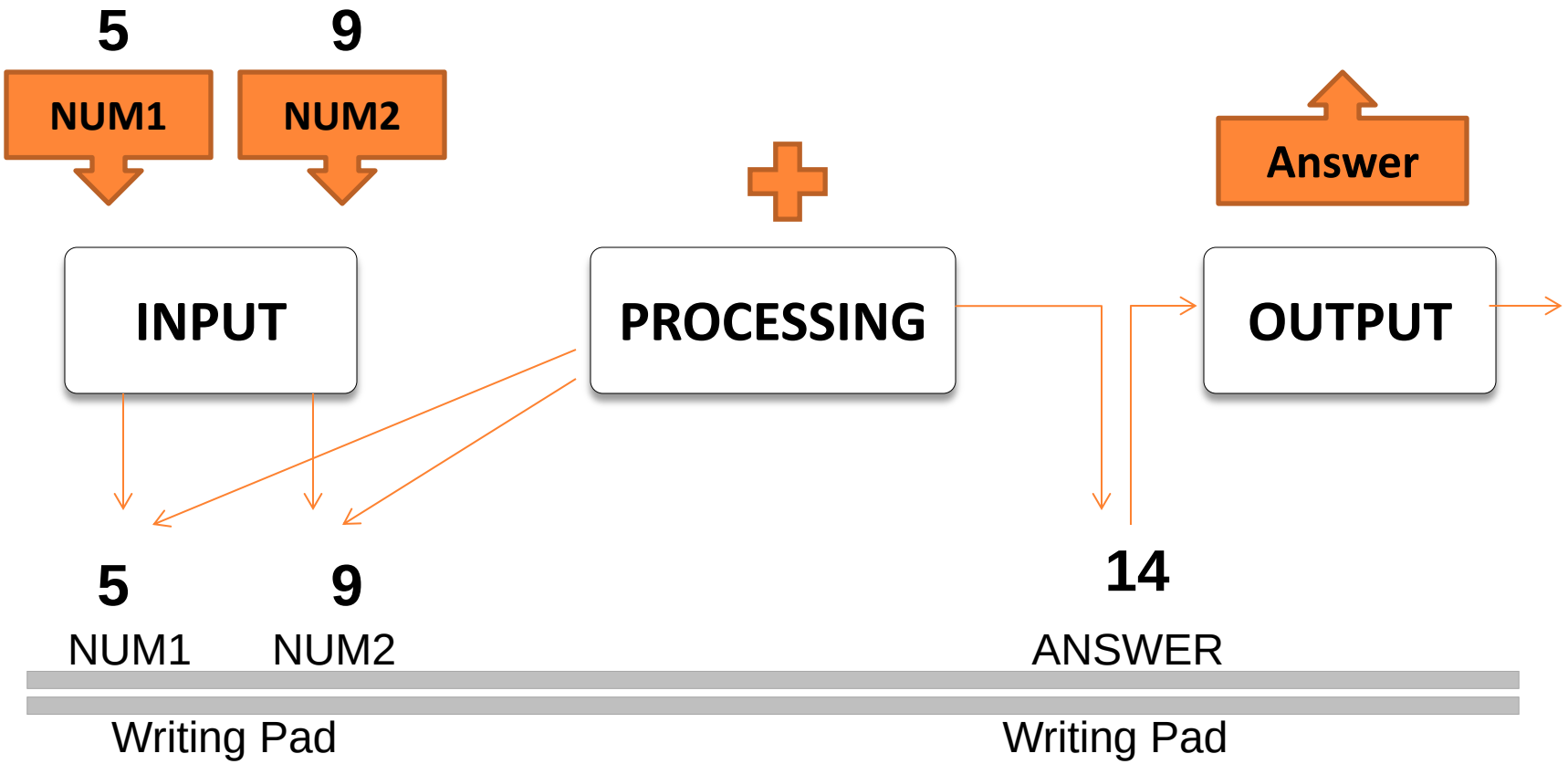
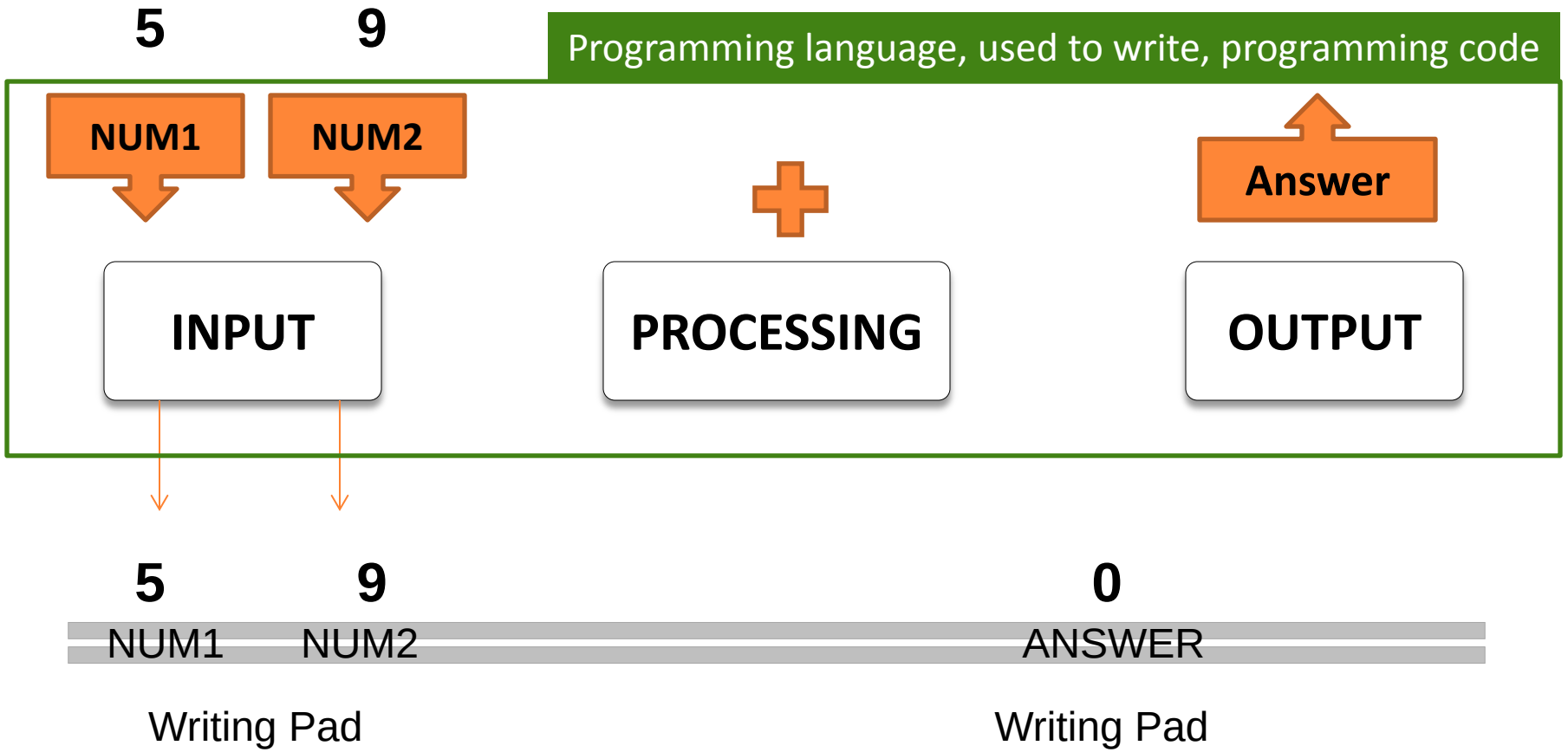
3. Visual Programming 1

What did we do last time?

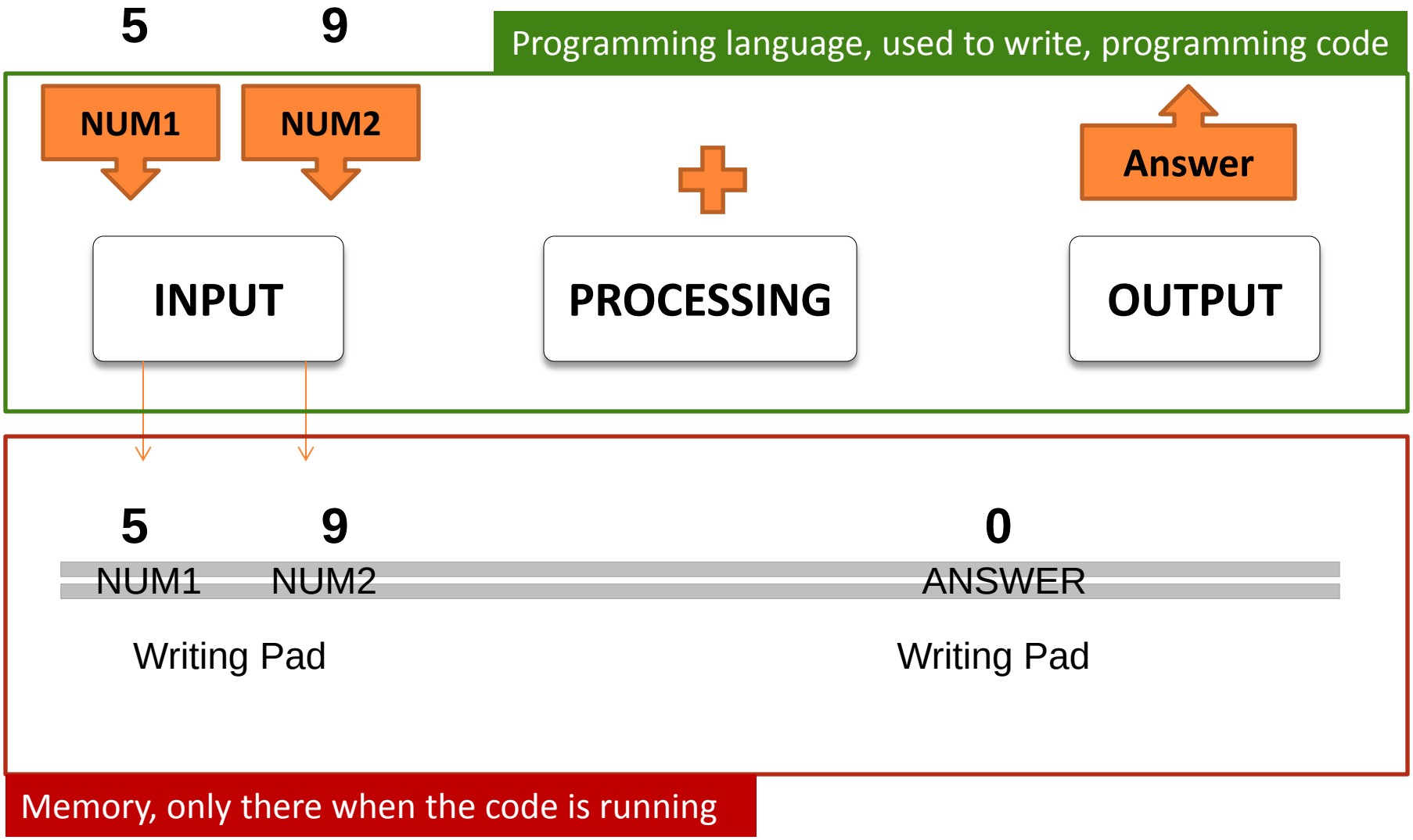
Model of a basic program



Programming language describes this conversation with the computer

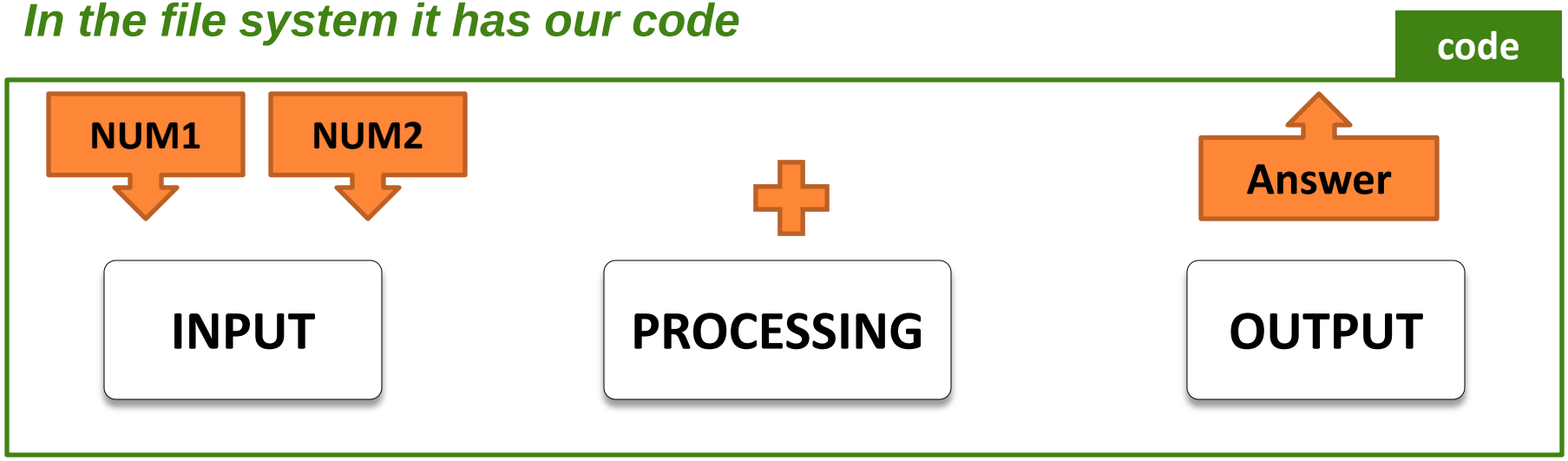


The writing pad in our metaphorical program is the writing pad

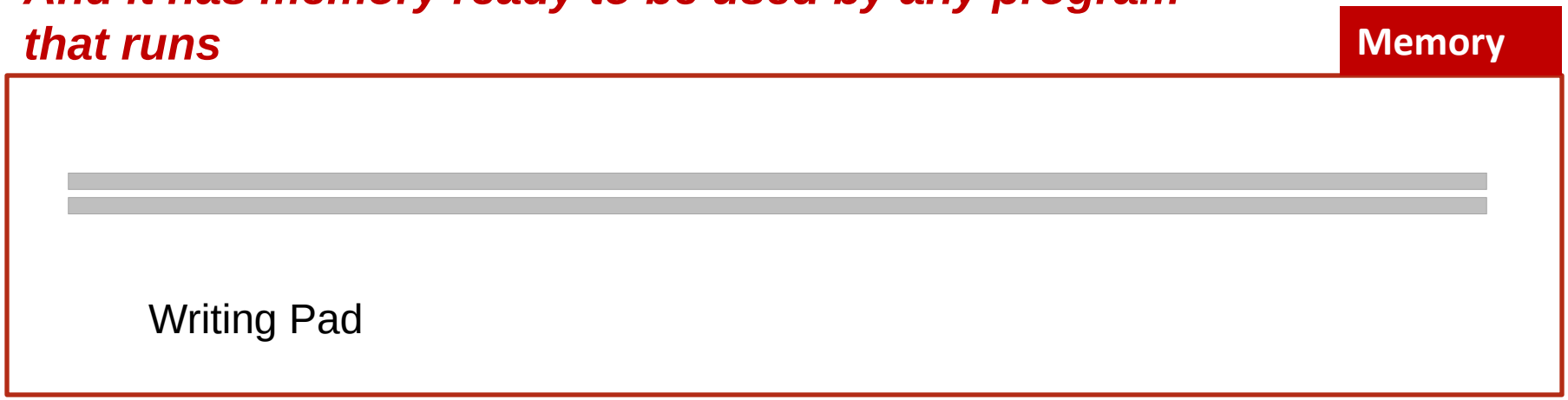


If a computer has power then ...

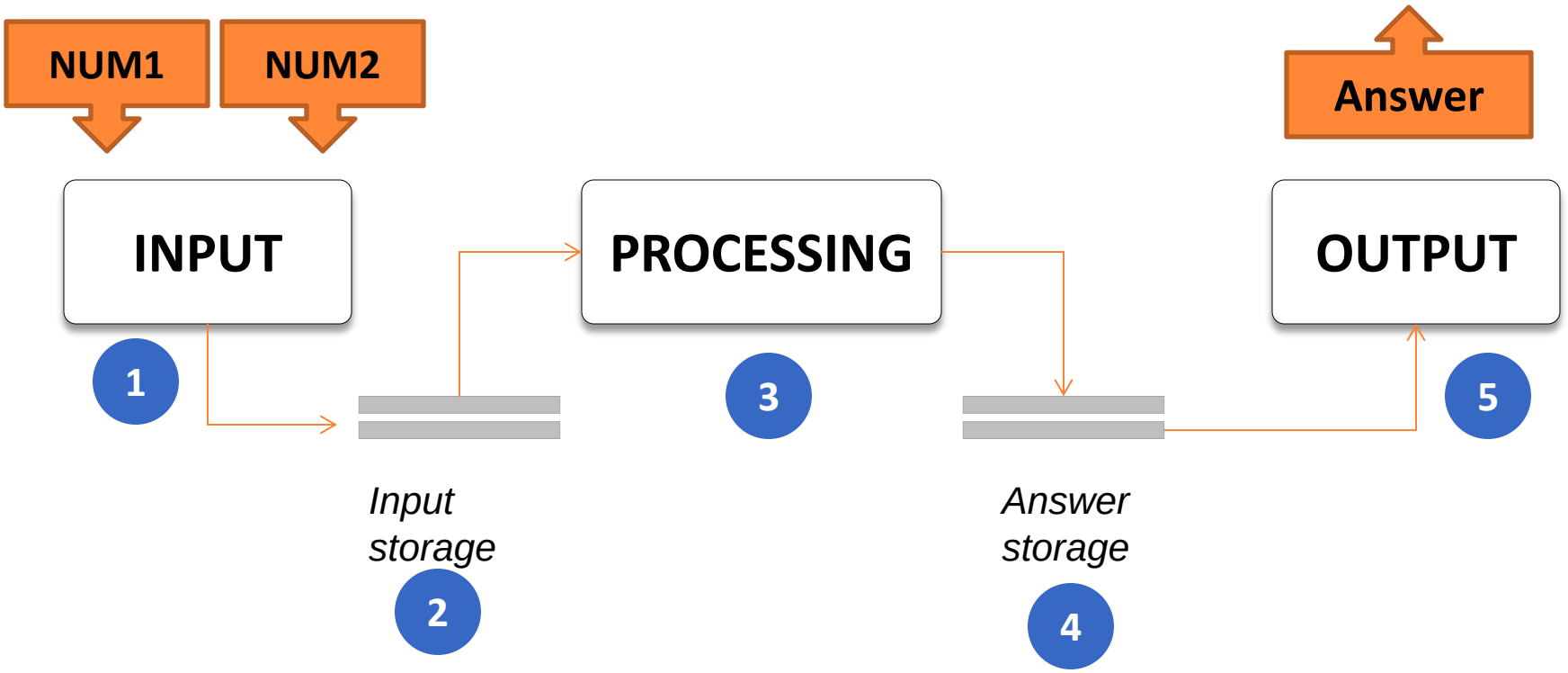
In the file system it has our code



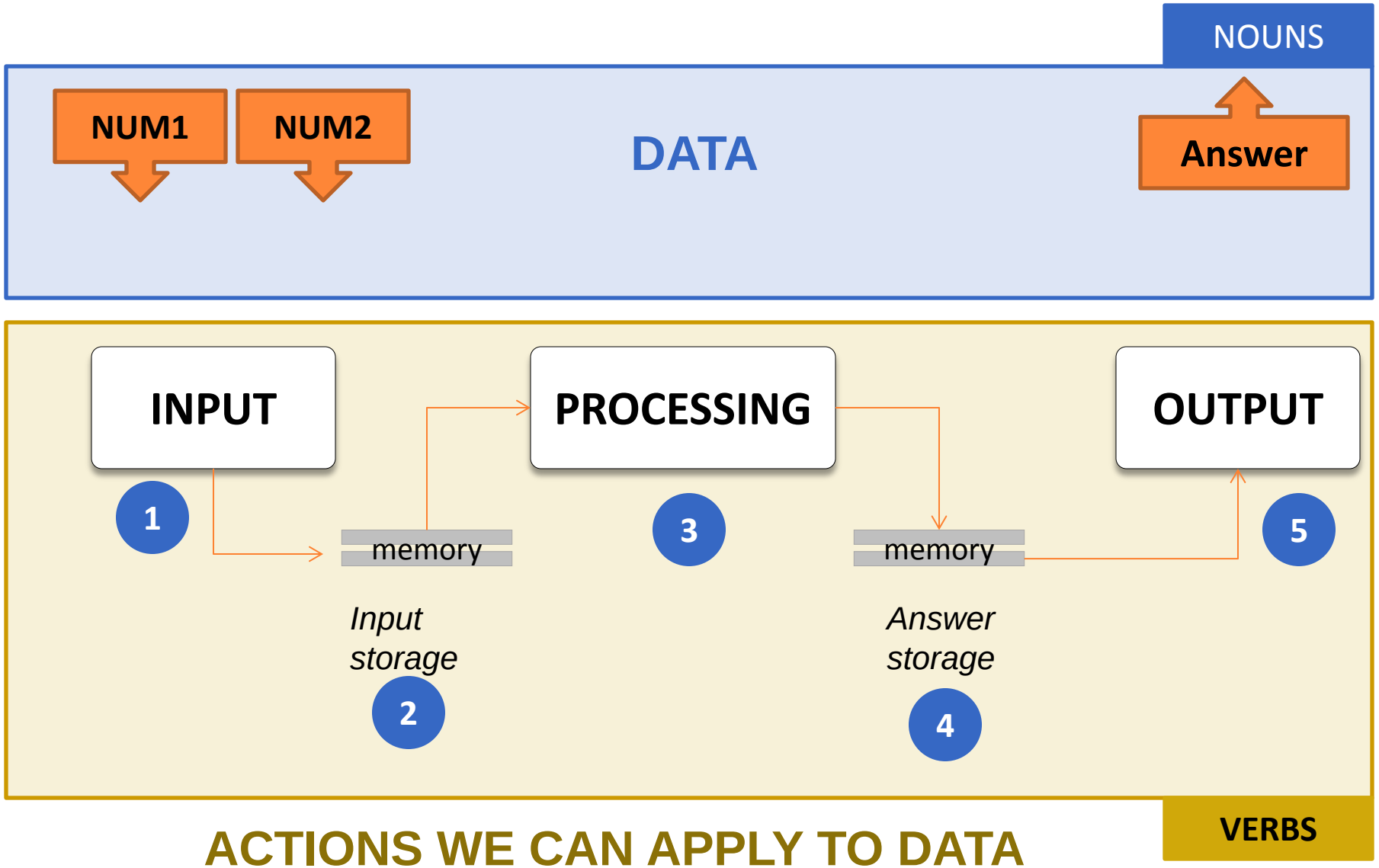
And it has memory ready to be used by any program that runs



The most basic program design is

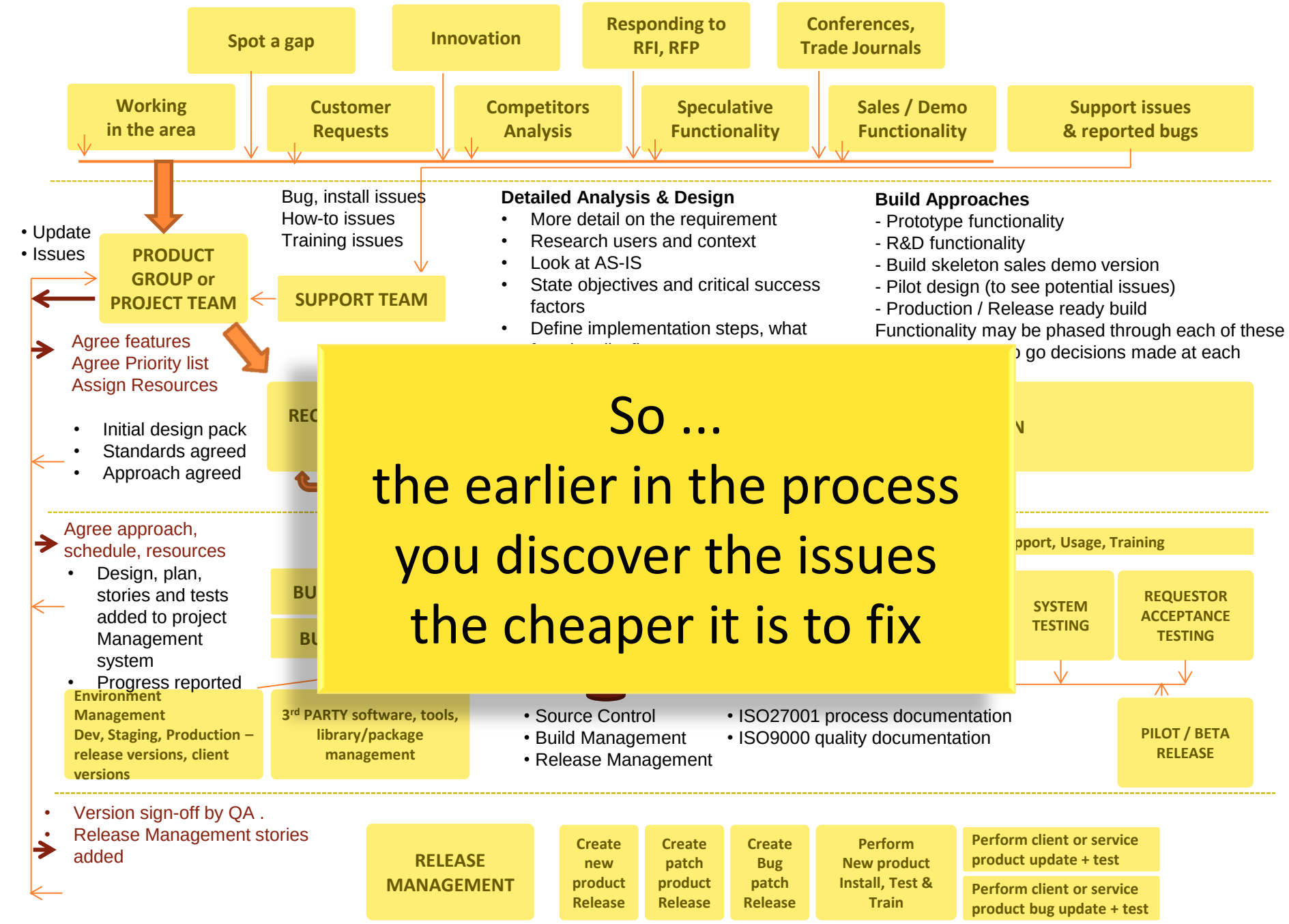


In terms of a generic programming language



ACTIONS WE CAN APPLY TO DATA

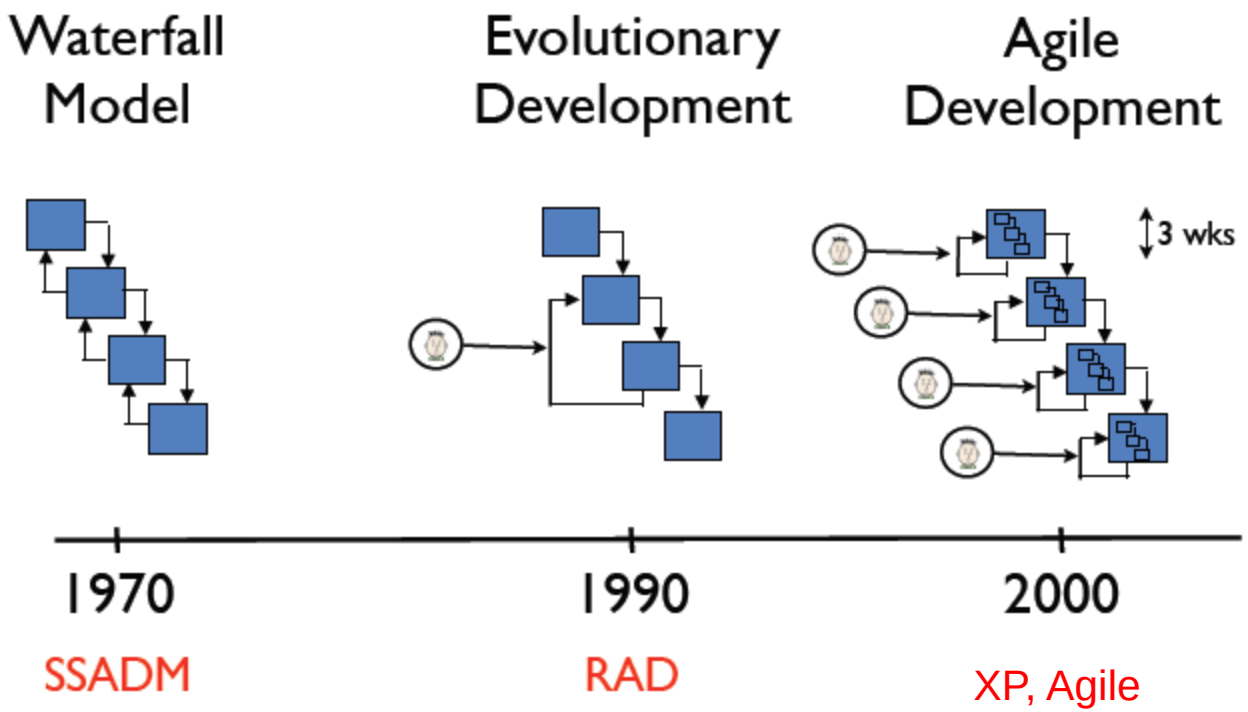
http://upload.wikimedia.org/wikipedia/commons/3/39/Aerial_view_of_a_US_helicopter_as_it_flies_over_a_Mogadishu_residential_area.JPEG


Spot a gap
Innovation
Responding to RFI, RFP
Conferences, Trade Journals
Working in the area
Customer Requests
Competitors Analysis
Speculative Functionality
Sales / Demo Functionality
Support issues & reported bugs
Bug, install issues
How-to issues
Training issues
Detailed Analysis & Design
• More detail on the requirement
• Research users and context
• Look at AS-IS
• State objectives and critical success factors
• Define implementation steps, what
Build Approaches
- Prototype functionality
- R&D functionality
- Build skeleton sales demo version
- Pilot design (to see potential issues)
- Production / Release ready build
Functionality may be phased through each of these
go decisions made at each
• Update
• Issues
PRODUCT GROUP or PROJECT TEAM
SUPPORT TEAM
Agree features
Agree Priority list
Assign Resources
• Initial design pack
• Standards agreed
• Approach agreed
So ...
the earlier in the process
you discover the issues
the cheaper it is to fix
Agree approach, schedule, resources
• Design, plan, stories and tests added to project Management system
• Progress reported
pport, Usage, Training
SYSTEM TESTING
REQUESTOR ACCEPTANCE TESTING
PILOT / BETA RELEASE
Environment Management
Dev, Staging, Production – release versions, client versions
3rd PARTY software, tools, library/package management
• Source Control
• Build Management
• Release Management
• ISO27001 process documentation
• ISO9000 quality documentation
• Version sign-off by QA .
• Release Management stories added
RELEASE MANAGEMENT
Create new product Release
Create patch product Release
Create Bug patch Release
Perform New product Install, Test & Train
Perform client or service product update + test
Perform client or service product bug update + test

Other Approached

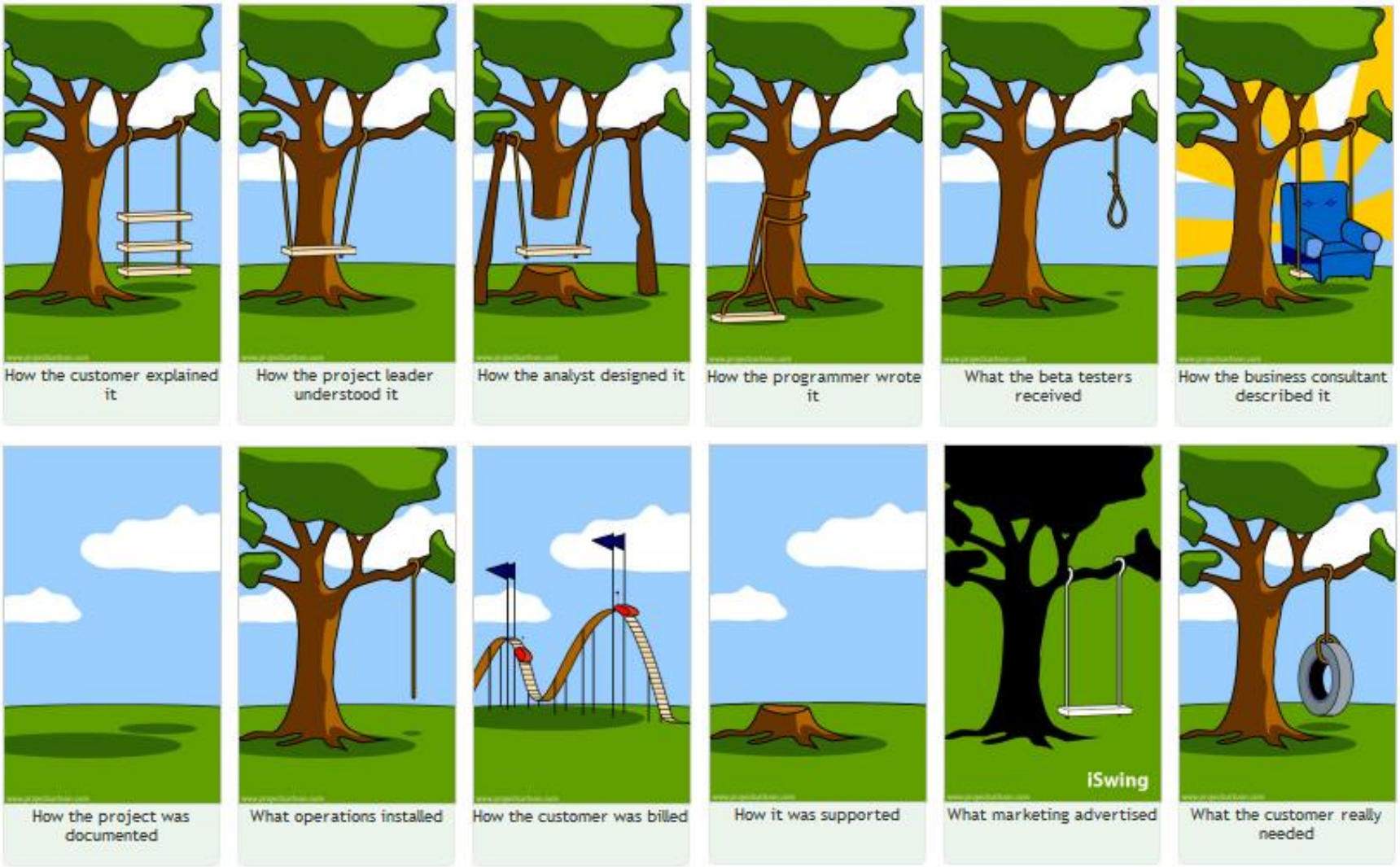
Software Engineering Life Cycle models

The current trend Is the Agile approach



[1 lecture slides, DIT, Sarah Jane Delany

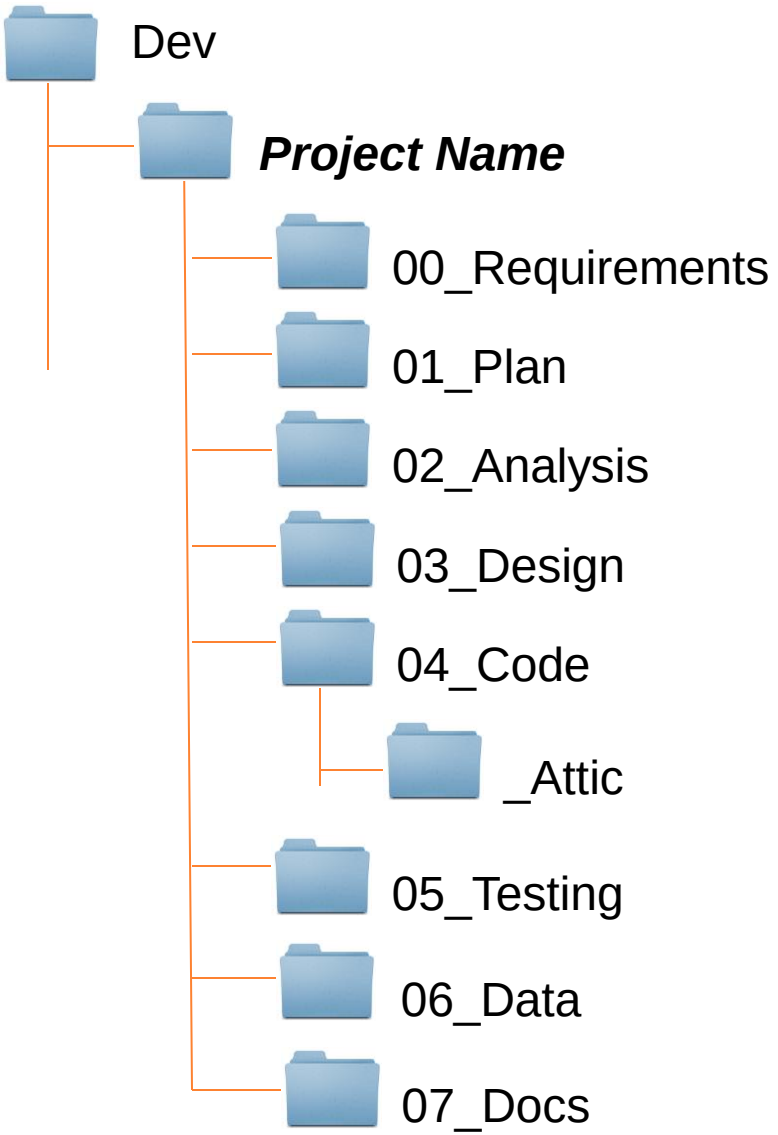
An approach you see all too often ...



The parable of the swing

[1] http://www.projectcartoon.com/cartoon/2

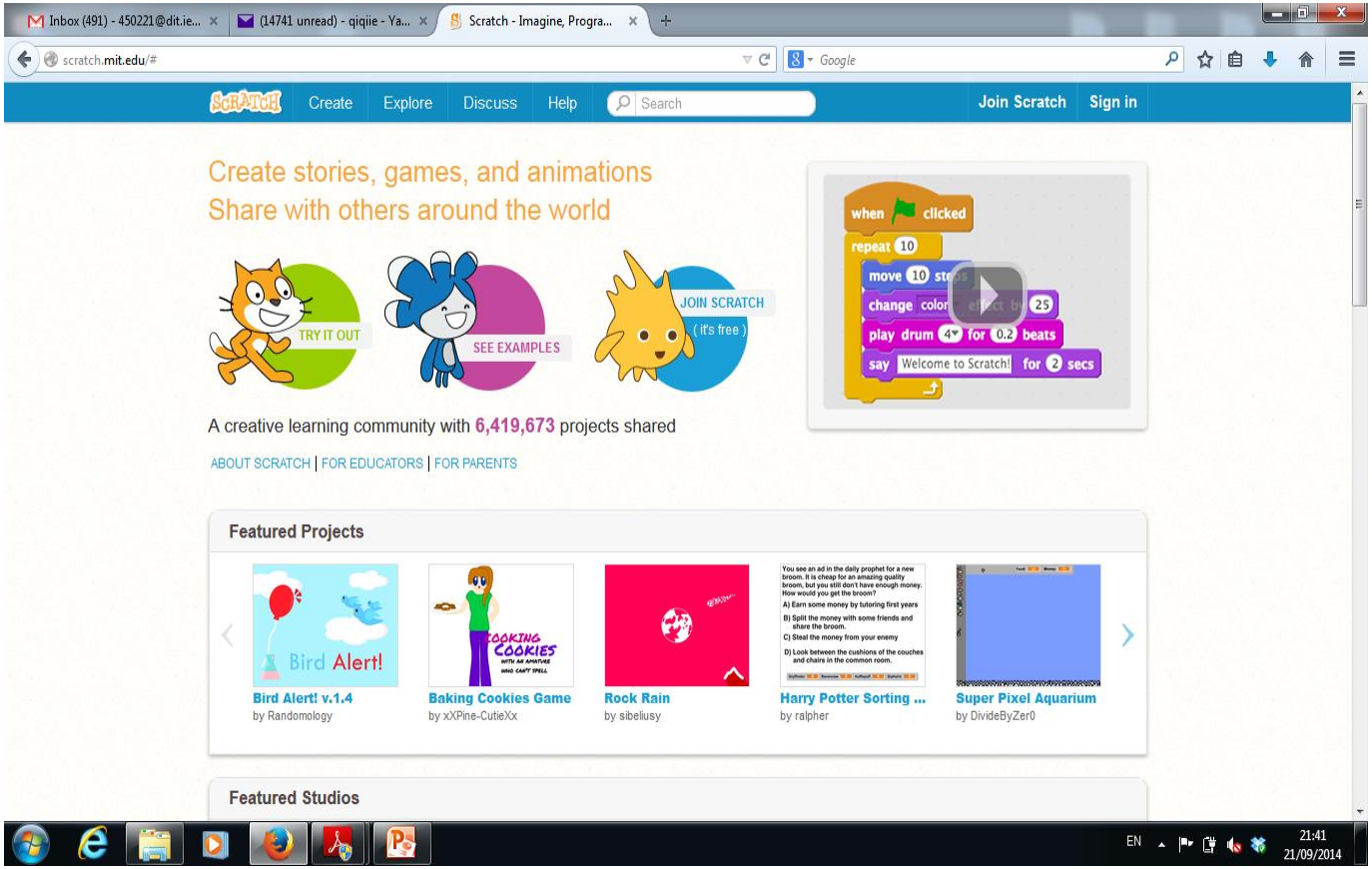
Programming is a Process



Programming is a ...

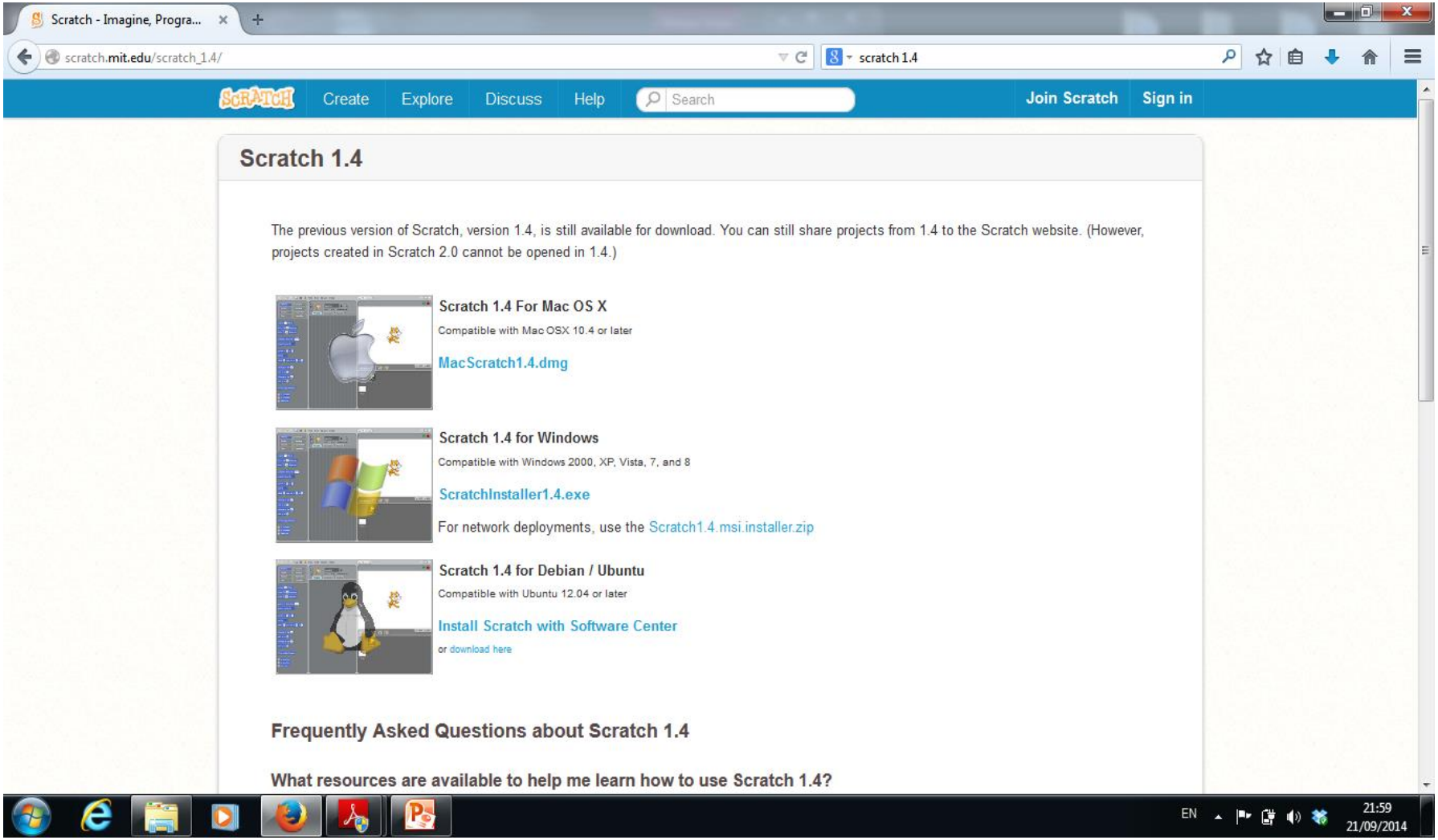
- Process
- And a way of thinking
- Problem solving
- Creating recipes in code
- Reusing approaches (patterns) and code (libraries) developed by others to build application, games and devices conceived by you or others

SCRATCH – visual programming
http://scratch.mit.edu/#



SCRATCH is a new programming language that let you create your own interactive stories, animations, games, music and art.

SCRATCH – visual programming



http://scratch.mit.edu/scratch_1.4/

About SCRATCH

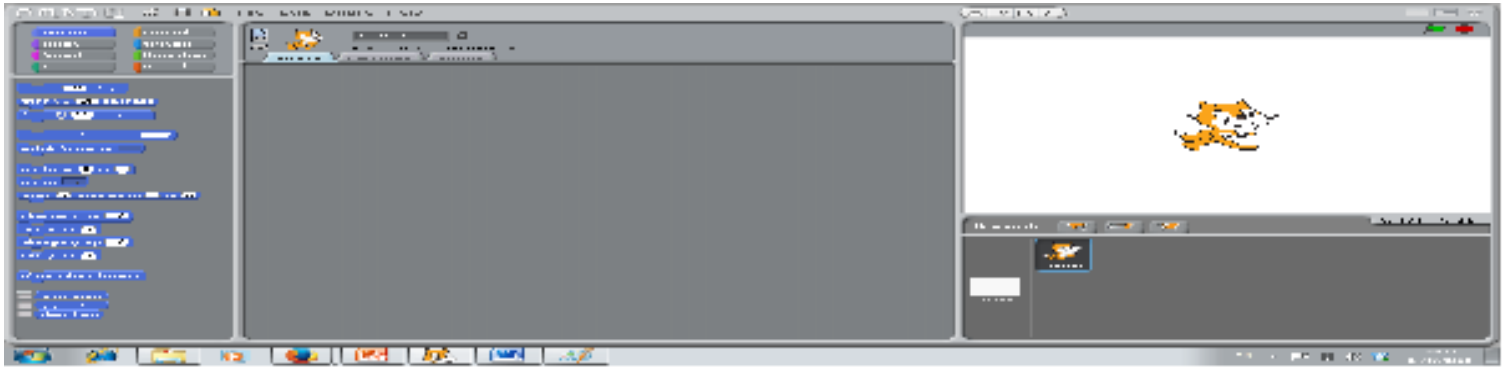
- Scratch allows the user to write programs by dragging and connecting simple programming instructions.
- The programming instructions resemble puzzle pieces and will only “fit” together in ways that make semantic sense.
- The instruction pieces are also color-coded according to what type of instruction they represent.
- The program that the user creates controls one or more objects, or sprites.

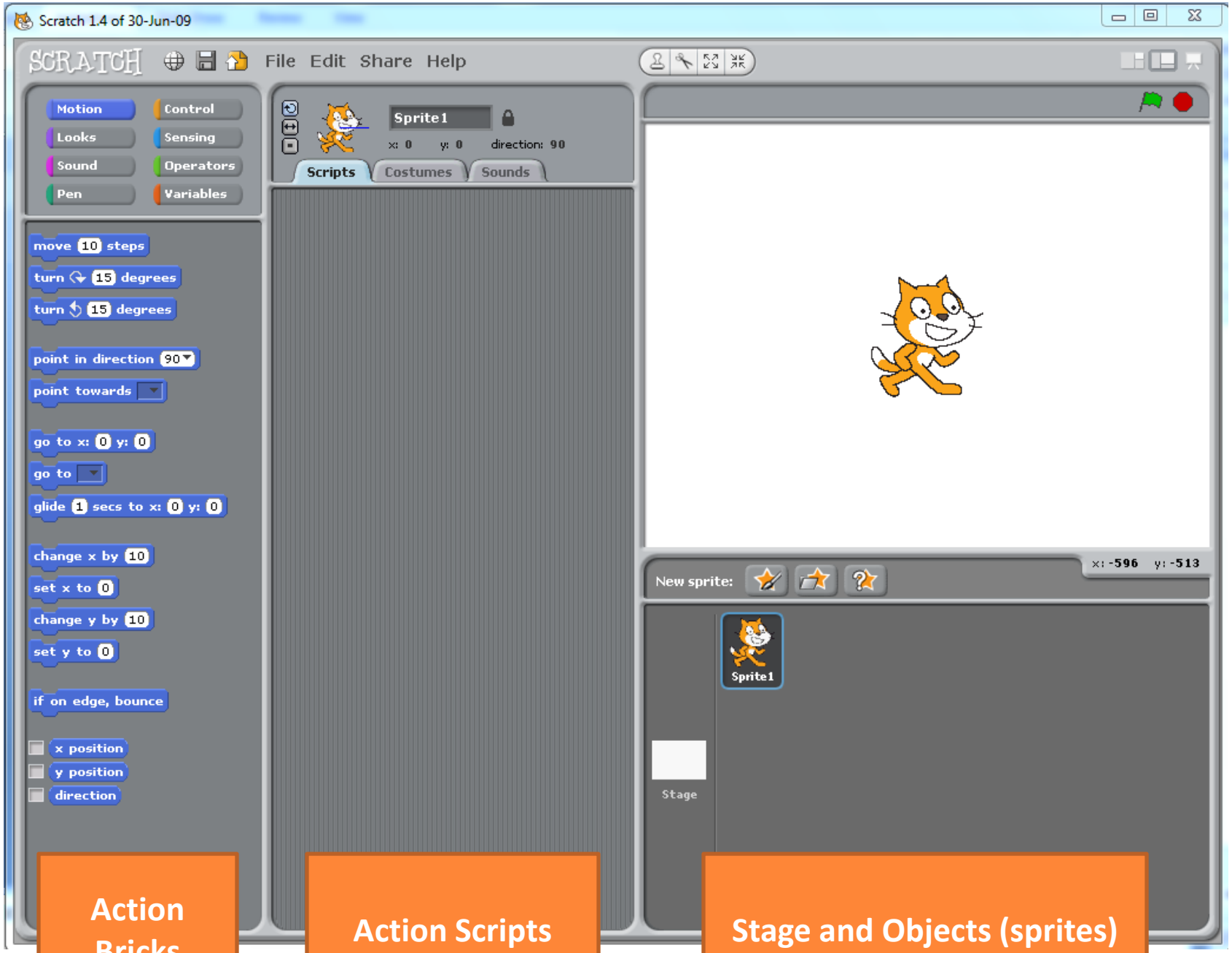
Eight categories of programming institutions

- **Motion:** move and rotate.
- **Looks:** changing a sprite's costume and colour, and “say” and “think” messages to the user.
- **Sound:** playing drum sounds as well as 128 different instruments and sound affects.
- **Pen:** ability to draw lines under program control.
- **Control:** control structure such as while loops and if statements.
- **Sensing:** allow the user's program to test the location of a sprite or the mouse pointer.
- **Operators:** arithmetic, boolean, and string operators that can be combined to form complex expressions.
- **Variables:** allow the user to create, display and manipulate scalar and list variables.

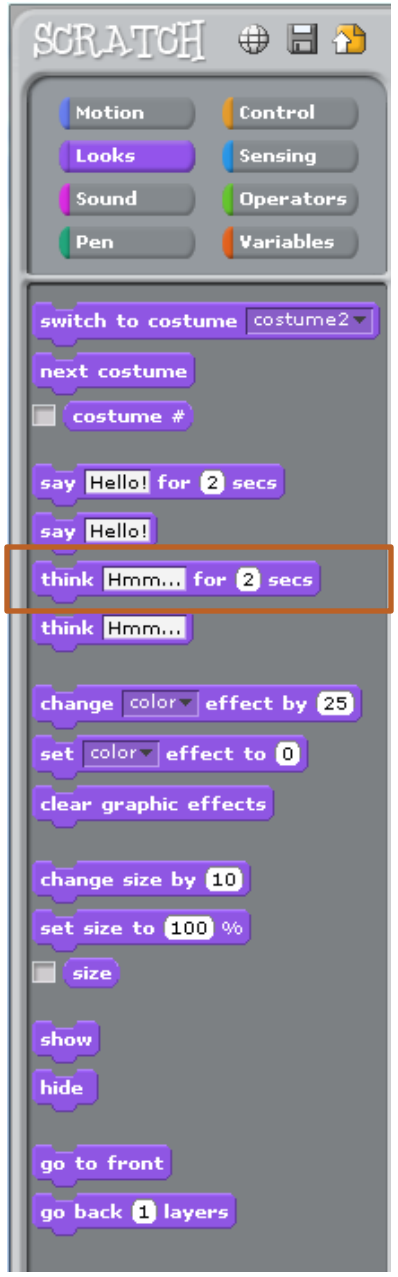
SCRATCH interface breaks out into 3 columns

- The **left column** contains the various instructions that the user can choose from to build a program.
- The **right column** is divided into two parts. The top part is the "stage" where all of the action takes place. The bottom part contains one or more sprites that are used in the program.
- The **center column** is where the actual programming takes place. The user simply drags programming instructions from the pallet into the center column and connects them together to build up one or more programs that control the current sprite.



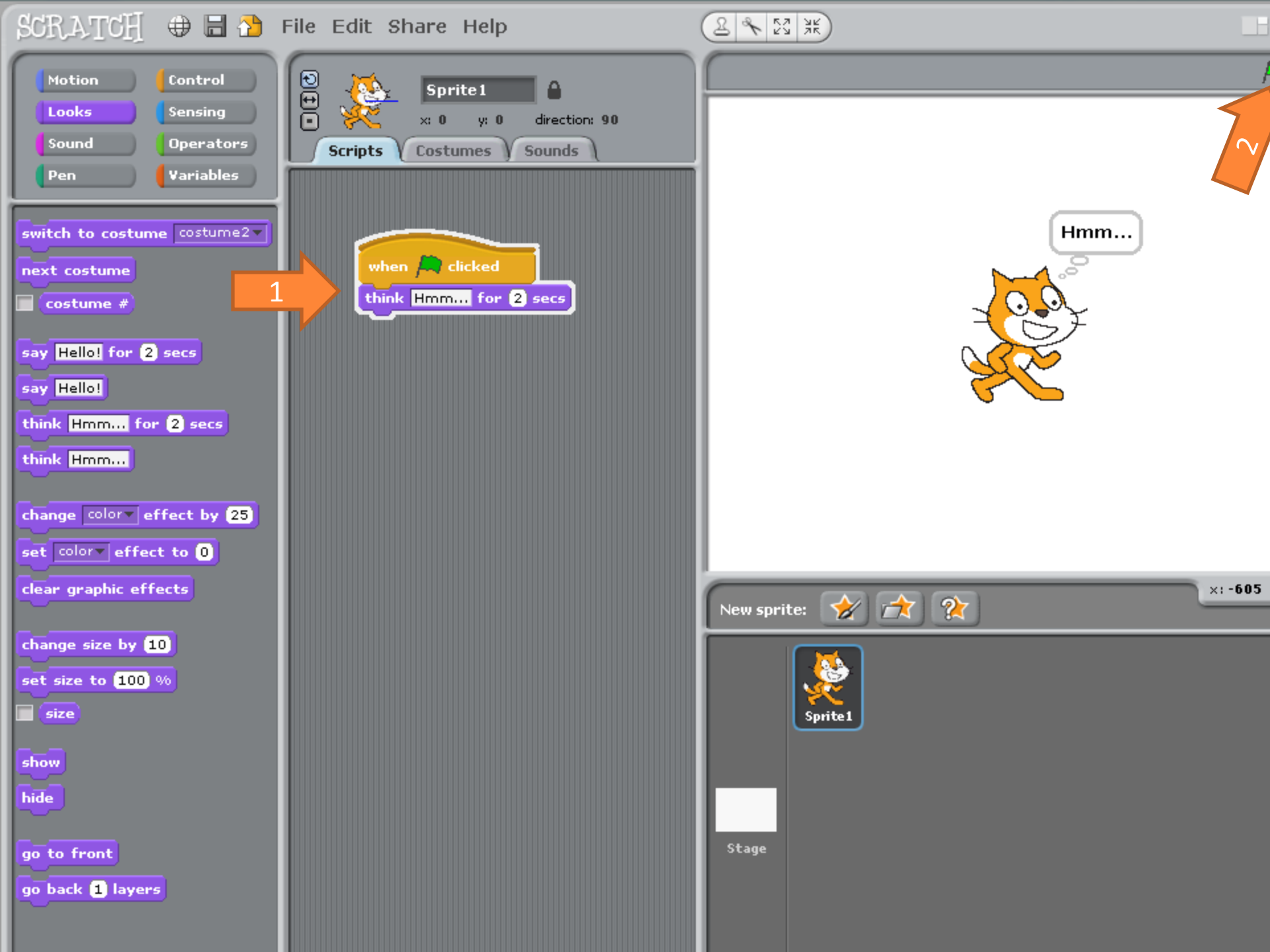

Scratch 1.4 of 30-Jun-09
SCRATCH
File Edit Share Help
Motion
Control
Looks
Sensing
Sound
Operators
Pen
Variables
move 10 steps
turn 15 degrees
turn 15 degrees
point in direction 90
point towards
go to x: 0 y: 0
go to
glide 1 secs to x: 0 y: 0
change x by 10
set x to 0
change y by 10
set y to 0
if on edge, bounce
x position
y position
direction
Sprite1
x: 0 y: 0 direction: 90
Scripts
Costumes
Sounds
New sprite:
x: -596 y: -513
Sprite1
Stage
Action Bricks
Action Scripts
Stage and Objects (sprites)

Control Bricks



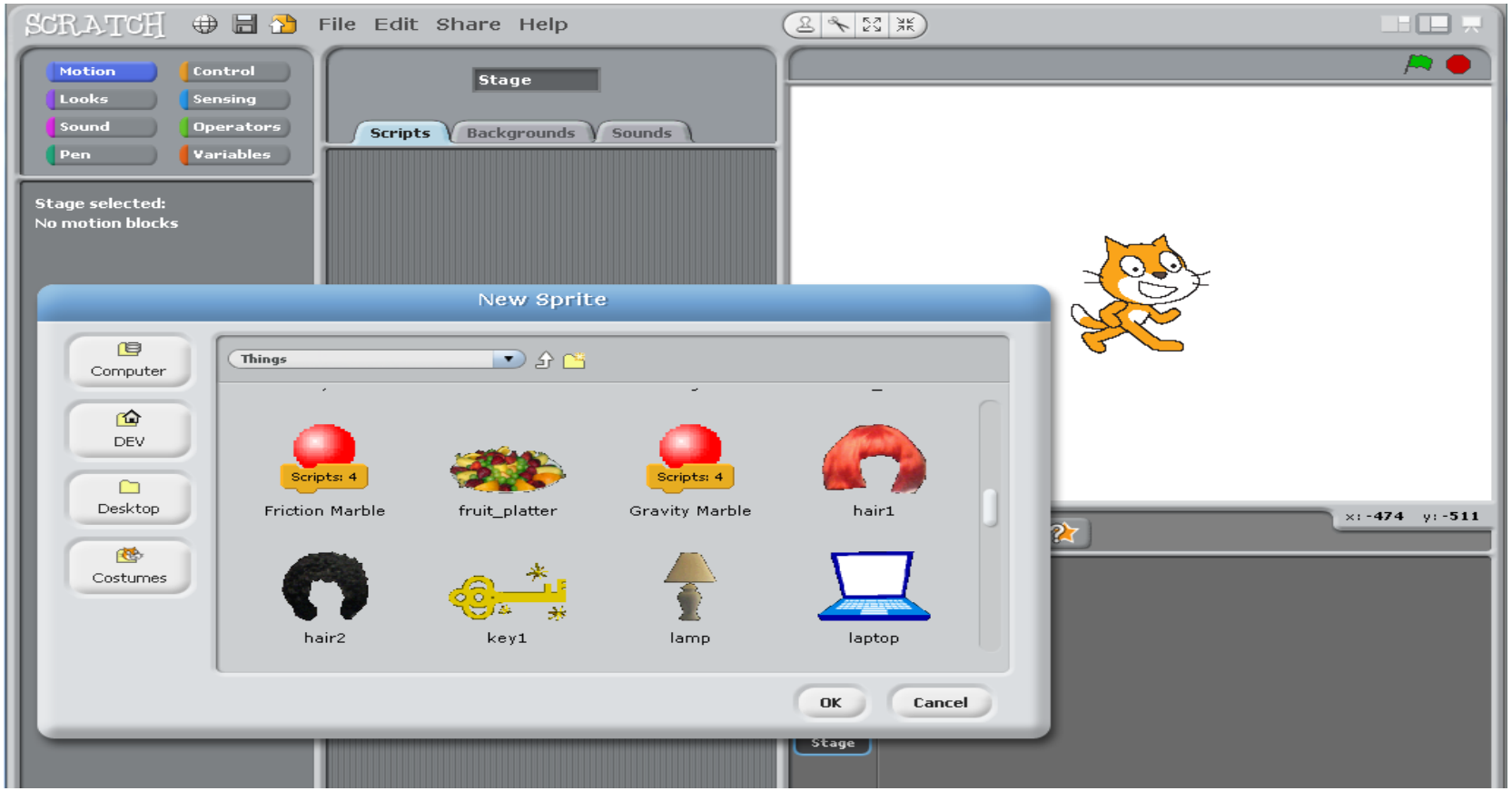
Looks Bricks (Output)

Our code applies to this guy

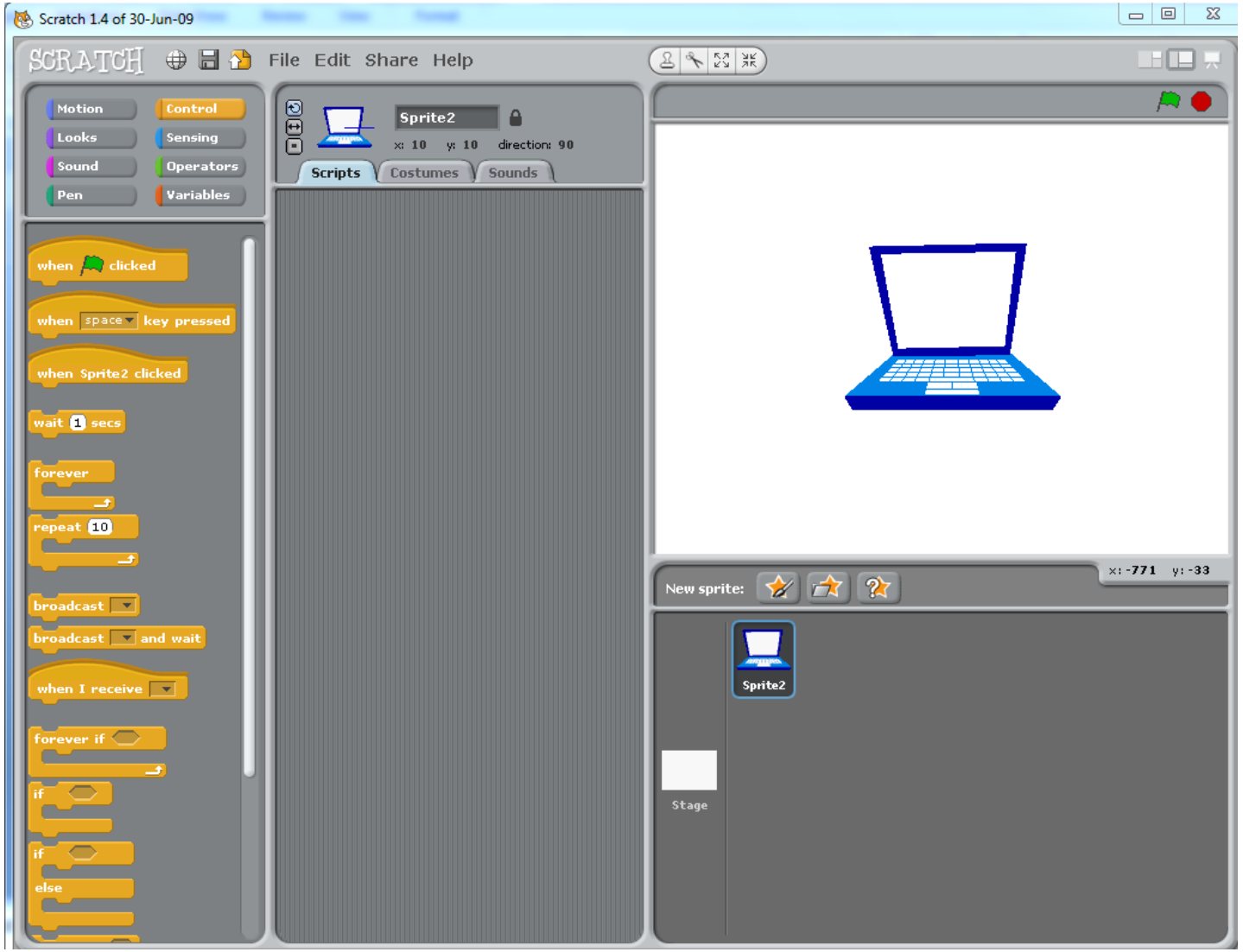

SCRATCH
File Edit Share Help
Motion
Control
Looks
Sensing
Sound
Operators
Pen
Variables
switch to costume costume2
next costume
costume #
say Hello! for 2 secs
say Hello!
think Hmm... for 2 secs
think Hmm...
change color effect by 25
set color effect to 0
clear graphic effects
change size by 10
set size to 100 %
size
show
hide
go to front
go back 1 layers
Sprite1
x: 0 y: 0 direction: 90
Scripts
Costumes
Sounds
1
when clicked
think Hmm... for 2 secs
2
Hmm...
New sprite:
x: -605
Sprite1
Stage

Change Sprite

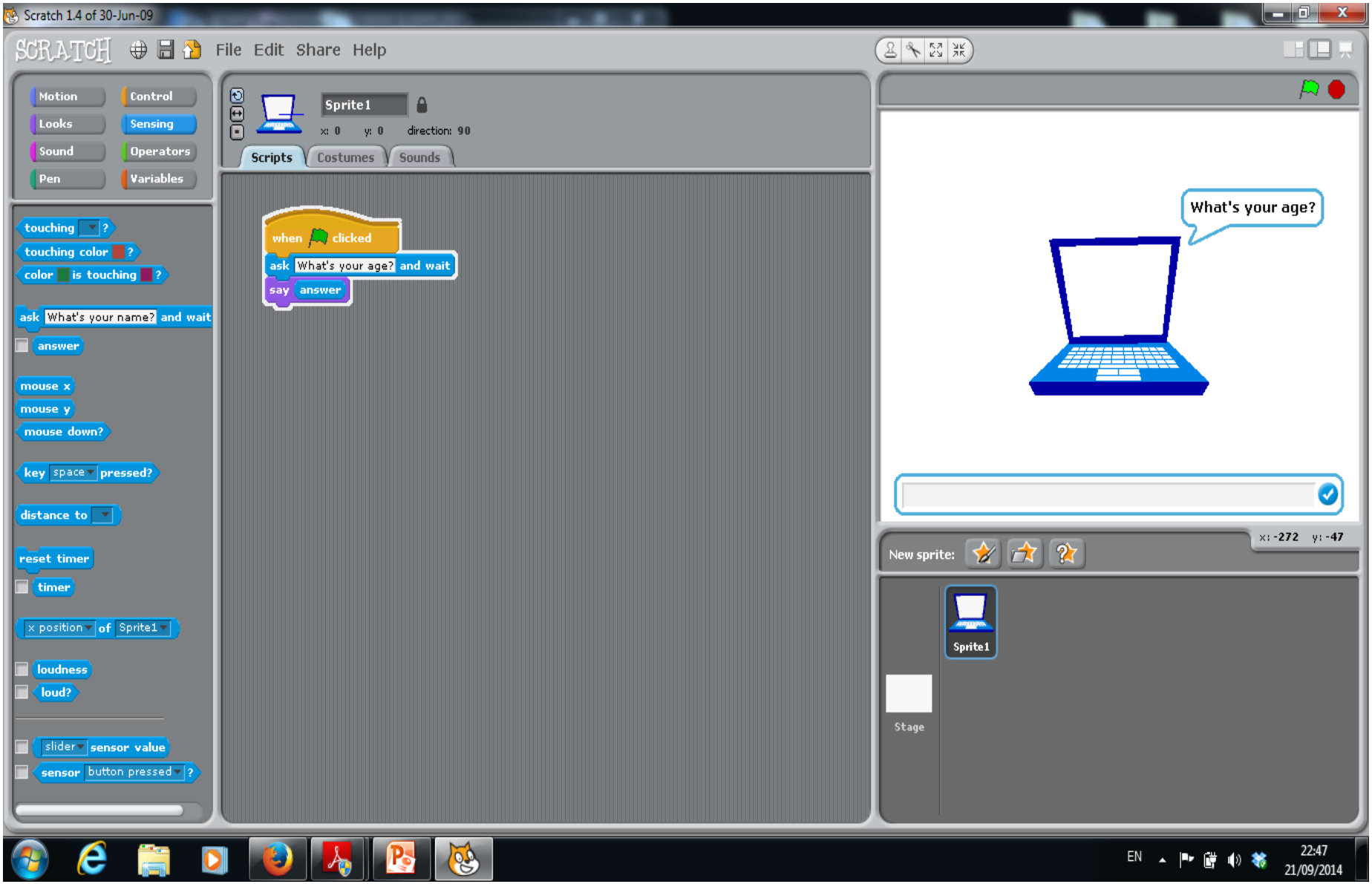
- Scratch includes several different sprites in quite a few different categories. However, the user can also import their own graphics or use the built-in sprite editor.



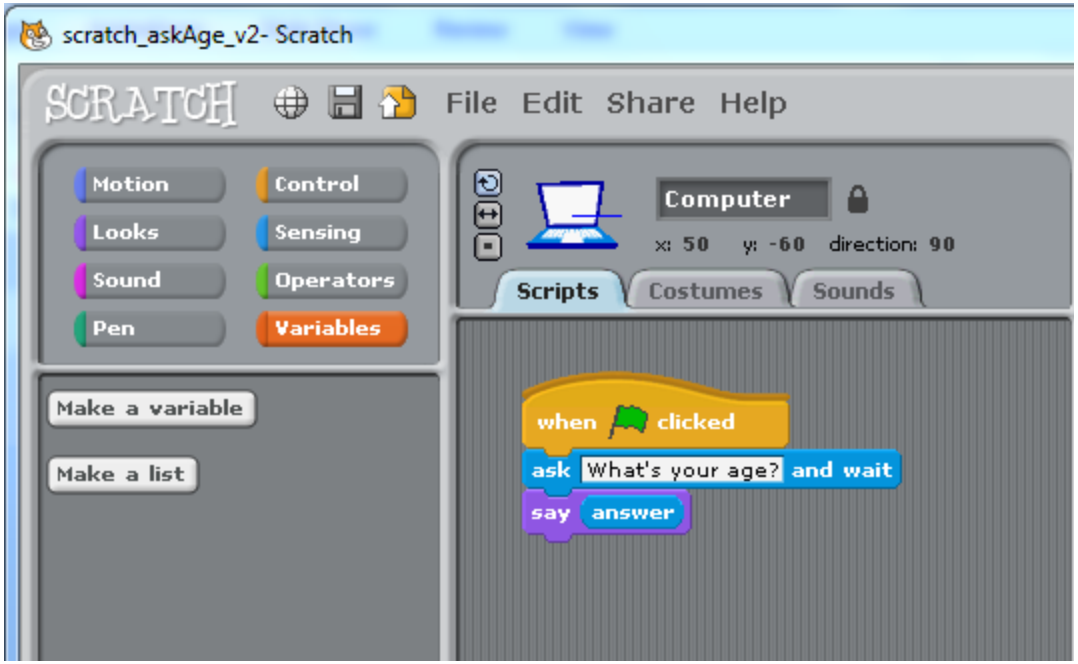
Want to ask for your age and display answer



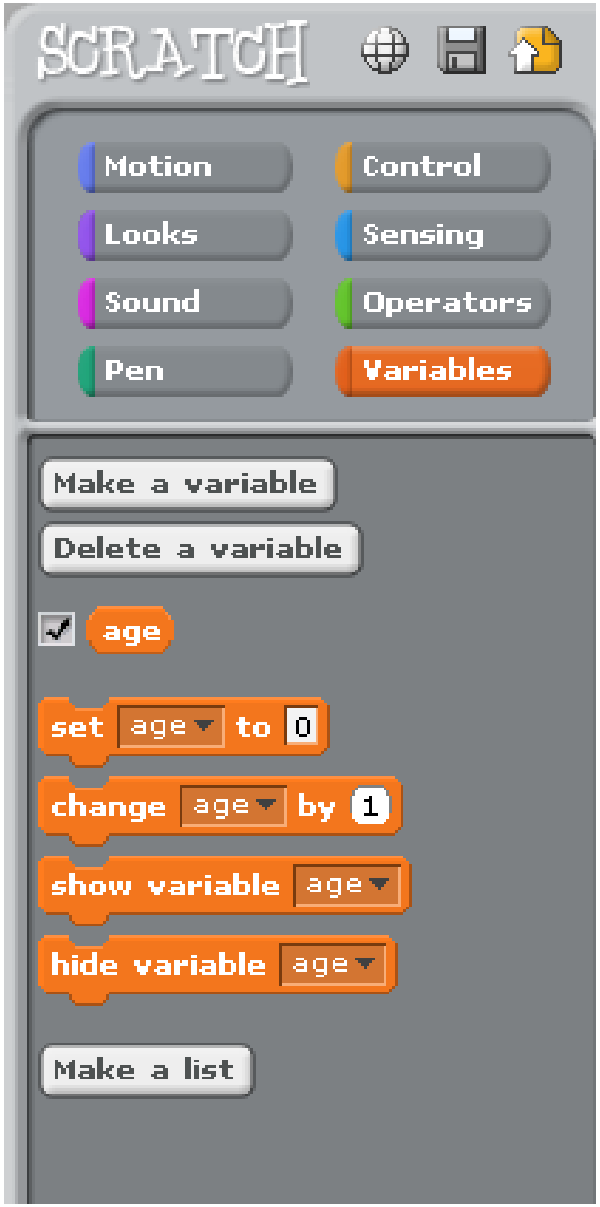
Ask Age and Show it



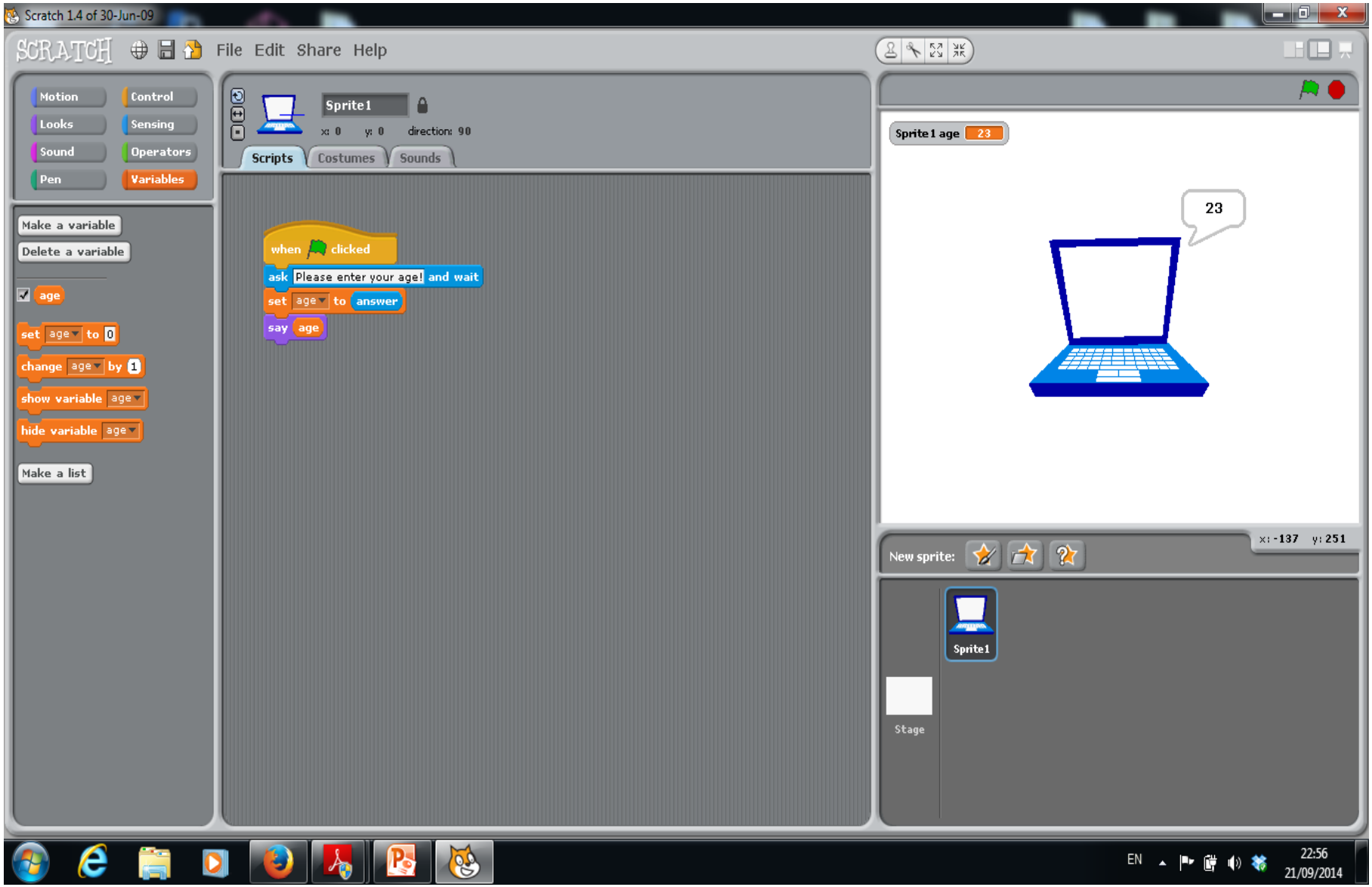
Lets create a variable



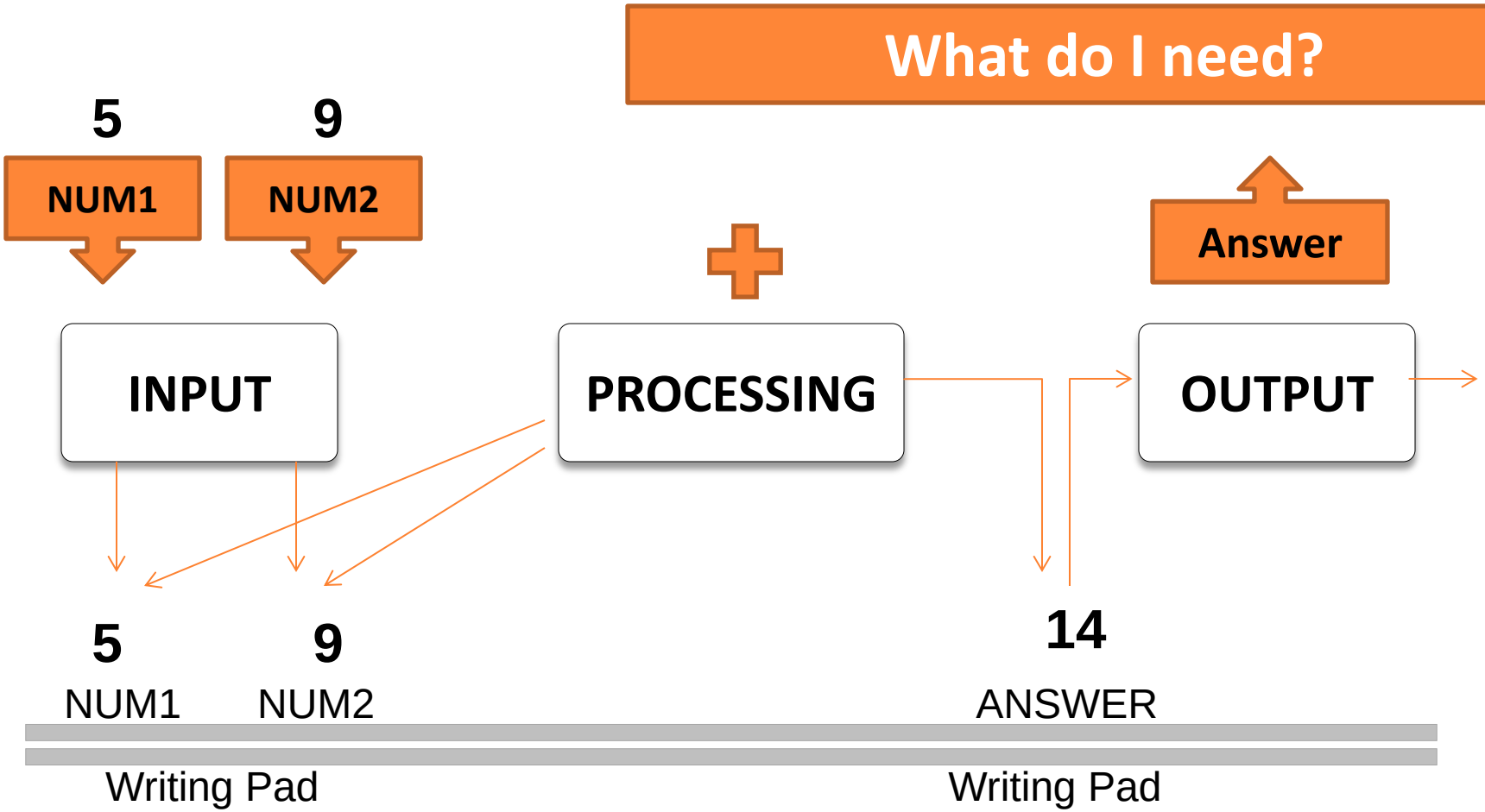
Writing Pad



Use the variable



Want to write this program



Need to design the program

How?

Program Design Process

1. Problem Definition
   - What is the objective
   - What is the program to do
2. Design
3. Test Cases (how will you test it)
4. Write Code
5. Test Code with test cases

References

- 2009, Barry, Paul and Griffiths, David; Head First Programming, O'Reilly Media Inc.
- 2009, Pine,Chris ; Learn to Program, 2nd Edition, The Pragmatic Programmers