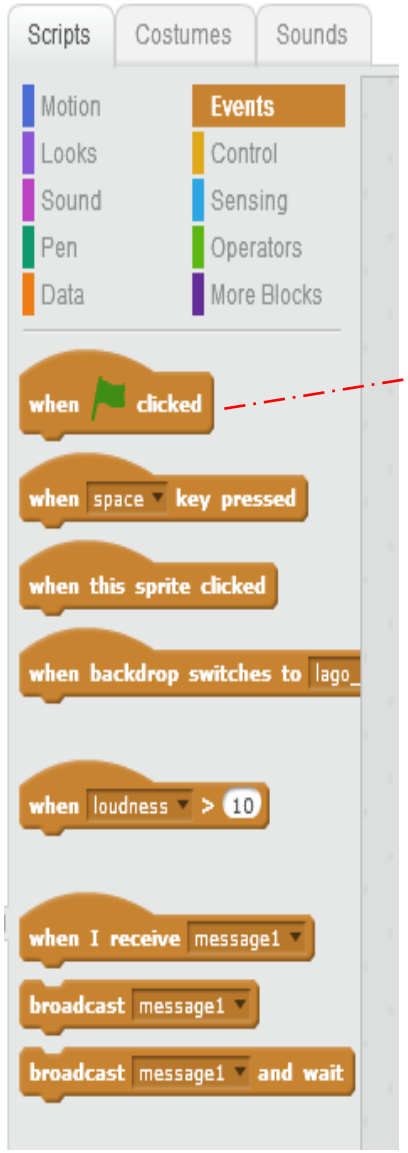



1… Quando deve accadere qualcosa? Eventi
2-3… Quando clicco sulla bandierina verde dello schermo … fai quello che scriveremo dopo

SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop



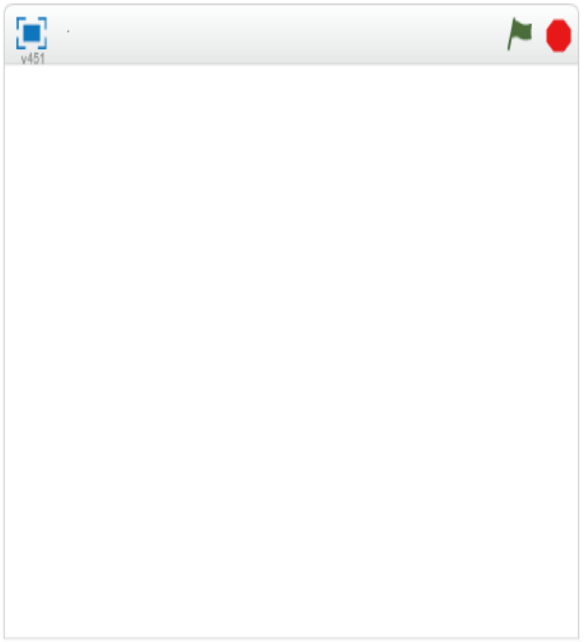



3

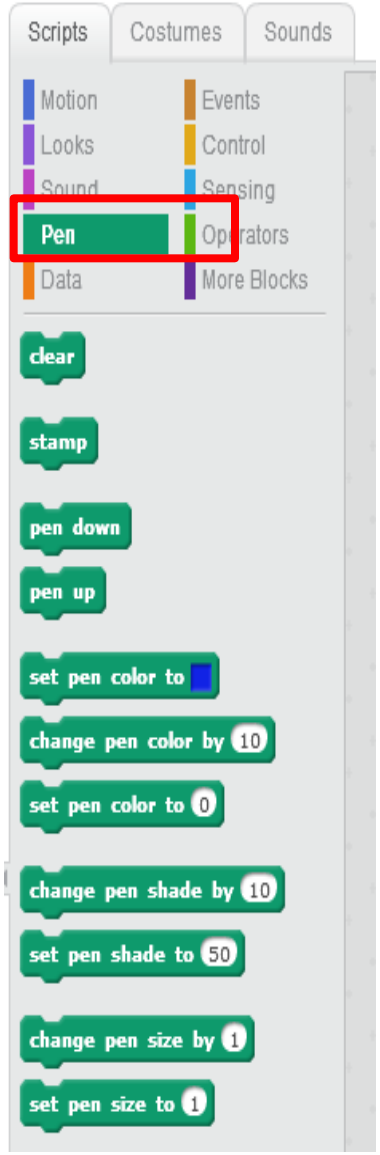

1… Quando deve accadere qualcosa? Eventi
2-3… Quando clicco sulla bandierina verde dello schermo … fai quello che scriveremo dopo

SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop



1

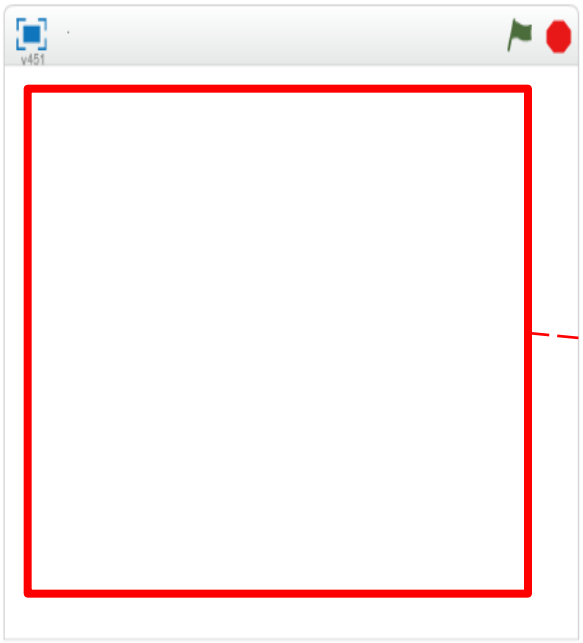


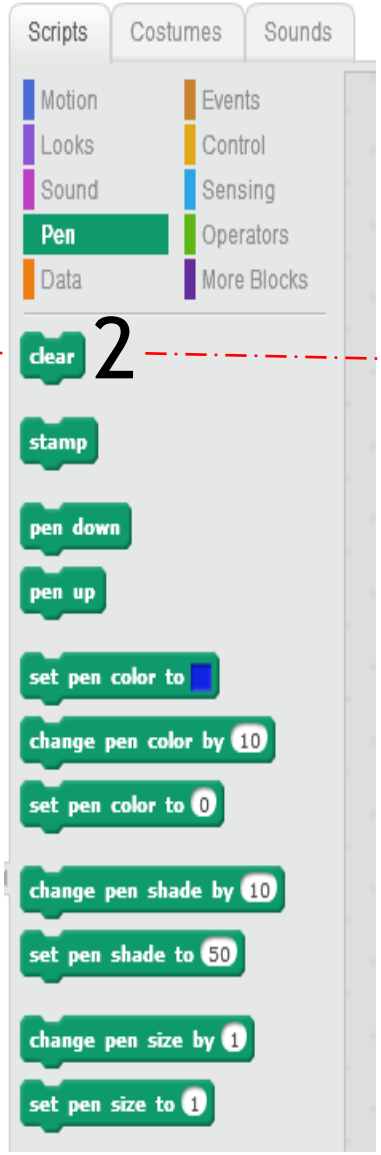


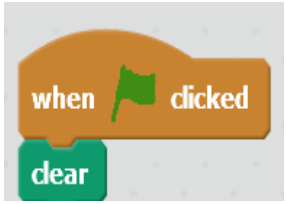
1… Utilizza lo strumento penna per disegnare
2-3… Cancella lo schermo ogni volta che clicco
4-5… Impostare la direzione dello sprite corrente

SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop



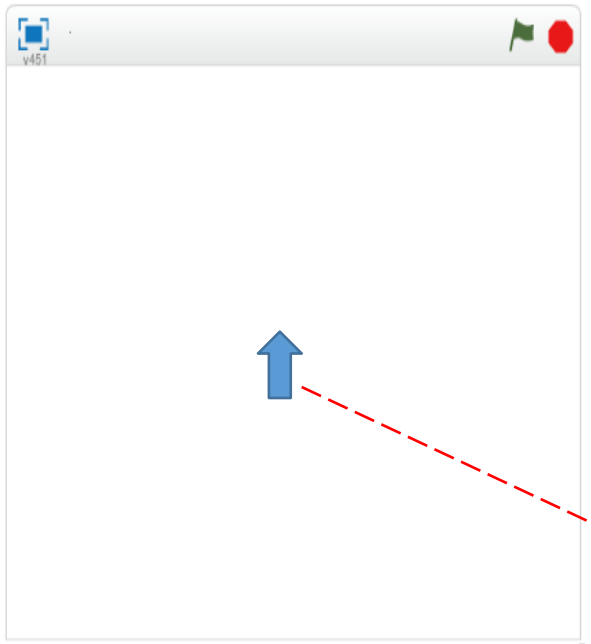


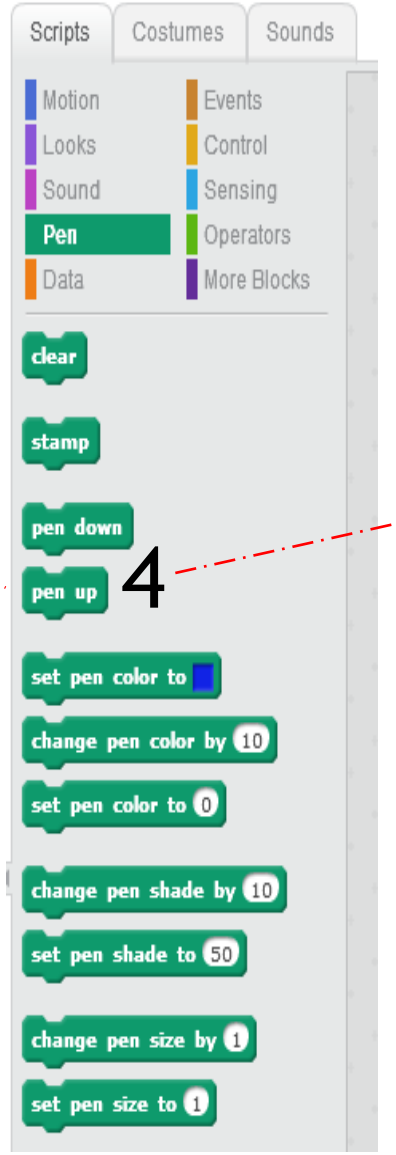




1… Utilizza lo strumento penna per disegnare
2-3… Cancella lo schermo ogni volta che clicco

SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop





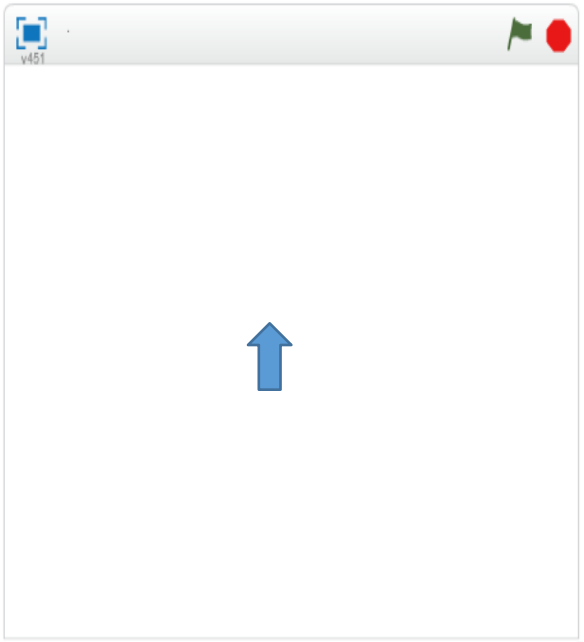

4

5

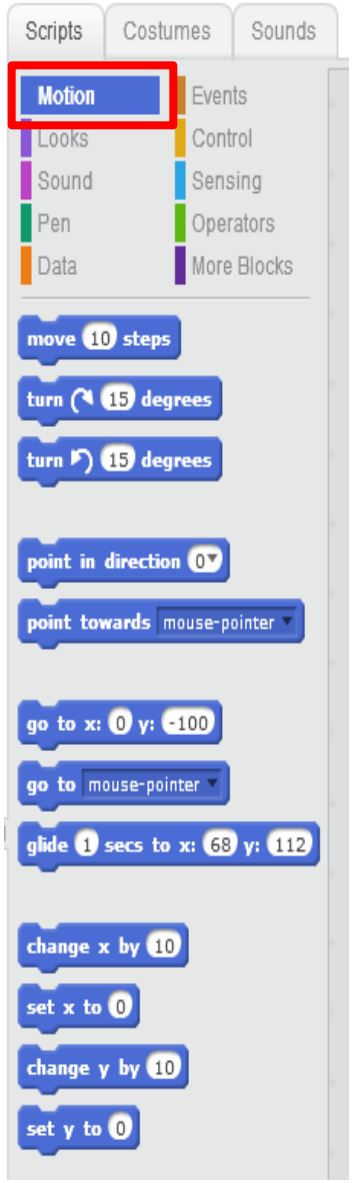

1… Utilizza lo strumento penna per disegnare
2-3… Cancella lo schermo ogni volta che clicco
4-5… Impostare la direzione dello sprite corrente

SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop



1

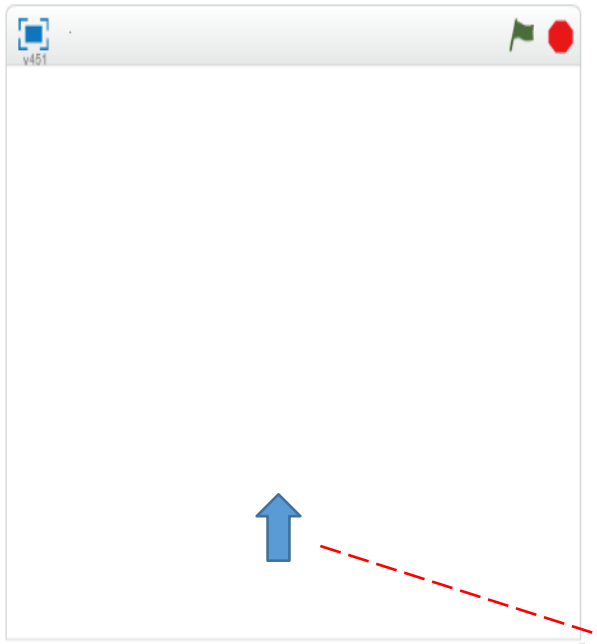


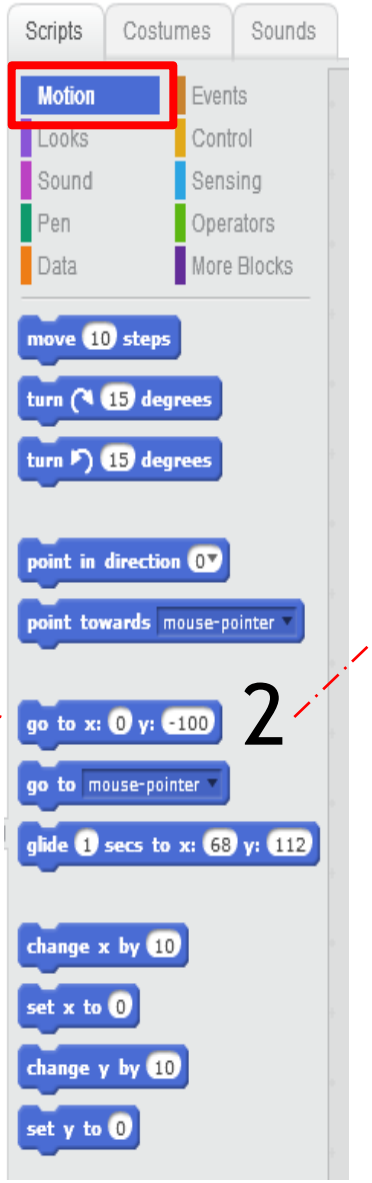


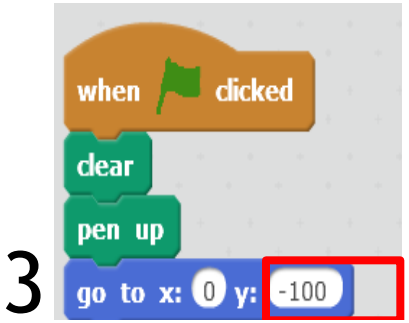
1 …Muovi il cursore per posizionare la penna virtuale

SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop



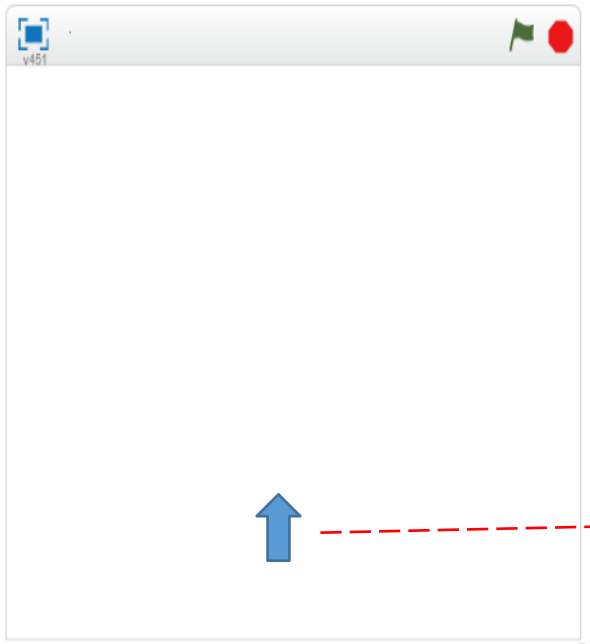


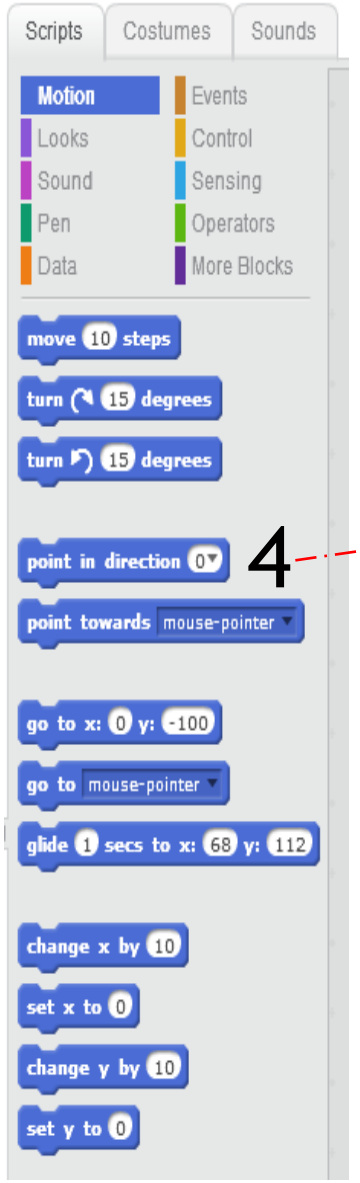



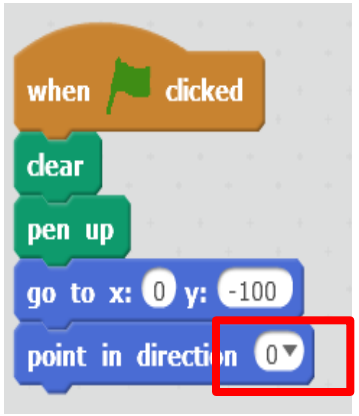

1 …Muovi il cursore per posizionare la penna virtuale
2-3 …Vai alla posizione X =0 e Y=-100 ( in basso al centro)

SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop

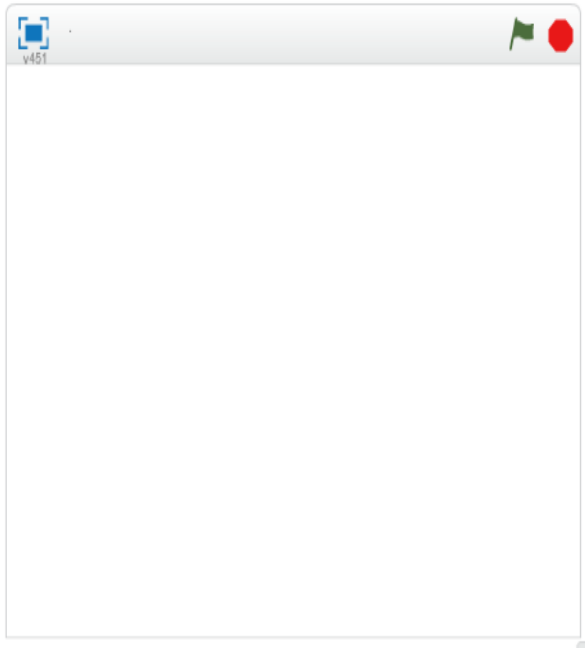




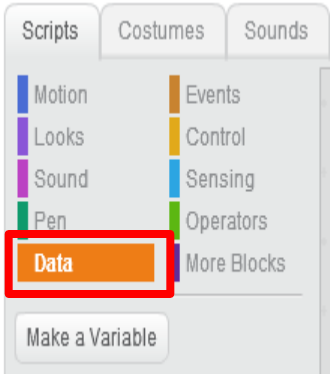



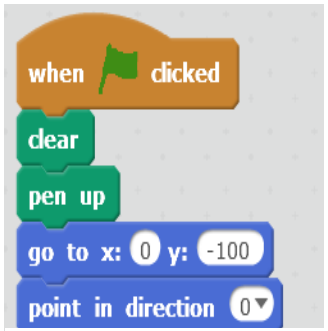

1 …Muovi il cursore per posizionare la penna virtuale
2-3 …Vai alla posizione X =0 e Y=-100 ( in basso al centro)
4-5 …Tira su la penna dello sprite, in modo da non attirare quando si muove

# Draw a tree | workshop



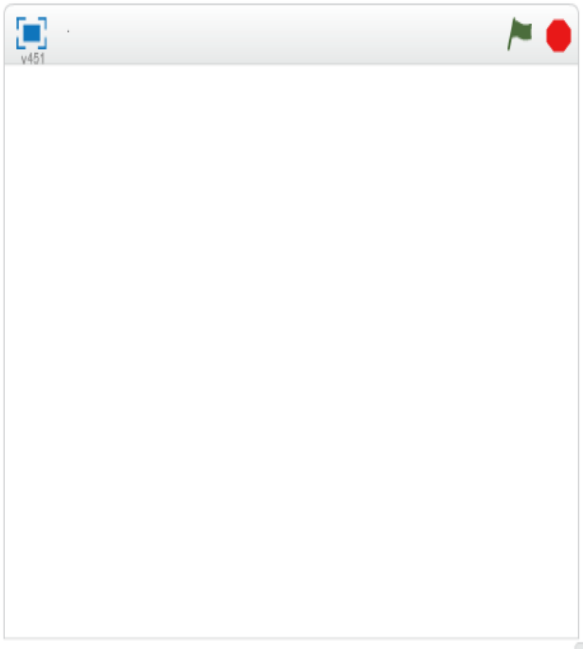
1

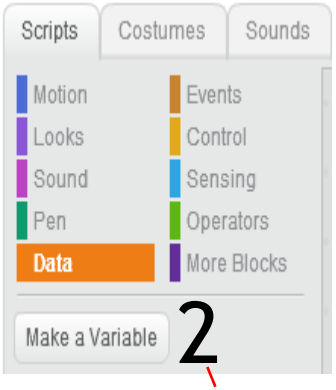


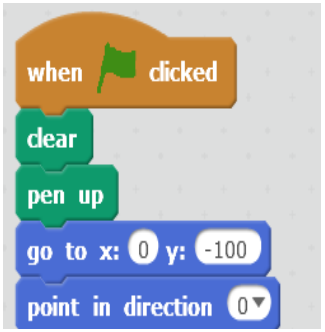



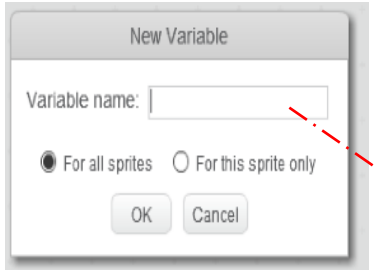

1-2 …Creo una variabile che chiamo «dimensione»

# Draw a tree | workshop





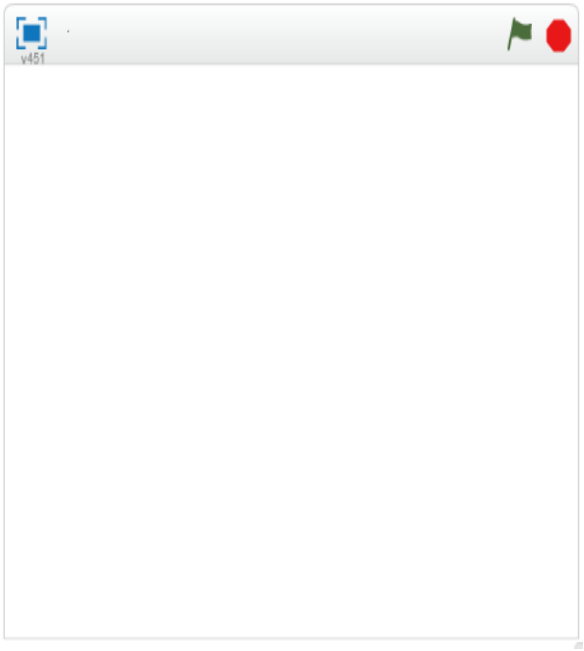



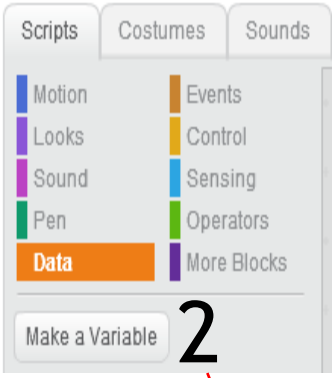



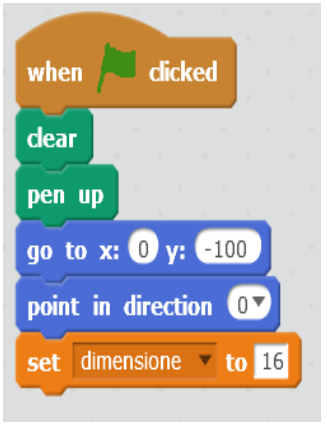

dimensione

1-2 …Creo una variabile che chiamo «dimensione» che ci permetterà di creare rami di dimensioni sempre più piccoli

# Draw a tree | workshop





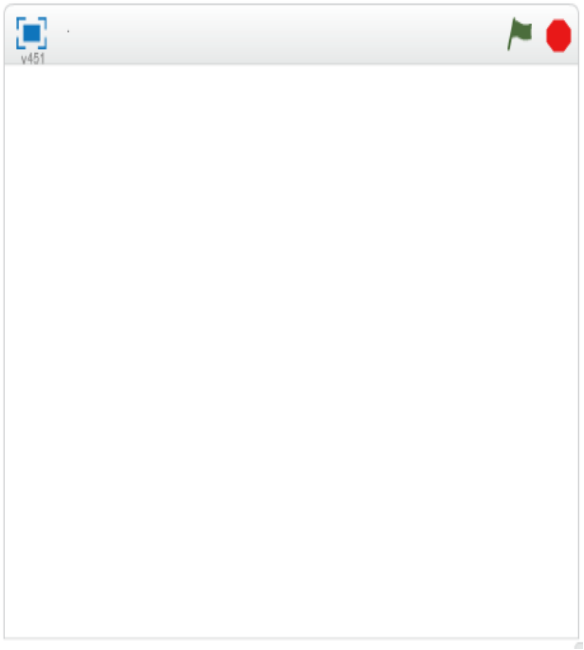



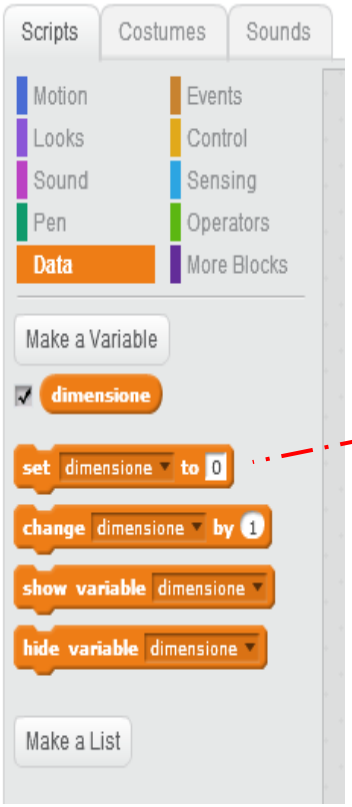

dimensione

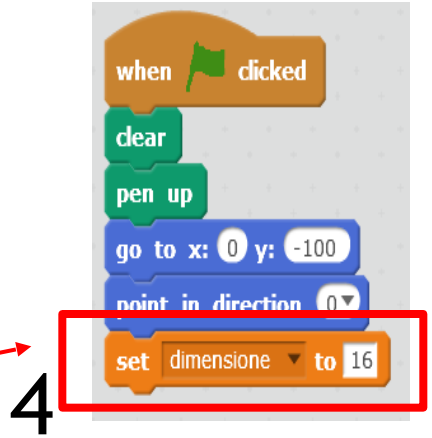

3

1-2 …Creo una variabile che chiamo «dimensione» che ci permetterà di creare rami di dimensioni sempre più piccoli partendo dal valore iniziale che gli assegneremo es. 16

# Draw a tree | workshop

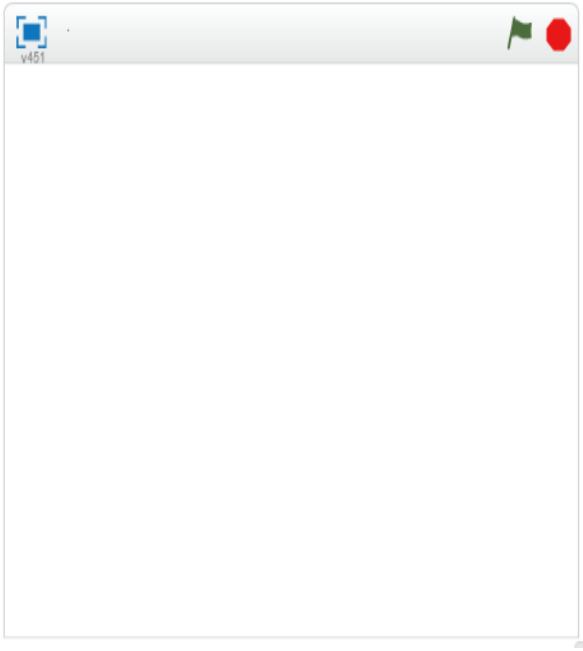


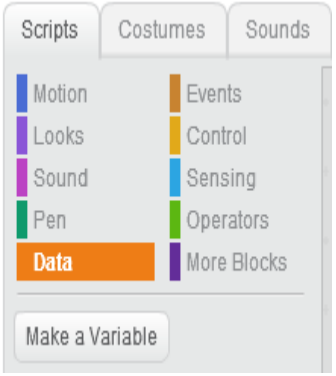


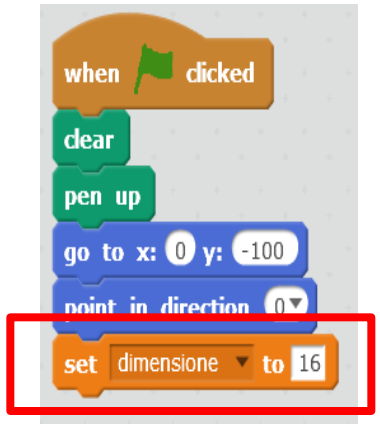

4

# Draw a tree | workshop



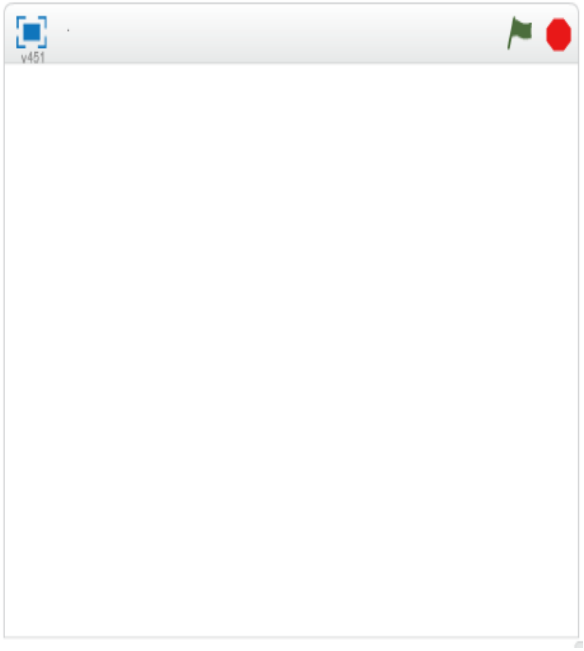


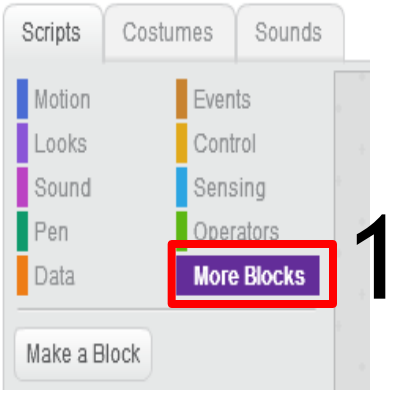

4



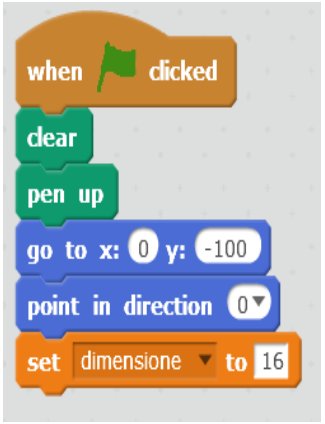
SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop



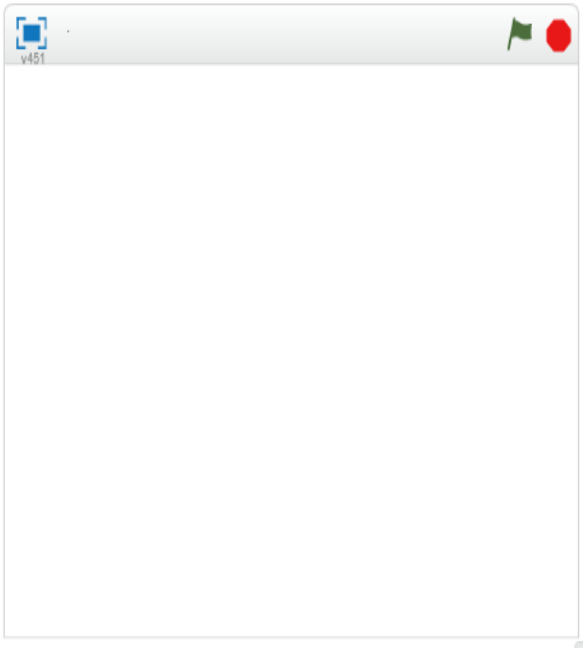


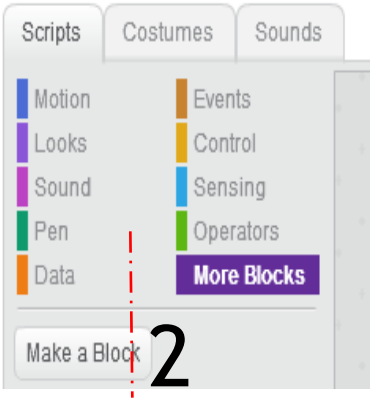

1

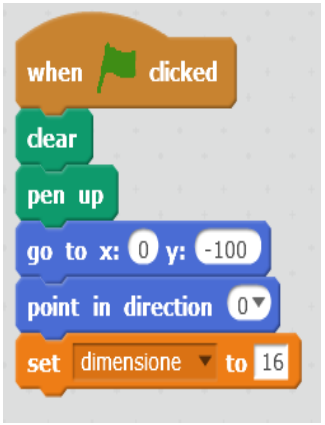


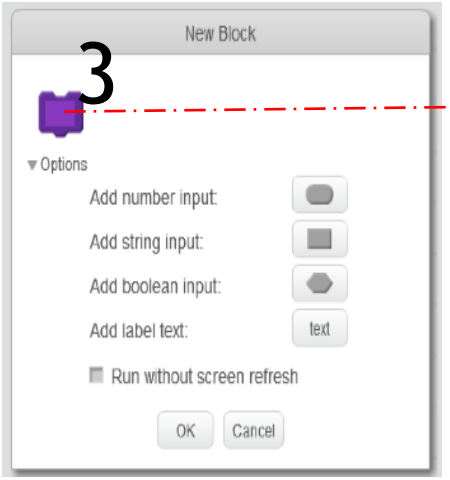
SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop





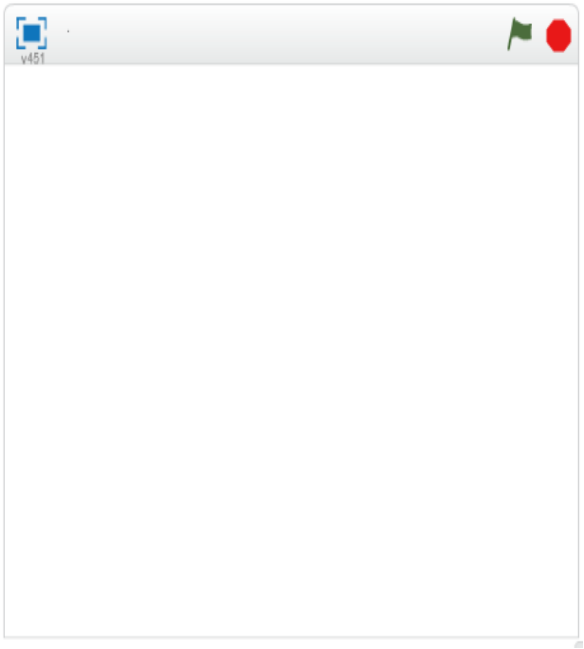



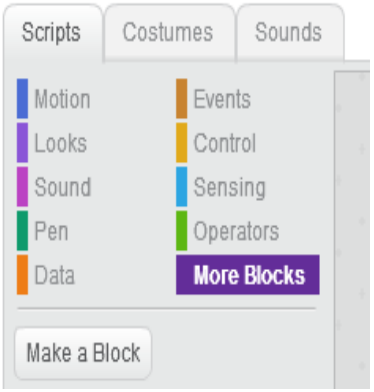



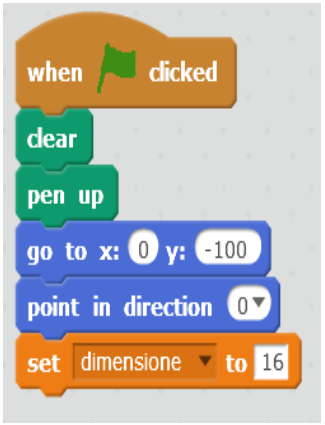

Disegna un albero di

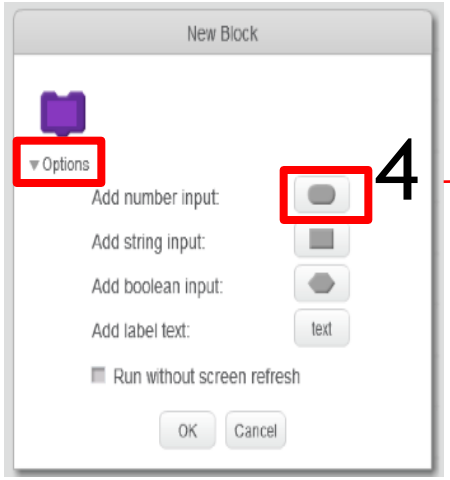
SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop





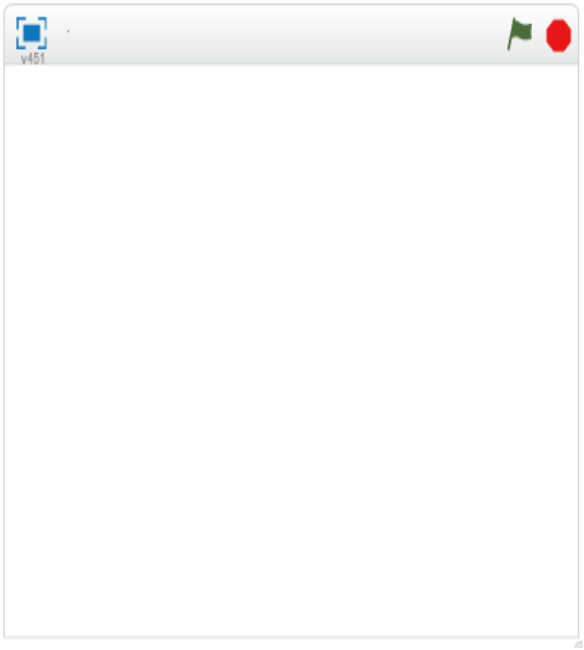



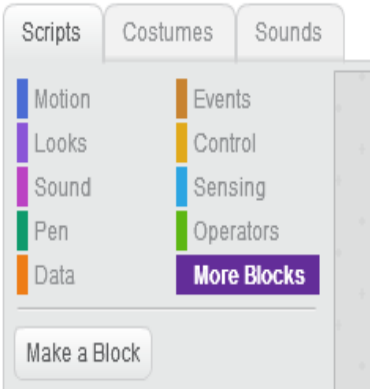

4

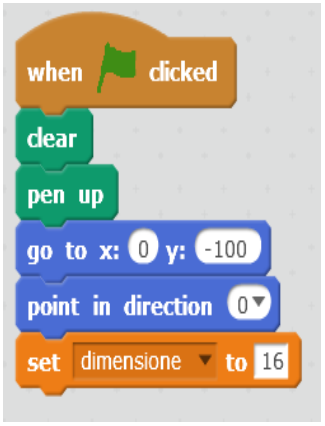
lev

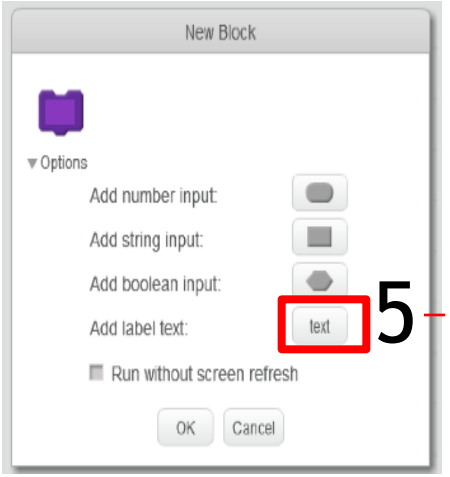
SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop



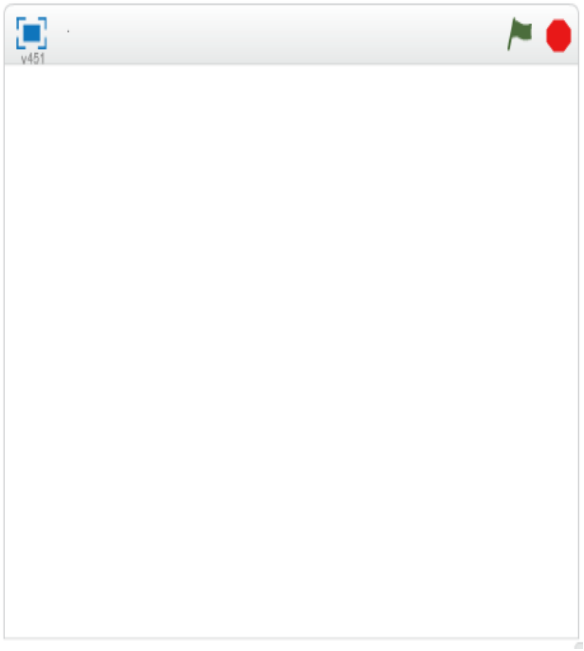



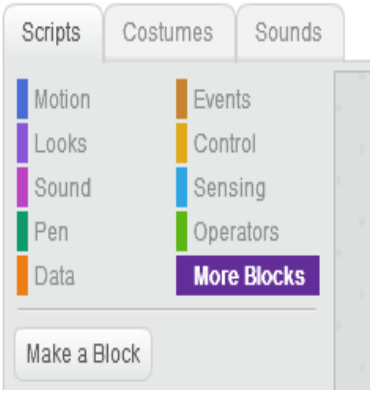



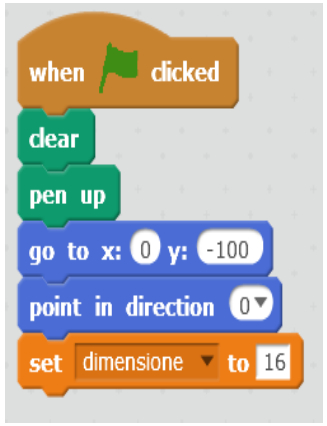

5 livelli

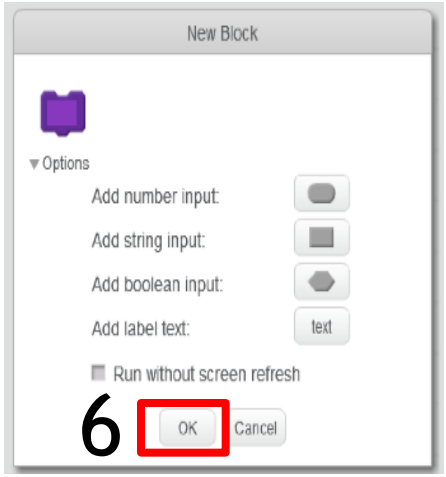
SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop



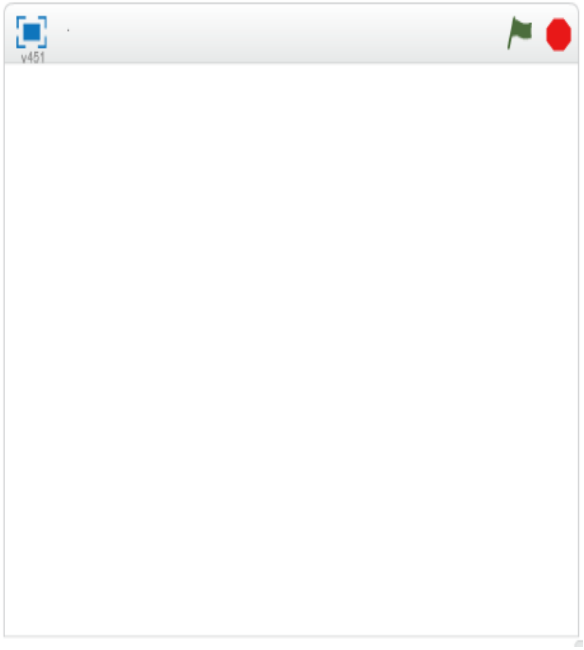



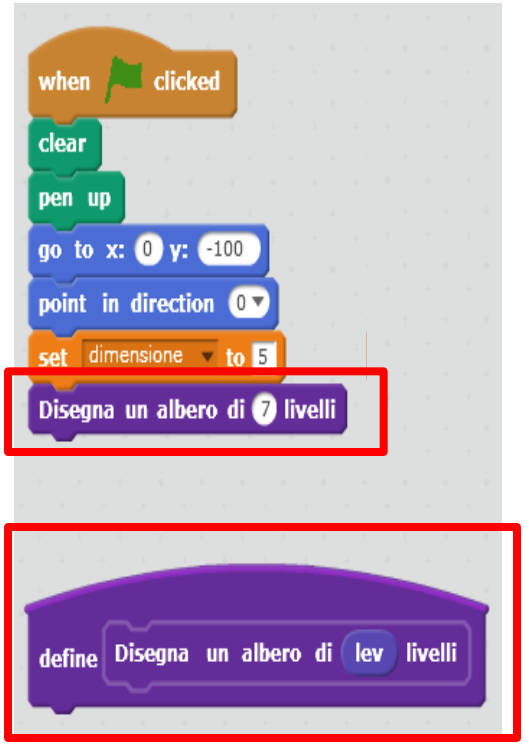



SIXMEMOS
OPEN SOURCE CULTURE

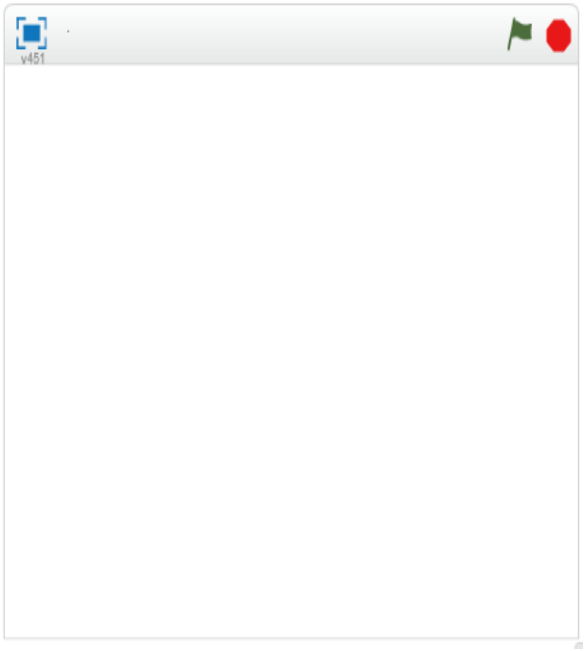
# Draw a tree | workshop

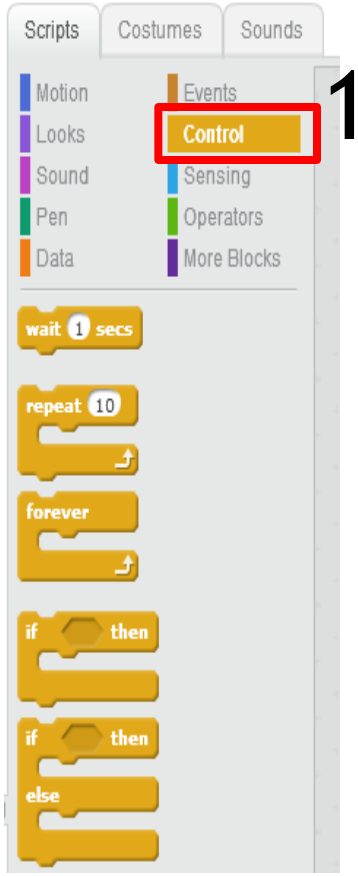


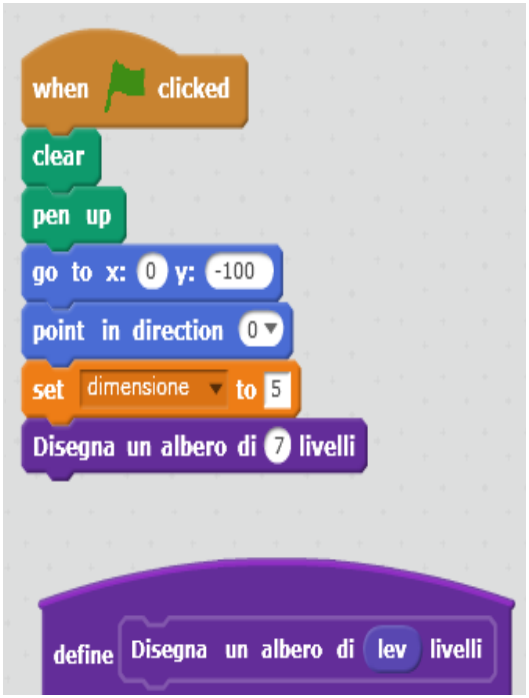
SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop



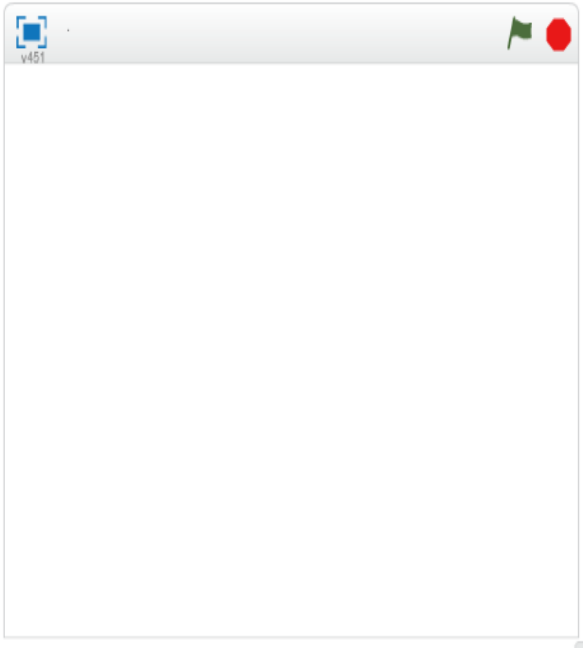


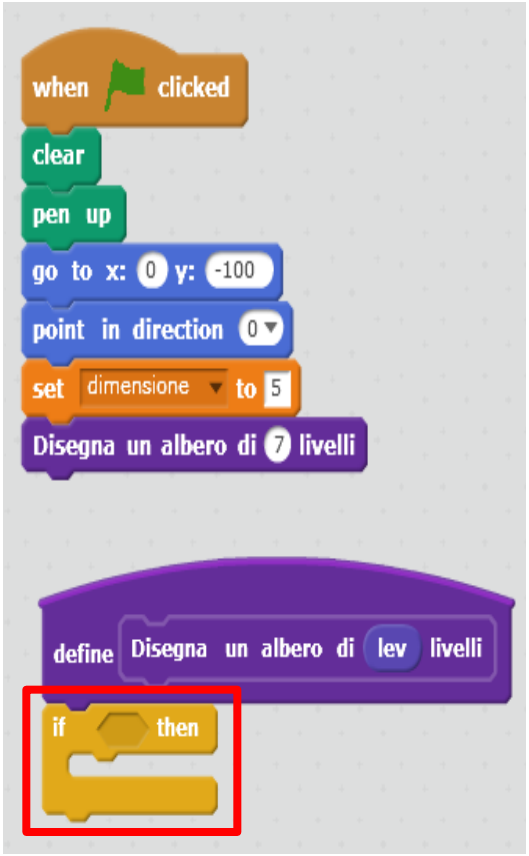

1



SIXMEMOS
OPEN SOURCE CULTURE

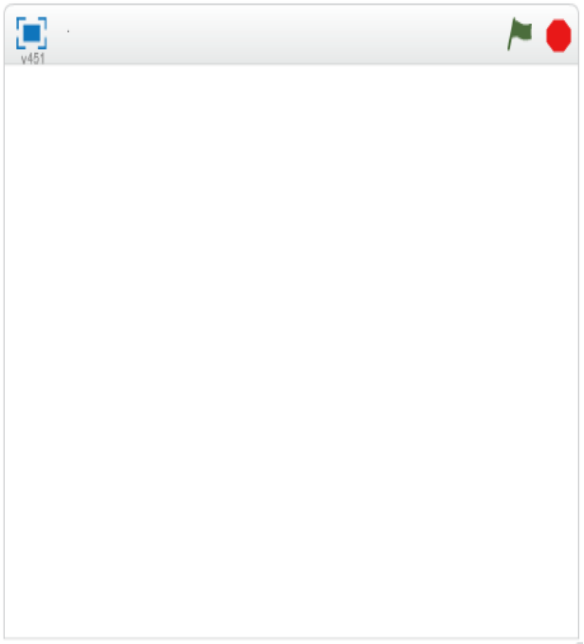
# Draw a tree | workshop

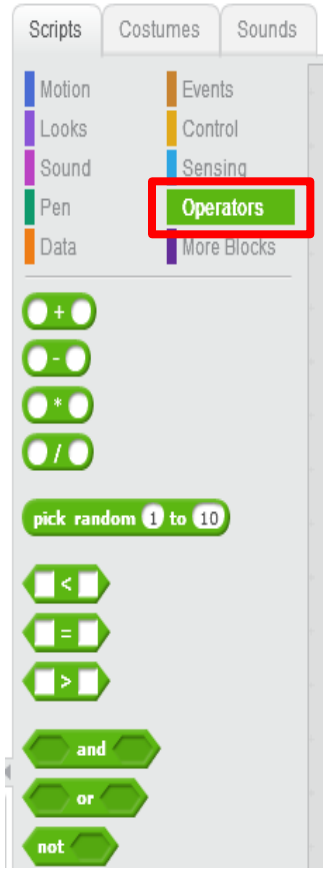


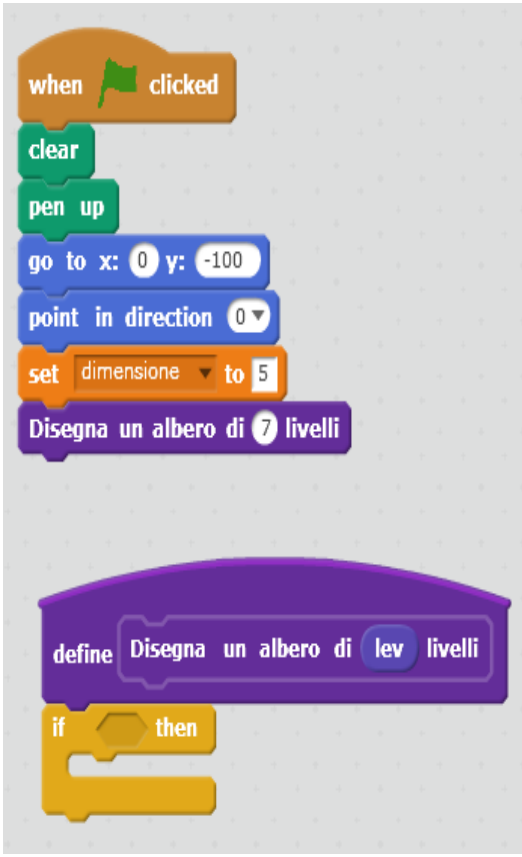
SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop

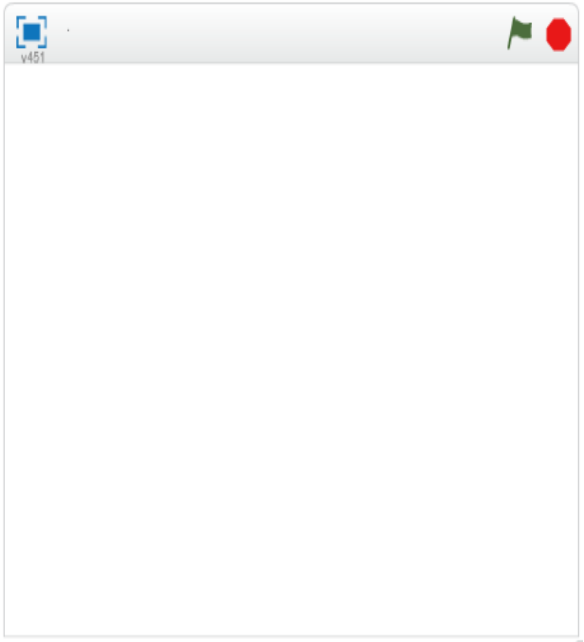


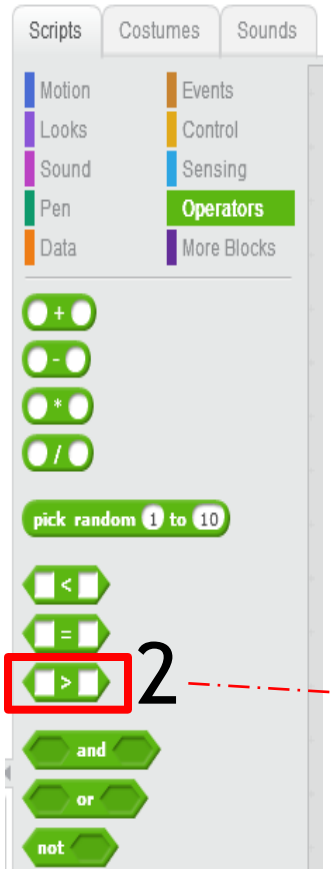


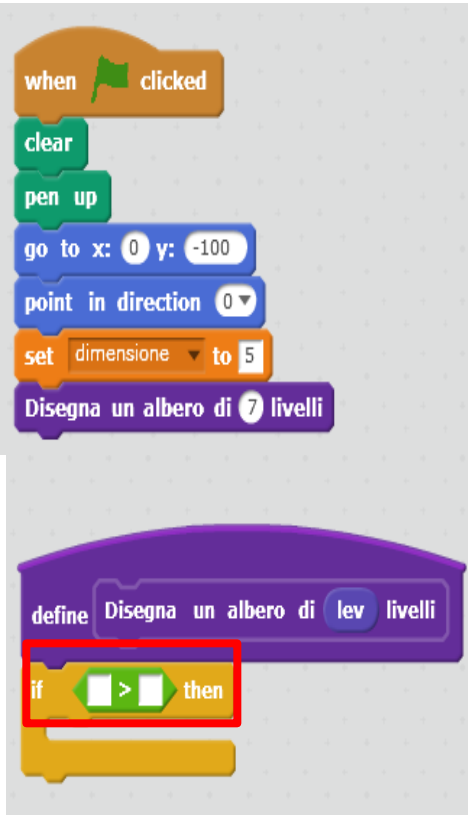

1



# Draw a tree | workshop



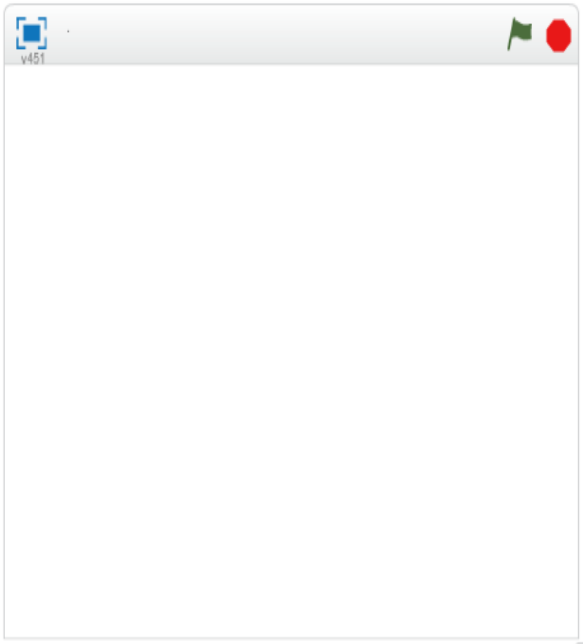


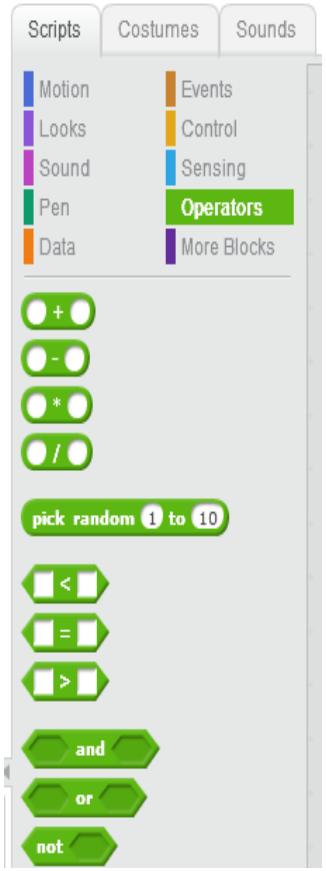



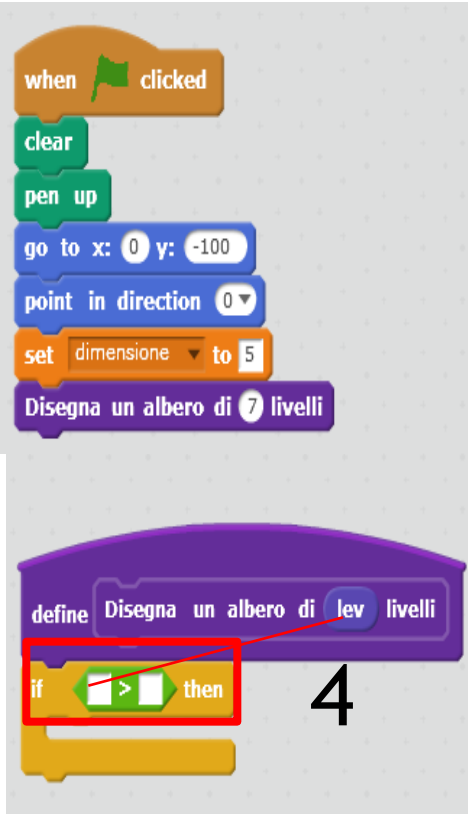

1-2 …

SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop

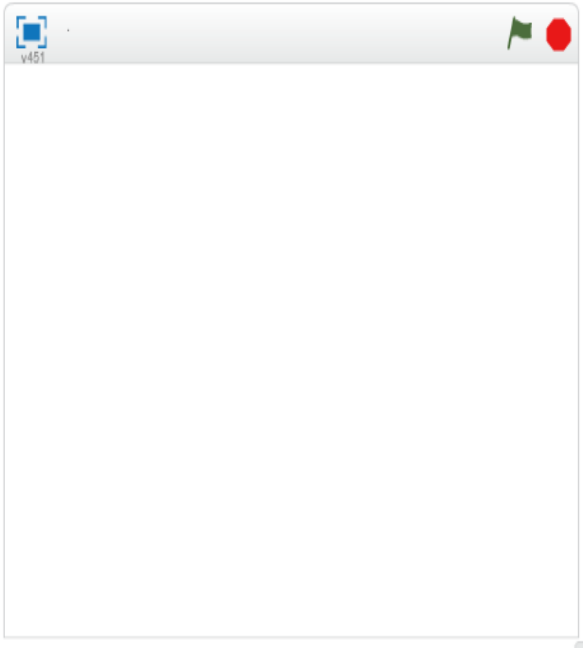


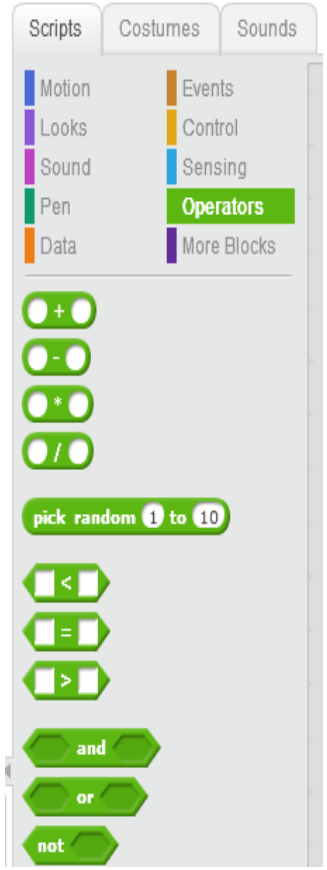


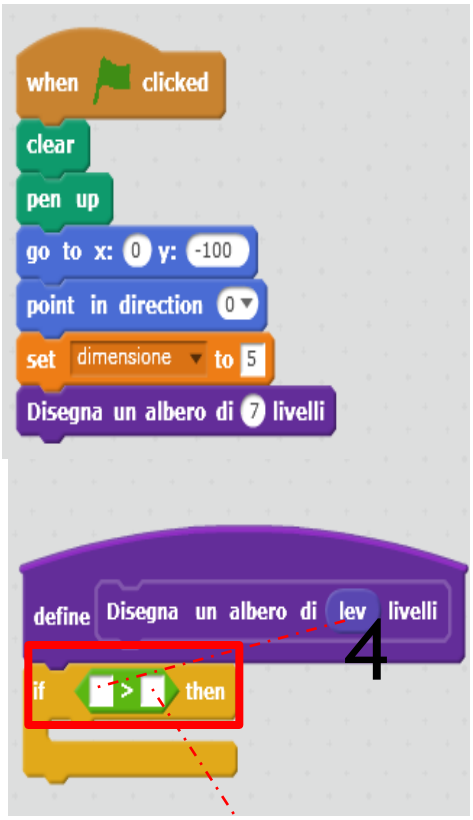




1-2 …

# Draw a tree | workshop





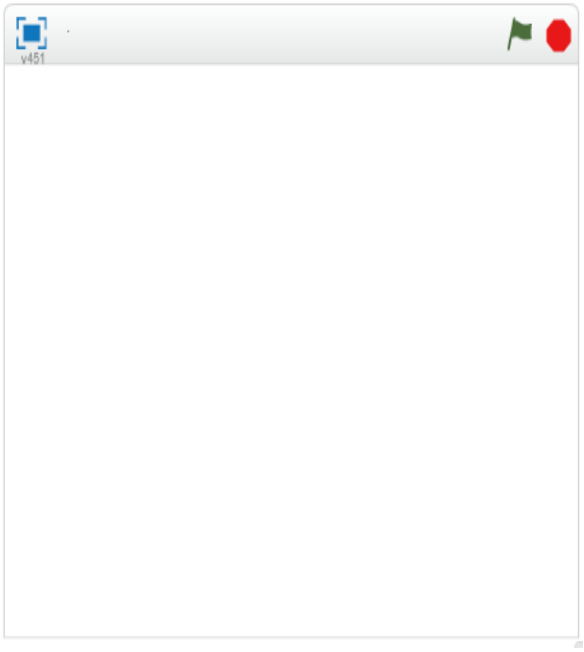




5

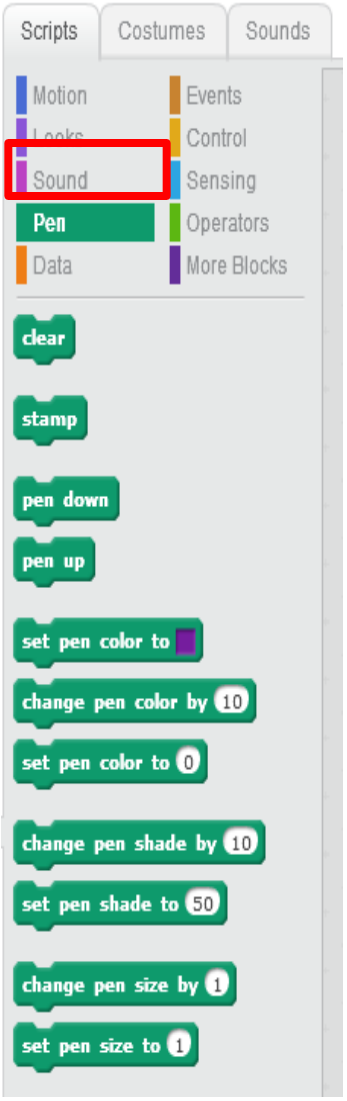
Inserisco il valore 0

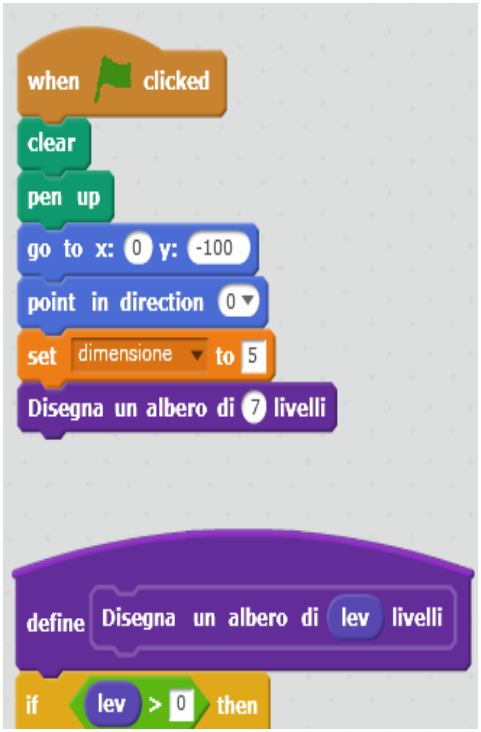
SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop



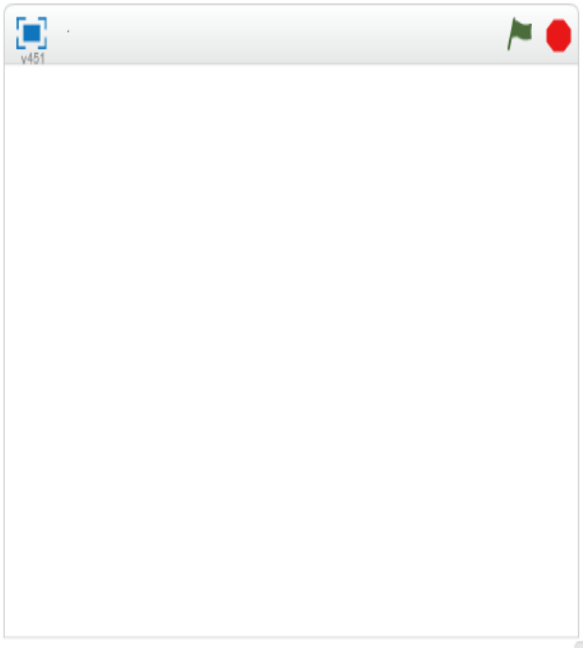
1

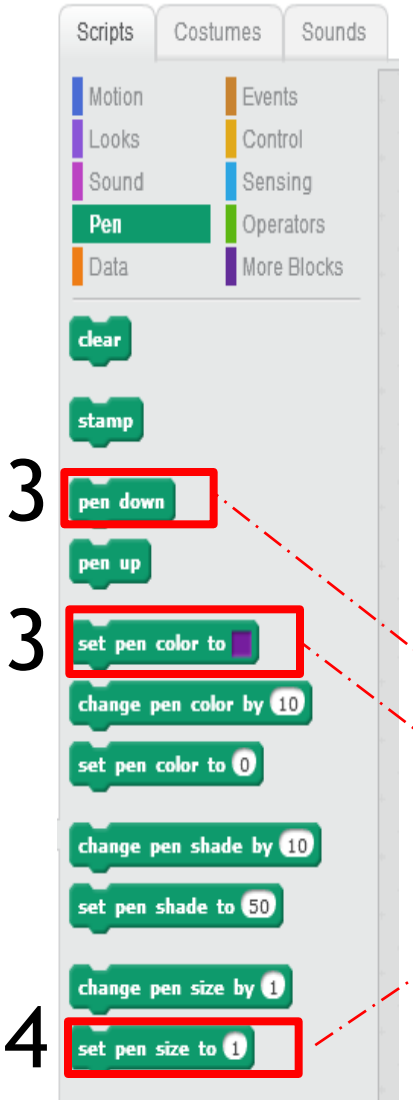


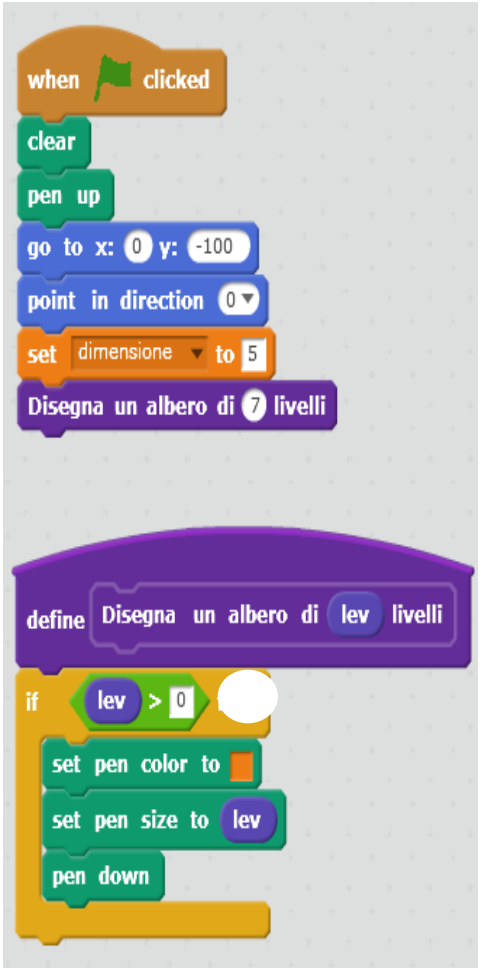



SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop

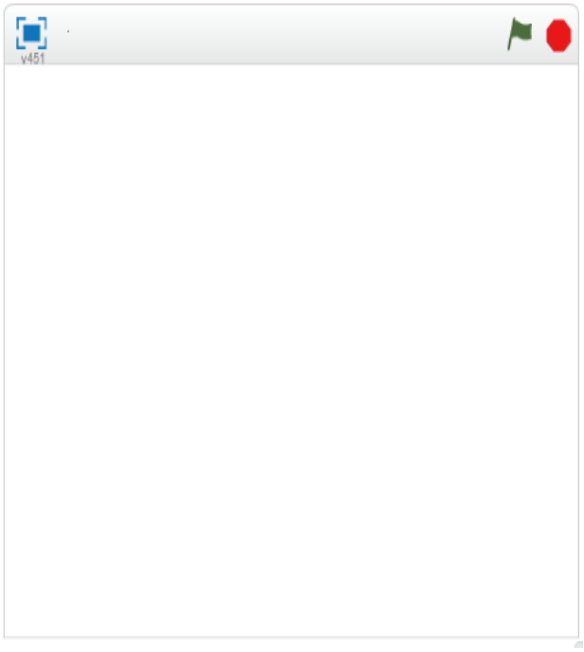


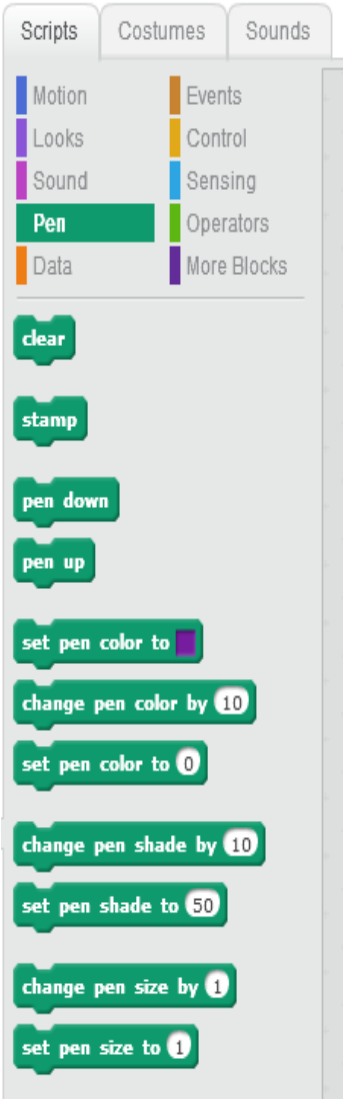


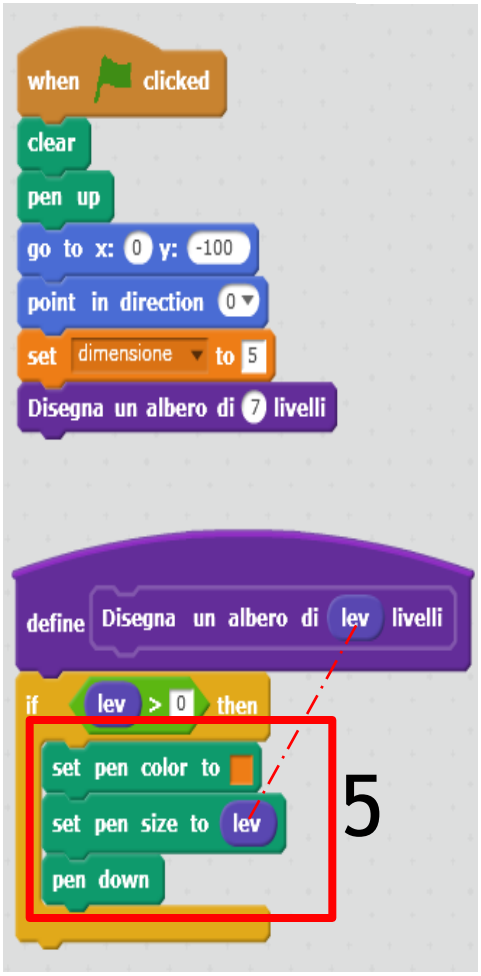



SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop

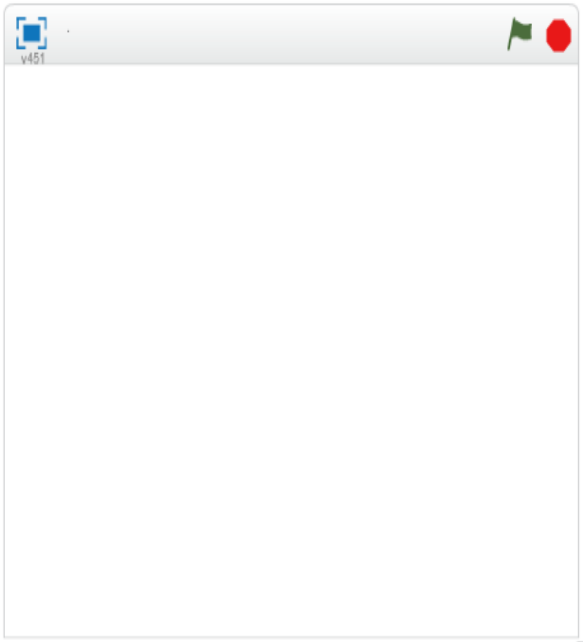




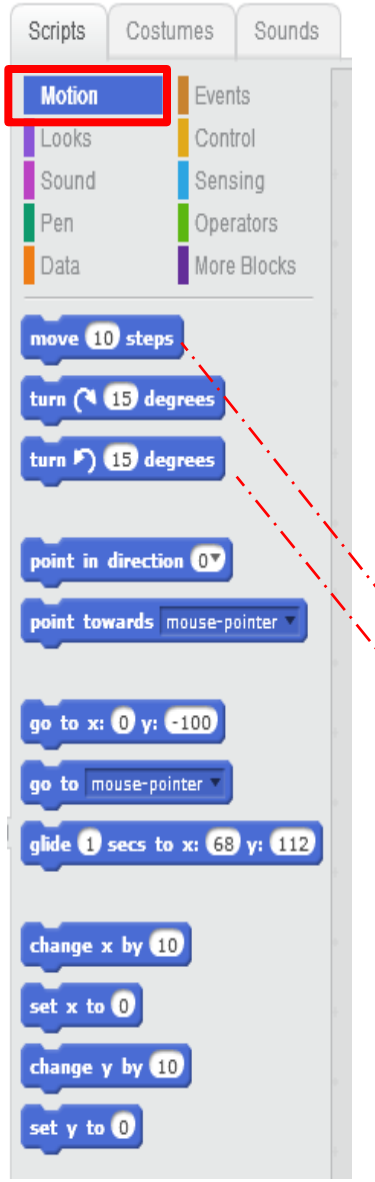



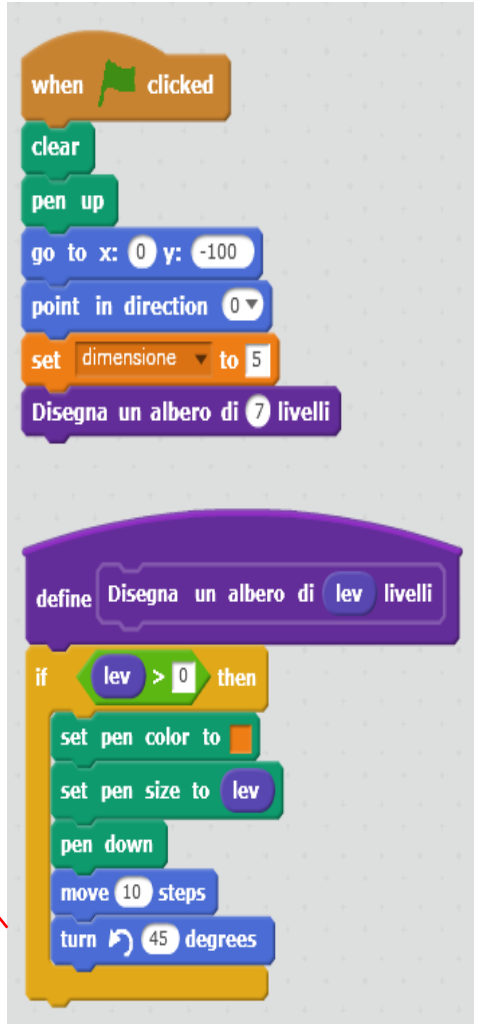
SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop



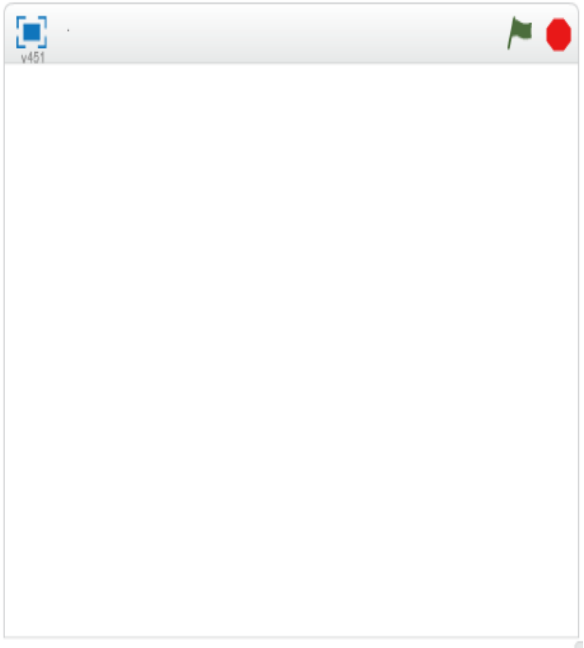
1

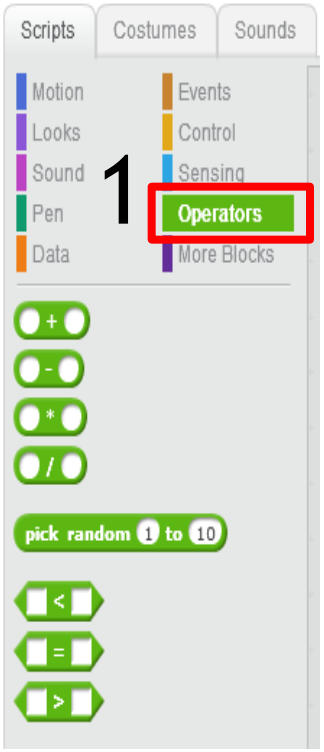


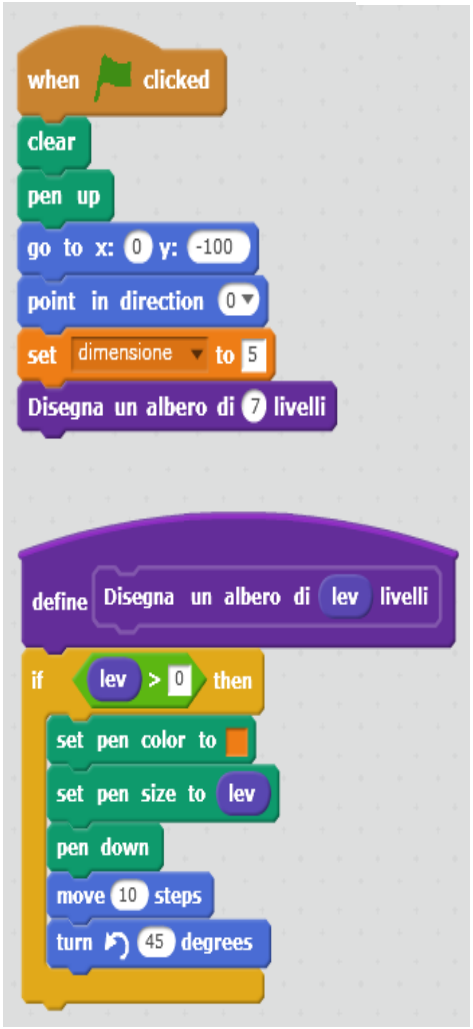



SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop

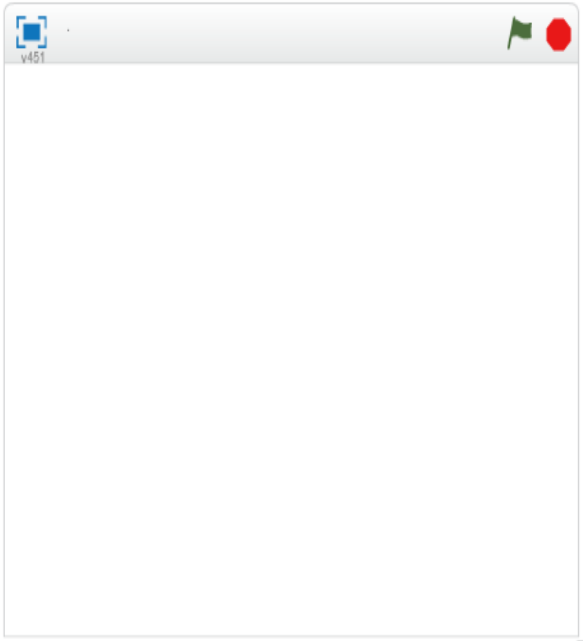


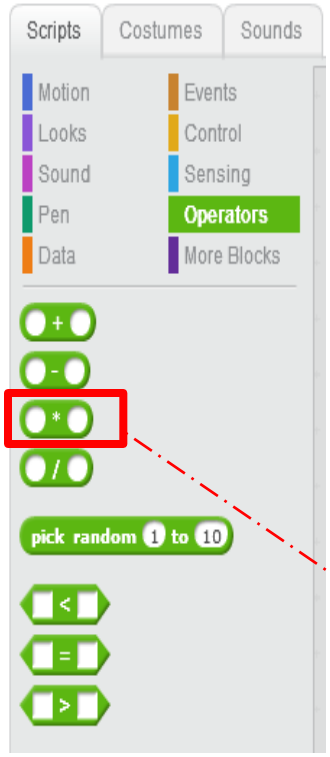


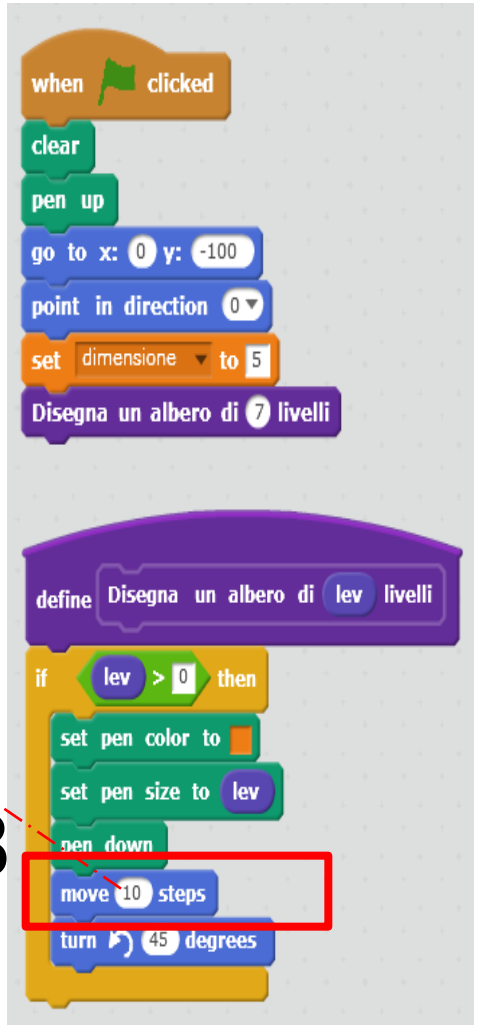
SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop





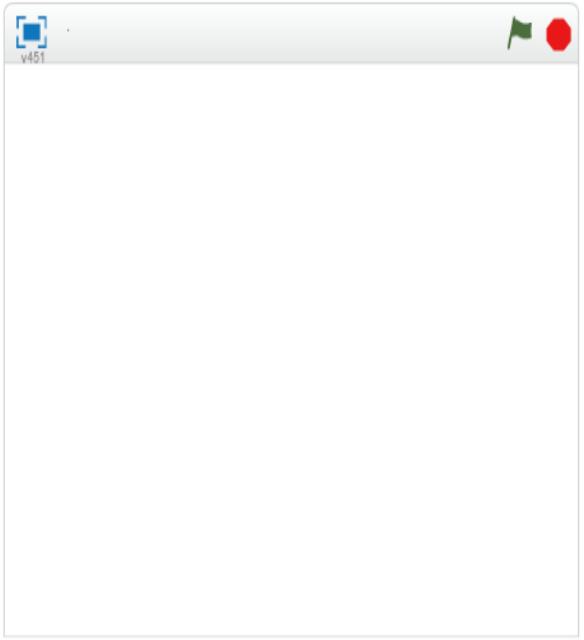

2

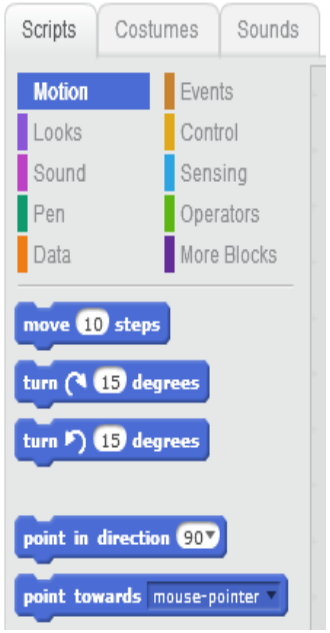


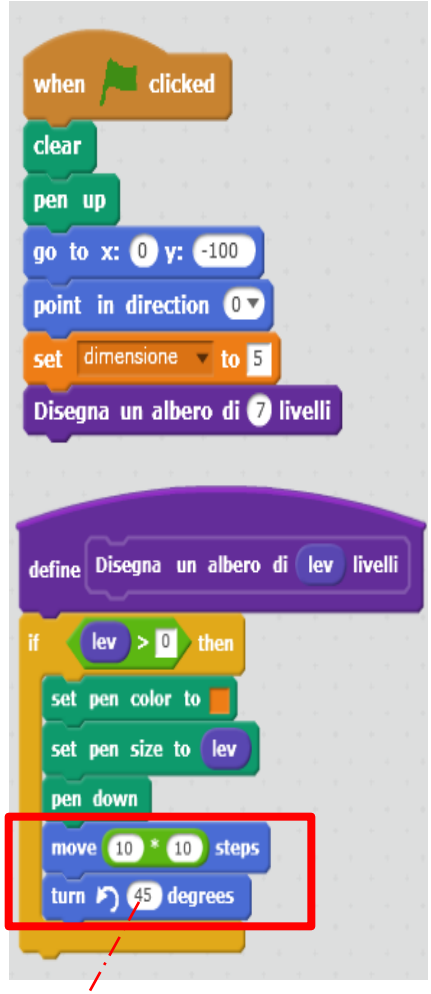

3

SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop



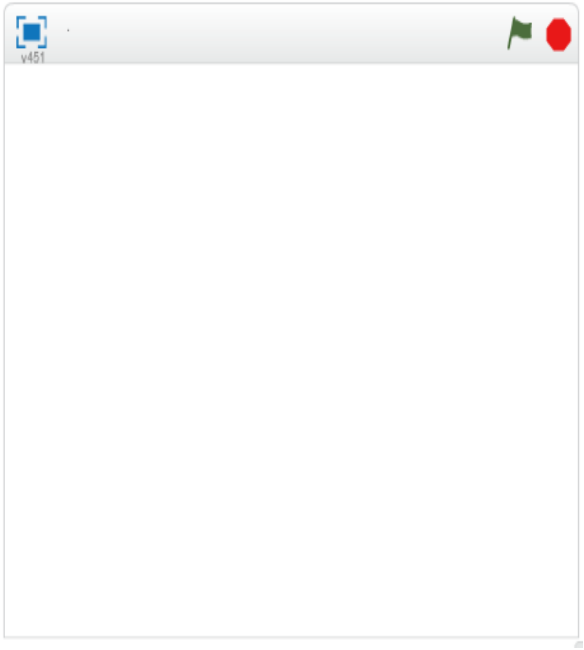



Inserisco i gradi 45

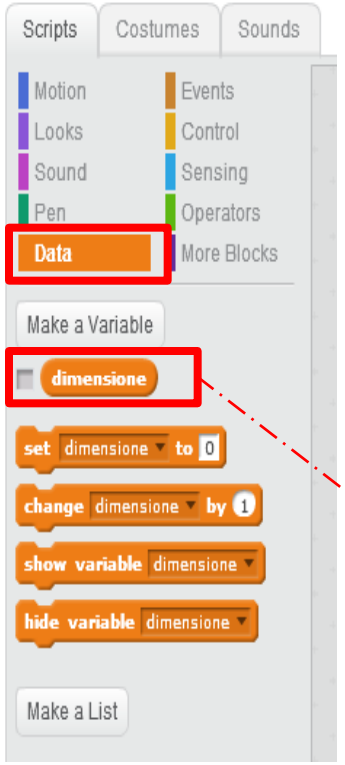
SIXMEMOS
OPEN SOURCE CULTURE

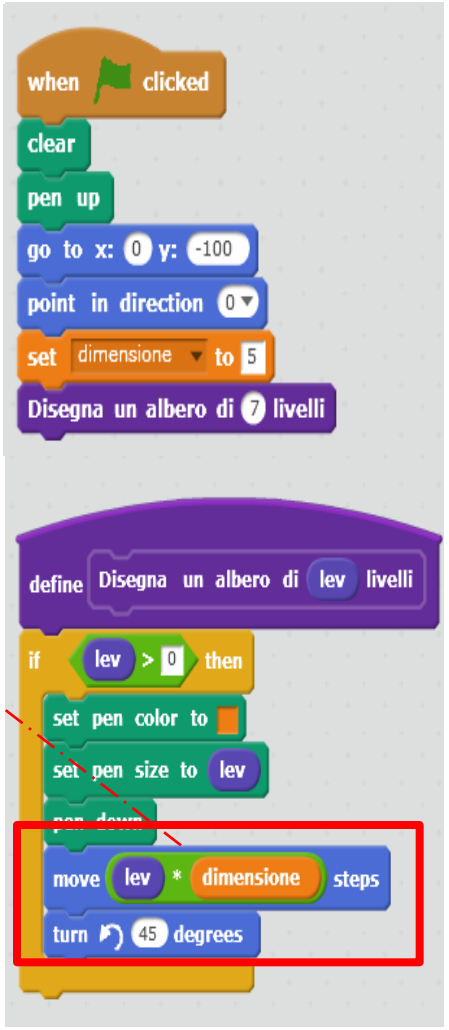
# Draw a tree | workshop



1

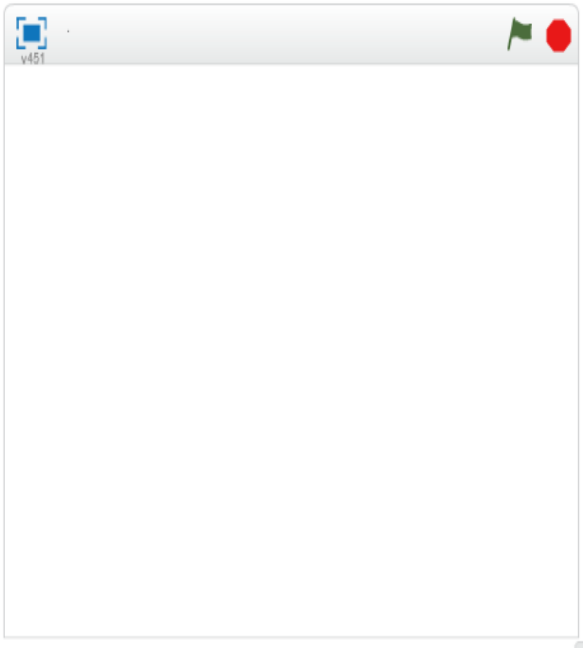
2

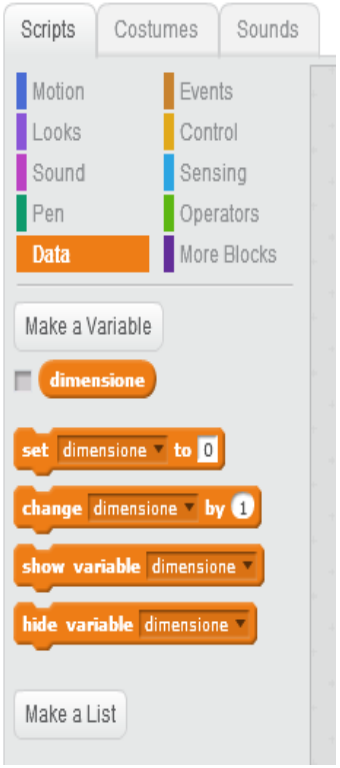


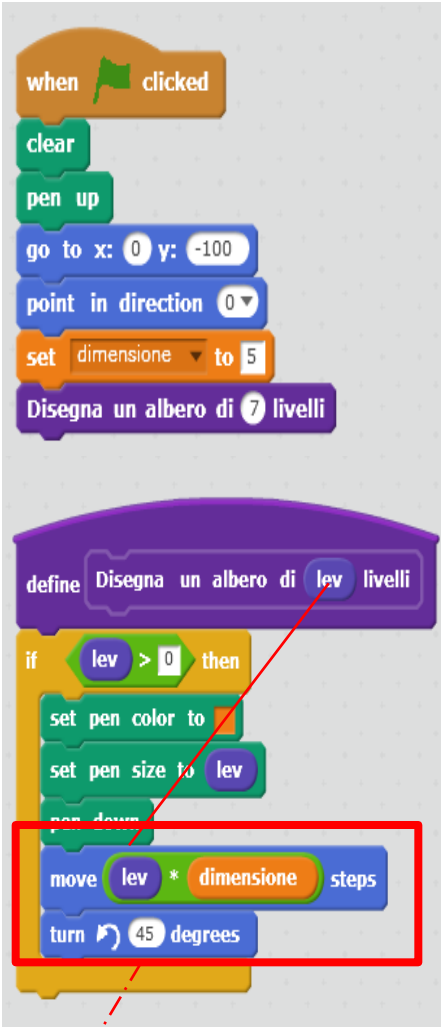



SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop

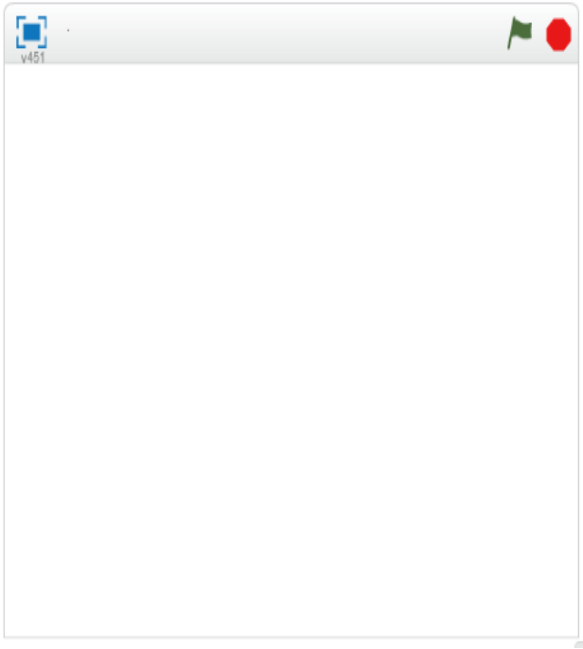




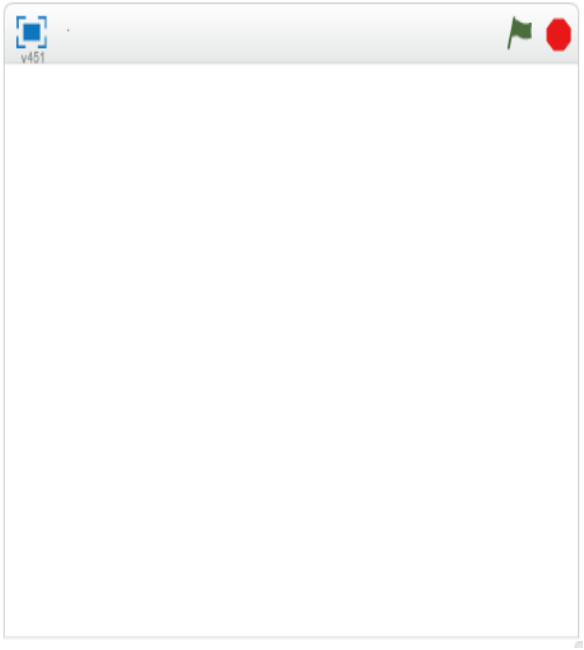
SIXMEMOS
OPEN SOURCE CULTURE

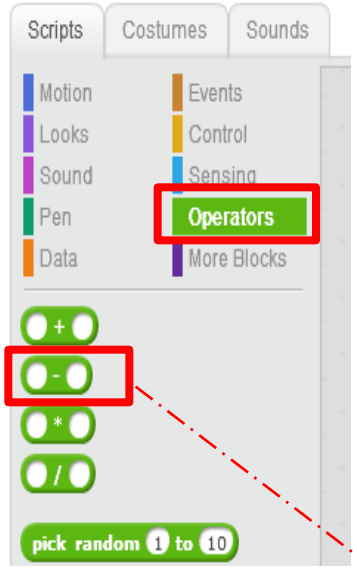
# Draw a tree | workshop

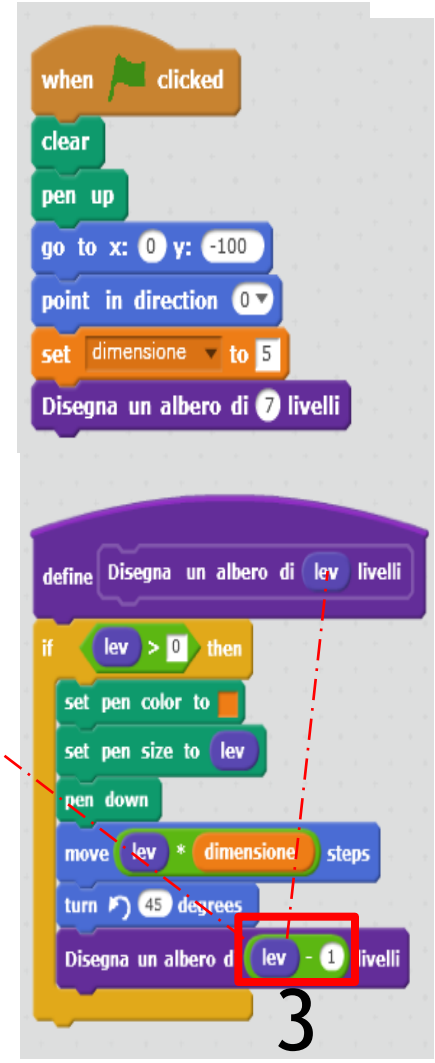



SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop

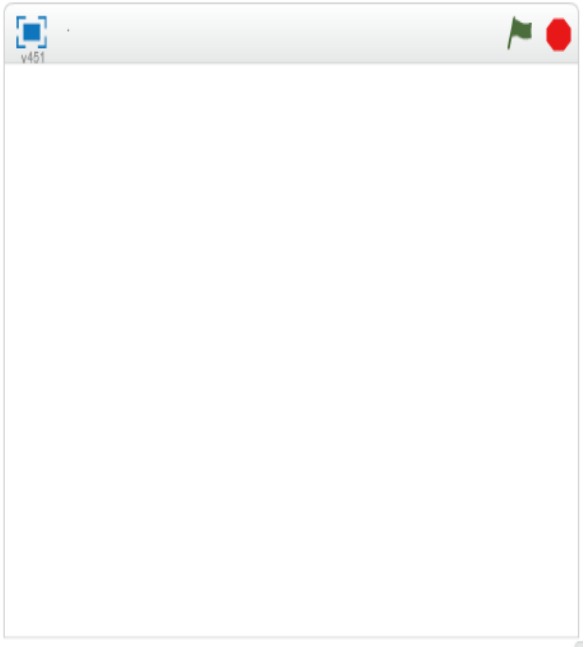


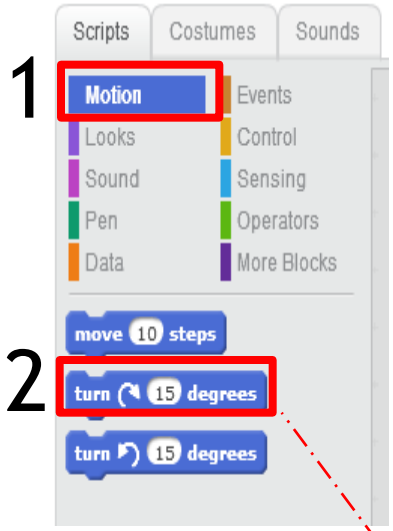


SIXMEMOS
OPEN SOURCE CULTURE

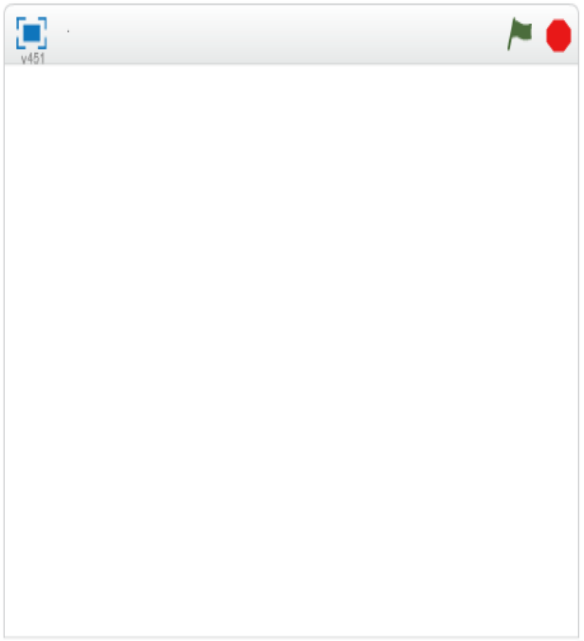
# Draw a tree | workshop





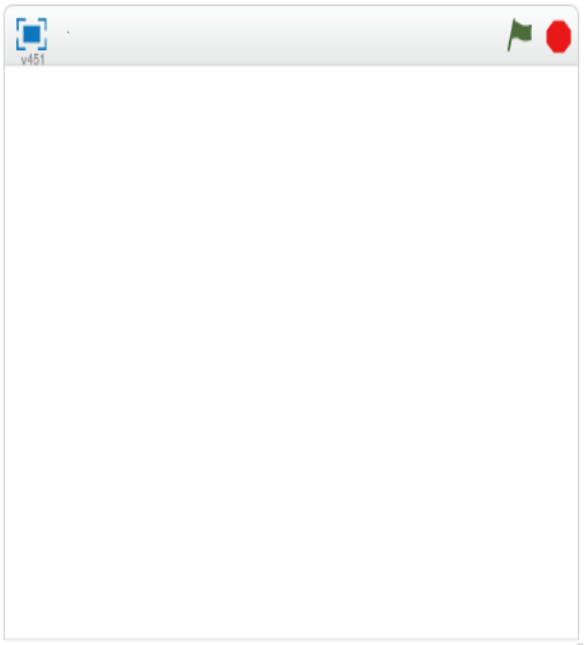

SIXMEMOS
OPEN SOURCE CULTURE

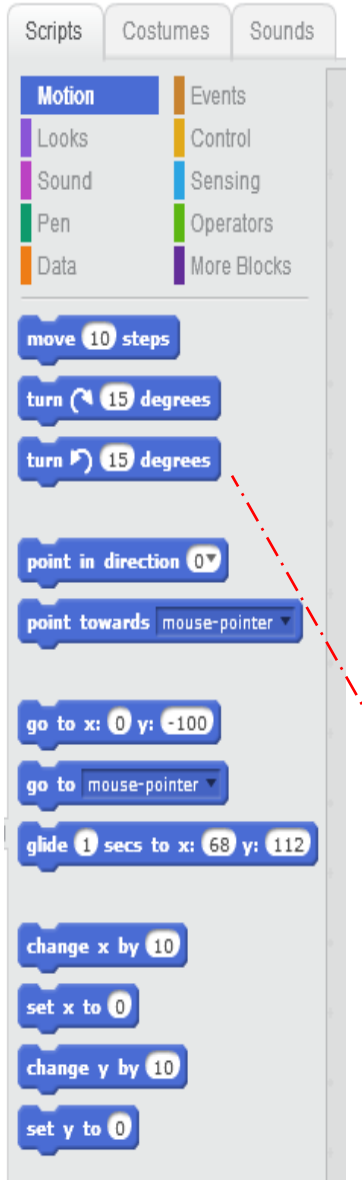
# Draw a tree | workshop




SIXMEMOS
OPEN SOURCE CULTURE

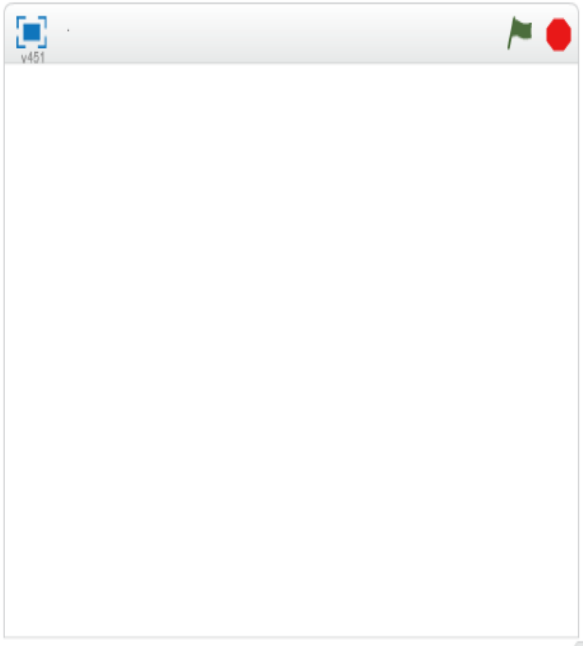
# Draw a tree | workshop

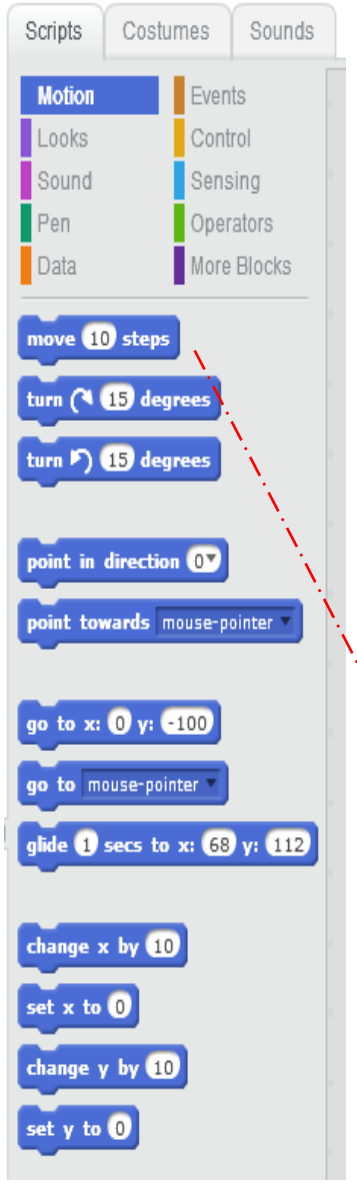





SIXMEMOS
OPEN SOURCE CULTURE

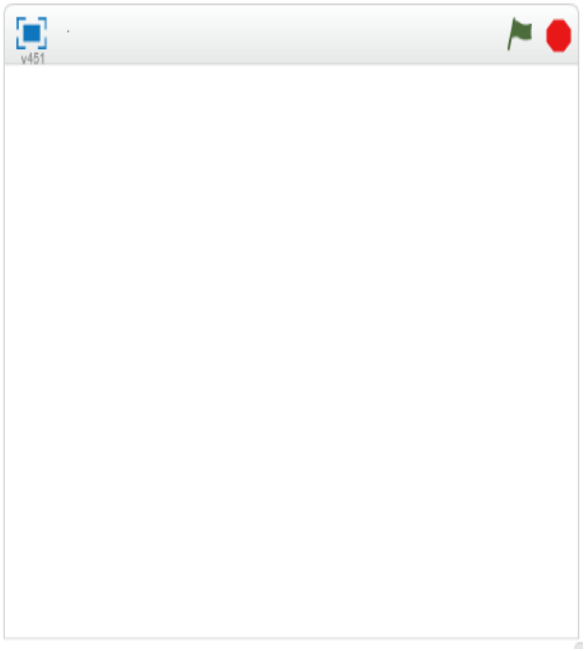
# Draw a tree | workshop

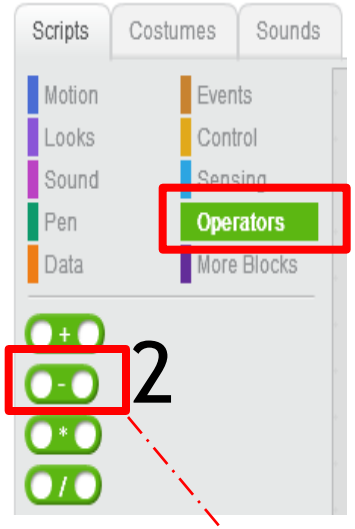





SIXMEMOS
OPEN SOURCE CULTURE

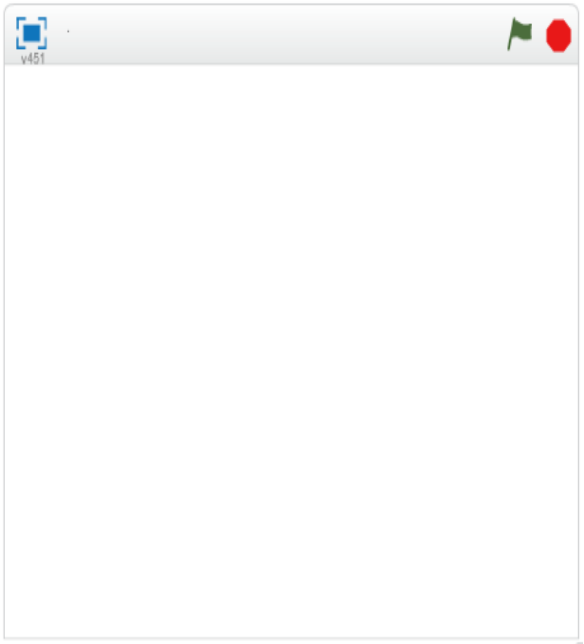
# Draw a tree | workshop

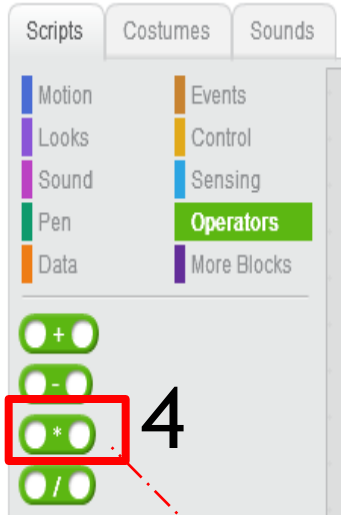


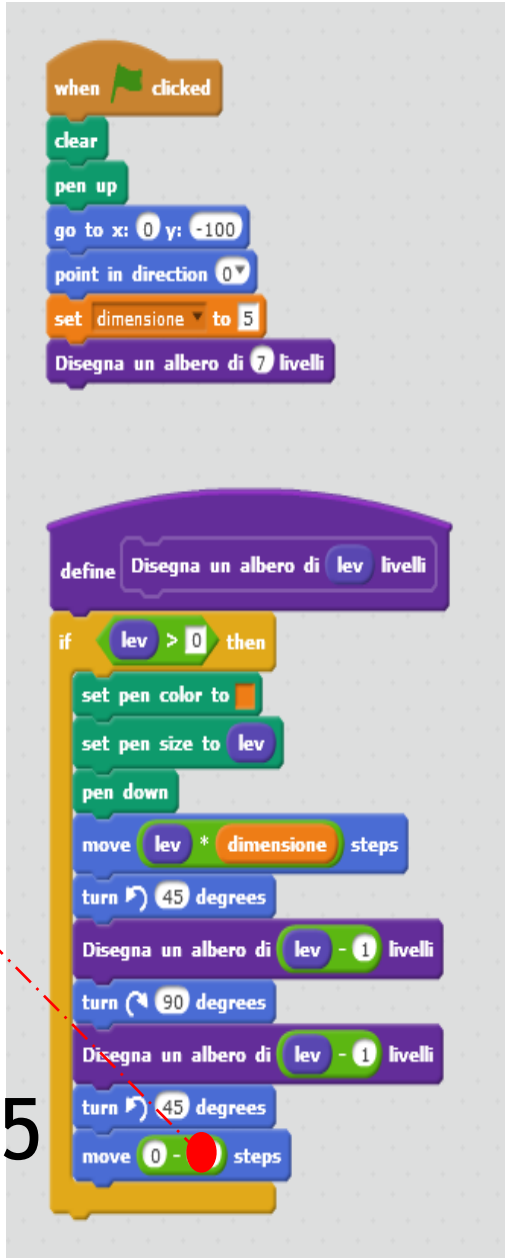



SIXMEMOS
OPEN SOURCE CULTURE

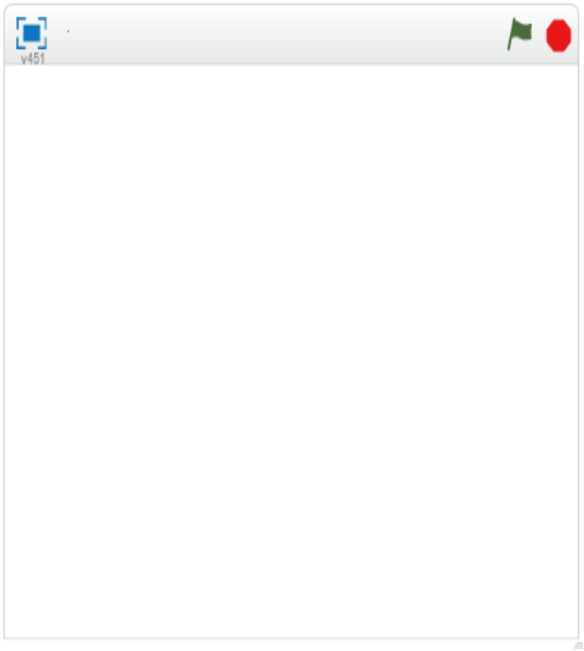
# Draw a tree | workshop

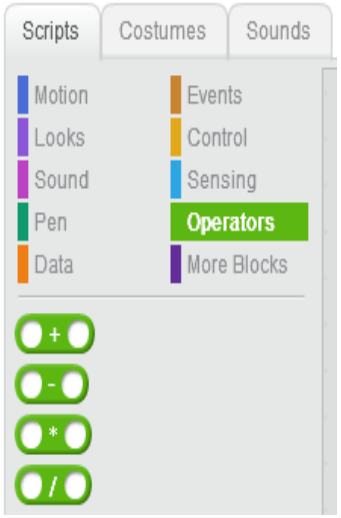


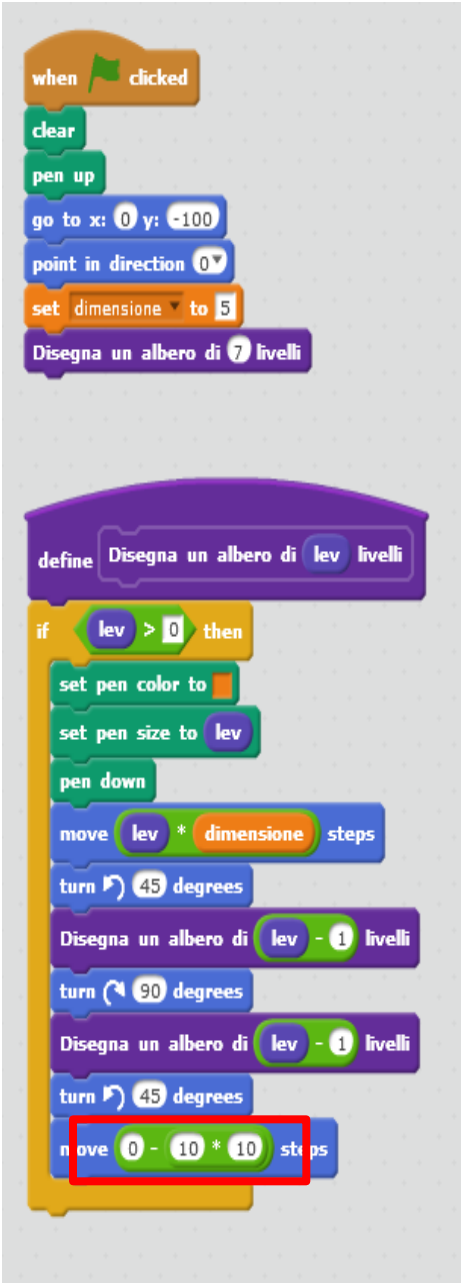


# Draw a tree | workshop

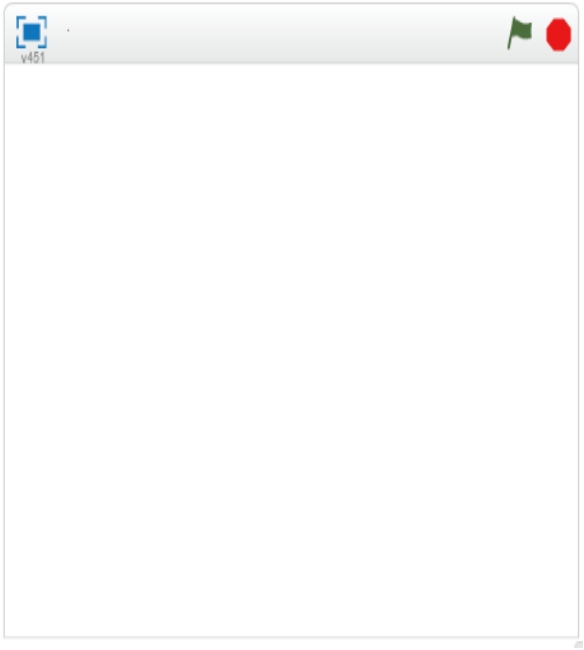


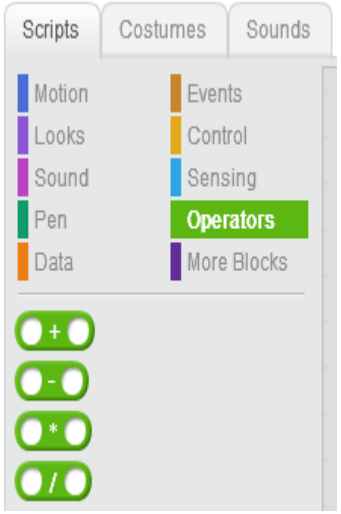


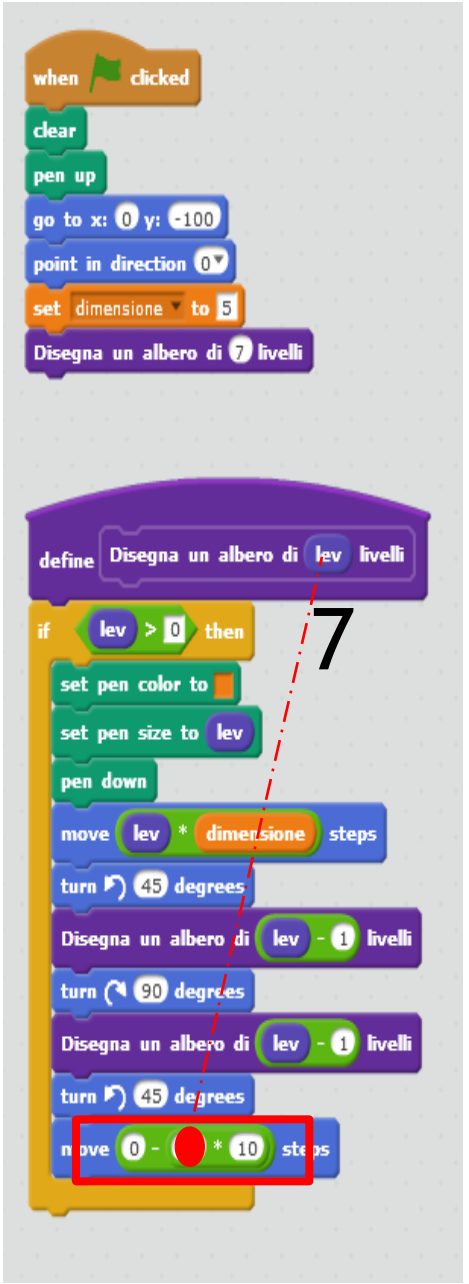



SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop

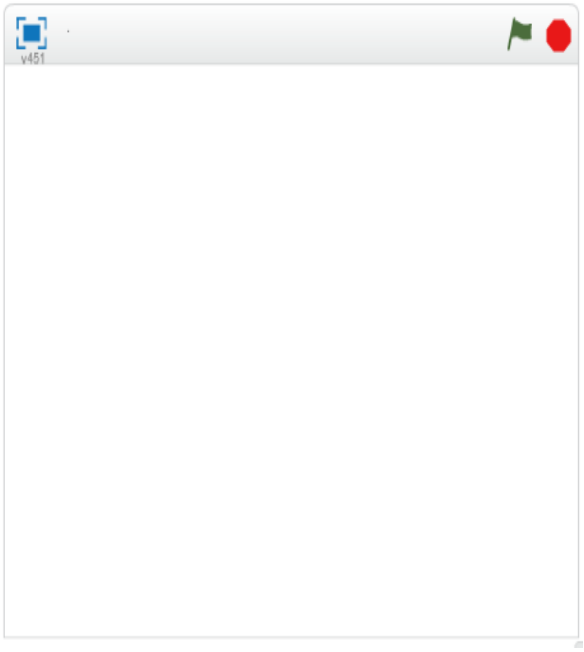


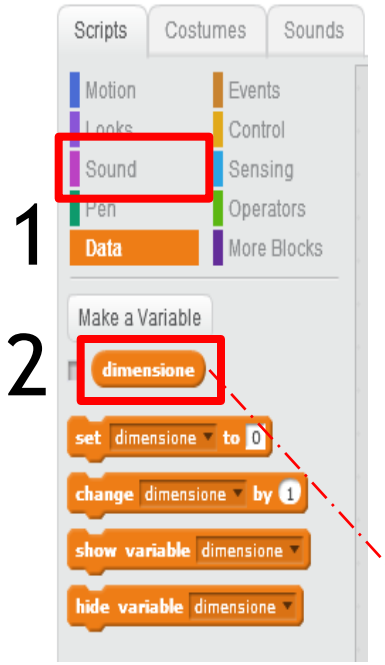


SIXMEMOS
OPEN SOURCE CULTURE

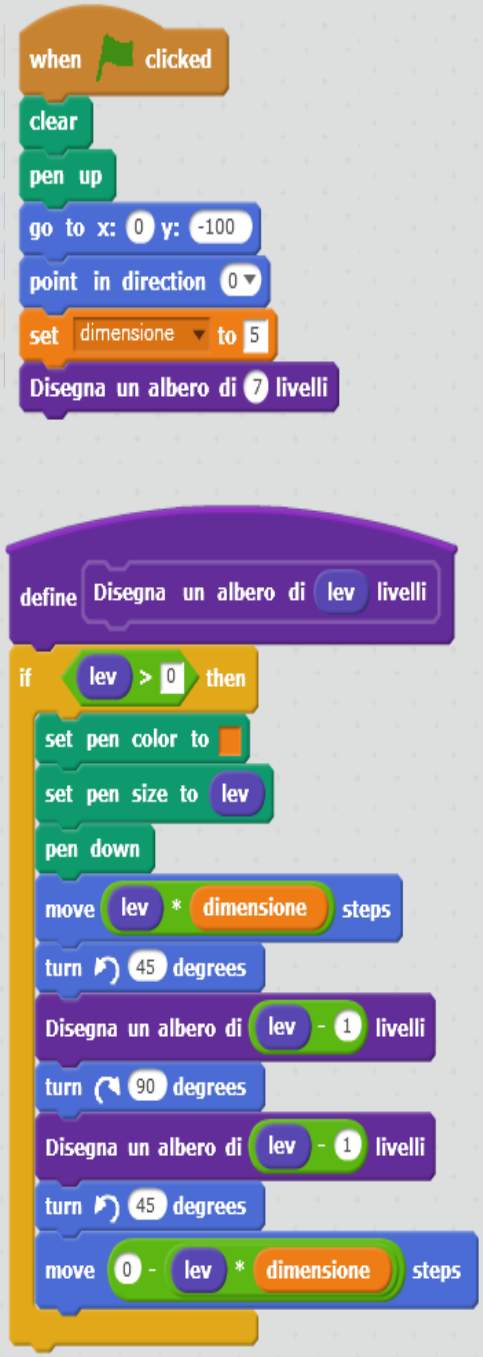
# Draw a tree | workshop






SIXMEMOS
OPEN SOURCE CULTURE

# Draw a tree | workshop



# FRACTAL TREE
# WITH PROCESSING

Creo l'area di lavoro

```
void setup() {
  size(800, 800);
}
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
line(0, 0, 0, -lunghezza);
translate(0, -lunghezza);
lunghezza *= 0.66;

if (lunghezza > 2) {
pushMatrix();
  rotate(PI+40);
  ramo(lunghezza);
popMatrix();

pushMatrix();
    rotate(PI-40);
    ramo(lunghezza);
popMatrix();
 }
```

```
void setup() {
  size(800, 800);
}
Inizio a disegnare
void draw() {
background(255);
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
line(0, 0, 0, -lunghezza);
translate(0, -lunghezza);
lunghezza *= 0.66;

if (lunghezza > 2) {
pushMatrix();
  rotate(PI+40);
  ramo(lunghezza);
popMatrix();

pushMatrix();
    rotate(PI-40);
    ramo(lunghezza);
popMatrix();
 }
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
```

Dico a processing che tutto quello che inizio a disegnare da qui in poi, lo disegno traslandolo al centro dell'area di lavoro (divido la larghezza in due)

```
translate(width/2, height);
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
line(0, 0, 0, -lunghezza);
translate(0, -lunghezza);
lunghezza *= 0.66;

if (lunghezza > 2) {
pushMatrix();
  rotate(PI+40);
  ramo(lunghezza);
popMatrix();

pushMatrix();
    rotate(PI-40);
    ramo(lunghezza);
popMatrix();
 }
```

SIXMEMOS
OPEN SOURCE CULTURE

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
```

Creo una variabile per la lunghezza braccio e gli assegno subito un valore iniz "200"

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
line(0, 0, 0, -lunghezza);
translate(0, -lunghezza);
lunghezza *= 0.66;

if (lunghezza > 2) {
pushMatrix();
  rotate(PI+40);
  ramo(lunghezza);
popMatrix();

pushMatrix();
    rotate(PI-40);
    ramo(lunghezza);
popMatrix();
 }
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
Disegno l'albero - se prima era lungo 200 adesso è lungo come la variabile "lu
void ramo(float lunghezza) {
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
line(0, 0, 0, -lunghezza);
translate(0, -lunghezza);
lunghezza *= 0.66;

if (lunghezza > 2) {
pushMatrix();
  rotate(PI+40);
  ramo(lunghezza);
popMatrix();

pushMatrix();
    rotate(PI-40);
    ramo(lunghezza);
popMatrix();
 }
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
Disegno la linea con i 4 valori standard (x,y,x2,y2) l'ultimo valore (y2) varia
line(0, 0, 0, -lunghezza);
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2,
height);
ramo(200);
}
void ramo(float
lunghezza) {
line(0, 0, 0, -
lunghezza);
translate(0, -
lunghezza);
lunghezza *= 0.66;

if (lunghezza > 2) {
pushMatrix();
  rotate(PI+40);
  ramo(lunghezza);
popMatrix();

pushMatrix();
    rotate(PI-40);
    ramo(lunghezza);
popMatrix();
 }
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
 line(0, 0, 0, -lunghezza);
```

Muovo la linea

```
  translate(0, -lunghezza);
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
line(0, 0, 0, -lunghezza);
translate(0, -lunghezza);
lunghezza *= 0.66;

if (lunghezza > 2) {
pushMatrix();
  rotate(PI+40);
  ramo(lunghezza);
popMatrix();

pushMatrix();
    rotate(PI-40);
    ramo(lunghezza);
popMatrix();
 }
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
 line(0, 0, 0, -lunghezza);
 translate(0, -lunghezza);
```

Ogni ramo sarà 2/3 delle dimensioni di quello precedente ottenuta dalla moltiplicazione ed assegnazione alla variabile lunghezza un valore di 0.66

```
lunghezza *= 0.66;
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
line(0, 0, 0, -lunghezza);
translate(0, -lunghezza);
lunghezza *= 0.66;

if (lunghezza > 2) {
pushMatrix();
  rotate(PI+40);
  ramo(lunghezza);
popMatrix();

pushMatrix();
    rotate(PI-40);
    ramo(lunghezza);
popMatrix();
 }
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
 line(0, 0, 0, -lunghezza);
 translate(0, -lunghezza);
 lunghezza *= 0.66;

 if (lunghezza > 2) {
```

Funzione ricorsiva ha bisogno di una condizione, disegna fino a quando la lunghezza del braccio è maggiore di 2 pixel

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
line(0, 0, 0, -lunghezza);
translate(0, -lunghezza);
lunghezza *= 0.66;

if (lunghezza > 2) {
pushMatrix();
  rotate(PI+40);
  ramo(lunghezza);
popMatrix();

pushMatrix();
    rotate(PI-40);
    ramo(lunghezza);
popMatrix();
 }
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
 line(0, 0, 0, -lunghezza);
 translate(0, -lunghezza);
 lunghezza *= 0.66;

 if (lunghezza > 2) {
```

Salvo lo stato attuale della trasformazione

```
pushMatrix();
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
line(0, 0, 0, -lunghezza);
translate(0, -lunghezza);
lunghezza *= 0.66;

if (lunghezza > 2) {
pushMatrix();
  rotate(PI+40);
  ramo(lunghezza);
popMatrix();

pushMatrix();
    rotate(PI-40);
    ramo(lunghezza);
popMatrix();
 }
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
 line(0, 0, 0, -lunghezza);
 translate(0, -lunghezza);
 lunghezza *= 0.66;

if (lunghezza > 2) {
pushMatrix();
```

Ruoto quello che disegnerò (PI è una costante matematica con il valore 3,1415,927 mila. E 'il rapporto tra la circonferenza di un cerchio e il suo diametro.

```
rotate(PI+40);
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
line(0, 0, 0, -lunghezza);
translate(0, -lunghezza);
lunghezza *= 0.66;

if (lunghezza > 2) {
pushMatrix();
  rotate(PI+40);
  ramo(lunghezza);
popMatrix();

pushMatrix();
    rotate(PI-40);
    ramo(lunghezza);
popMatrix();
 }
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
 line(0, 0, 0, -lunghezza);
 translate(0, -lunghezza);
 lunghezza *= 0.66;

if (lunghezza > 2) {
pushMatrix();
  rotate(PI+40);
```

Richiamo la piccola funzione "ramo" che disegna un ramo; ogni volta che la richiama - fino a lunghezza maggiore di 2 - il valore di lunghezza sarà 2/3 di quello precedente

```
 ramo(lunghezza);
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
line(0, 0, 0, -lunghezza);
translate(0, -lunghezza);
lunghezza *= 0.66;

if (lunghezza > 2) {
pushMatrix();
  rotate(PI+40);
  ramo(lunghezza);
popMatrix();

pushMatrix();
    rotate(PI-40);
    ramo(lunghezza);
popMatrix();
 }
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
 line(0, 0, 0, -lunghezza);
 translate(0, -lunghezza);
 lunghezza *= 0.66;

if (lunghezza > 2) {
pushMatrix();
  rotate(PI+40);
  ramo(lunghezza);
Ogni volta che torniamo qui, "pop" al fine di ripristinare lo stato precedente matrice
popMatrix();
```



```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2,
height);
ramo(200);
}
void ramo(float
lunghezza) {
line(0, 0, 0, -
lunghezza);
translate(0, -
lunghezza);
lunghezza *= 0.66;

if (lunghezza > 2) {
pushMatrix();
  rotate(PI+40);
  ramo(lunghezza);
popMatrix();

pushMatrix();
    rotate(PI-40);
    ramo(lunghezza);
popMatrix();
 }
```

pushMatrix () funzione salva il sistema di coordinate corrente e popMatrix () ripristina il sistema di coordinate precedente. Ripeto la stessa cosa, solo a "sinistra", cambia solo il *rotate* + diventa -

```
pushMatrix();
    rotate(PI-40);
    ramo(lunghezza);
    popMatrix();
 }
}
```

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
line(0, 0, 0, -lunghezza);
translate(0, -lunghezza);
lunghezza *= 0.66;

if (lunghezza > 2) {
pushMatrix();
  rotate(PI+40);
  ramo(lunghezza);
popMatrix();

pushMatrix();
    rotate(PI-40);
    ramo(lunghezza);
popMatrix();
 }
```

SIXMEMOS
OPEN SOURCE CULTURE

```
void setup() {
  size(800, 800);
}
void draw() {
background(255);
translate(width/2, height);
ramo(200);
}
void ramo(float lunghezza) {
line(0, 0, 0, -lunghezza);
translate(0, -lunghezza);
lunghezza *= 0.66;

if (lunghezza > 2) {
pushMatrix();
  rotate(PI+40);
  ramo(lunghezza);
popMatrix();

pushMatrix();
    rotate(PI-40);
    ramo(lunghezza);
popMatrix();
 }
}
```

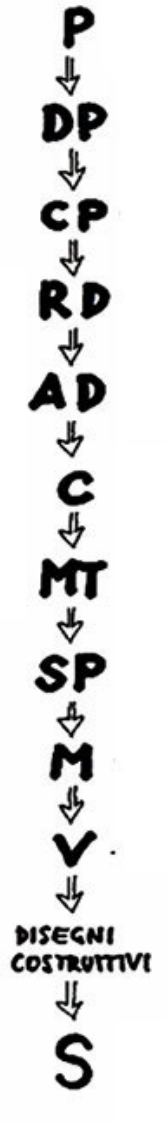
SIXMEMOS
OPEN SOURCE CULTURE

# REFLECTIONS

- Find the action
- Exploring Changes
- Measure the Limits
- Multiply the points of view
- Research the Similarities
- Displace the habits - Spiazzare le Abitudini


# Were we started?

SIXMEMOS
OPEN SOURCE CULTURE




Problema
Metodologia progettuale - Attività di apprendimento esperienziale - Processi cognitivi e tecnologie
Definizione problema
Tecnologie, attività esperienziali e processi cognitivi
Componenti problema
Competenze tecniche – Hardware & Software – Capacità di misurazione dell'efficacia
Raccolta dati
C'è qualche altra persona che lo ha fatto?
Analisi dati
Come lo ha fatto? Cosa possiamo imparare da lui?
Creatività
Come mettiamo tutto insieme nel modo più giusto?
Materiali e tecnologie
Cosa possiamo utilizzare: es. carta - forbici - tablet - app- Arduino - Makey Makey ...
Sperimentazione
Prototipi e attività
Modello
Giocare con l'ARte – Sculture aritmiche – Brick Opera
Verifica
Laboratori e Maker Faire
Soluzione
SIX MEMOS