Computer Architecture

Brent van Bladel

Stephen Pauwels

Universiteit Antwerpen

Computer Architecture

- Weekly projects on the construction of a processor architecture. Projects build on each other.

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- Pairs of 2 students

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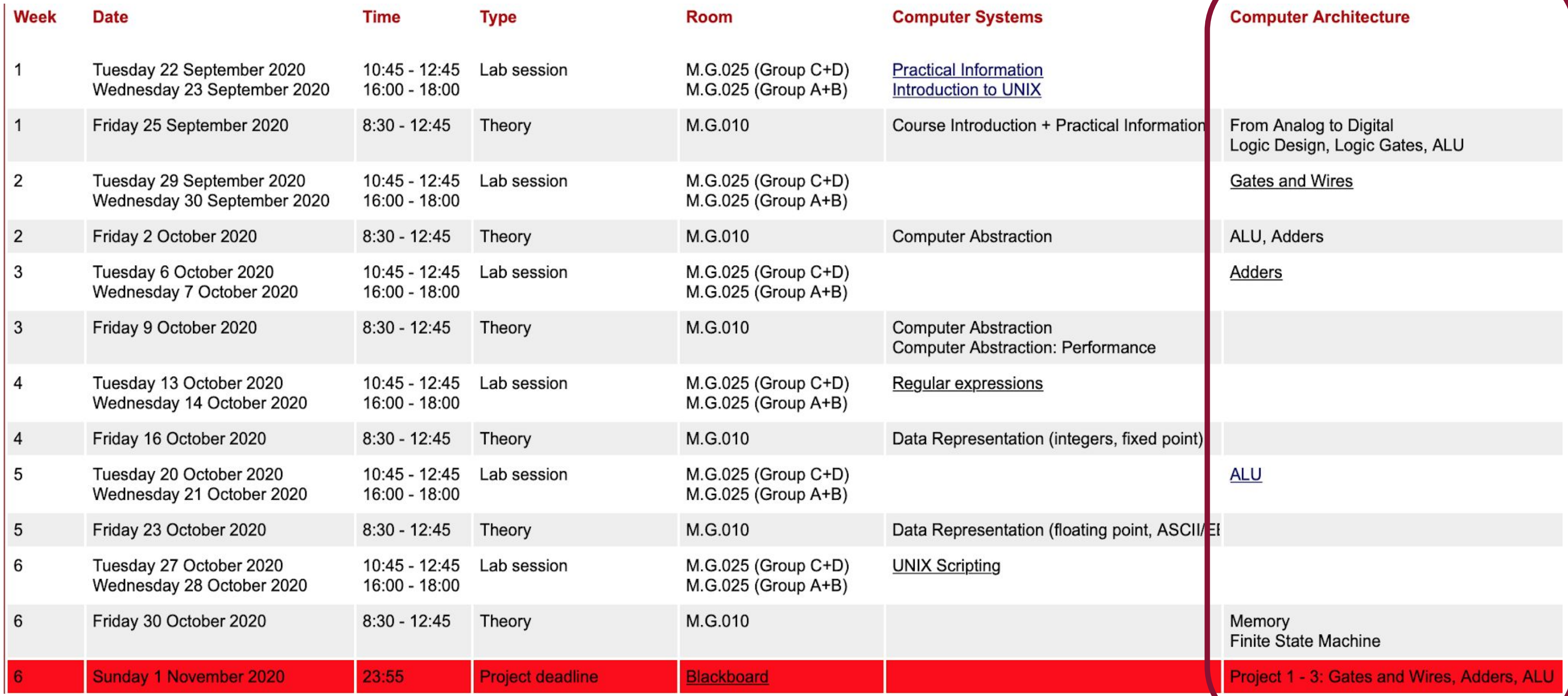
- Report via Blackboard

Computer Architecture

- Weekly projects on the construction of a processor architecture. Projects build on each other.
- Pairs of 2 students
- Report via Blackboard
- Evaluation during the semester
  - Three times
  - Demo
  - Feedback



Week	Date	Time	Type	Room	Computer Systems	Computer Architecture
1	Tuesday 22 September 2020 Wednesday 23 September 2020	10:45 - 12:45 16:00 - 18:00	Lab session	M.G.025 (Group C+D) M.G.025 (Group A+B)	Practical Information Introduction to UNIX	
1	Friday 25 September 2020	8:30 - 12:45	Theory	M.G.010	Course Introduction + Practical Information	From Analog to Digital Logic Design, Logic Gates, ALU
2	Tuesday 29 September 2020 Wednesday 30 September 2020	10:45 - 12:45 16:00 - 18:00	Lab session	M.G.025 (Group C+D) M.G.025 (Group A+B)		Gates and Wires
2	Friday 2 October 2020	8:30 - 12:45	Theory	M.G.010	Computer Abstraction	ALU, Adders
3	Tuesday 6 October 2020 Wednesday 7 October 2020	10:45 - 12:45 16:00 - 18:00	Lab session	M.G.025 (Group C+D) M.G.025 (Group A+B)		Adders
3	Friday 9 October 2020	8:30 - 12:45	Theory	M.G.010	Computer Abstraction Computer Abstraction: Performance	
4	Tuesday 13 October 2020 Wednesday 14 October 2020	10:45 - 12:45 16:00 - 18:00	Lab session	M.G.025 (Group C+D) M.G.025 (Group A+B)	Regular expressions	
4	Friday 16 October 2020	8:30 - 12:45	Theory	M.G.010	Data Representation (integers, fixed point)	
5	Tuesday 20 October 2020 Wednesday 21 October 2020	10:45 - 12:45 16:00 - 18:00	Lab session	M.G.025 (Group C+D) M.G.025 (Group A+B)		ALU
5	Friday 23 October 2020	8:30 - 12:45	Theory	M.G.010	Data Representation (floating point, ASCII/EI	
6	Tuesday 27 October 2020 Wednesday 28 October 2020	10:45 - 12:45 16:00 - 18:00	Lab session	M.G.025 (Group C+D) M.G.025 (Group A+B)	UNIX Scripting	
6	Friday 30 October 2020	8:30 - 12:45	Theory	M.G.010		Memory Finite State Machine
6	Sunday 1 November 2020	23:55	Project deadline	Blackboard		Project 1 - 3: Gates and Wires, Adders, ALU

Computer Architecture: Gates and Wires

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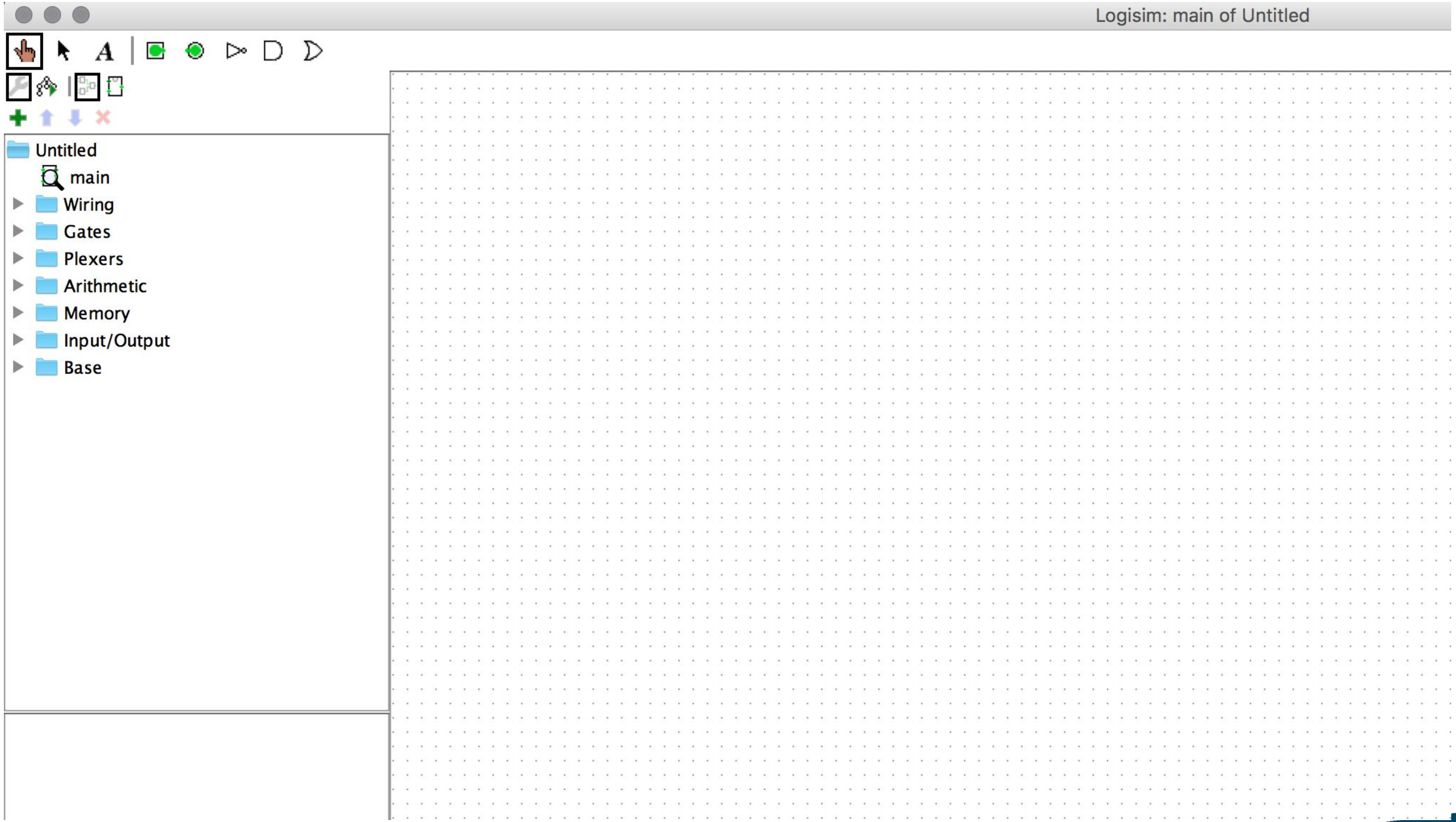
Gates and Wires

- Introduction to CA from Boolean Theory (ex. 1, 2, 4)
- Introduction to Logisim (ex. 3, 4, 5)

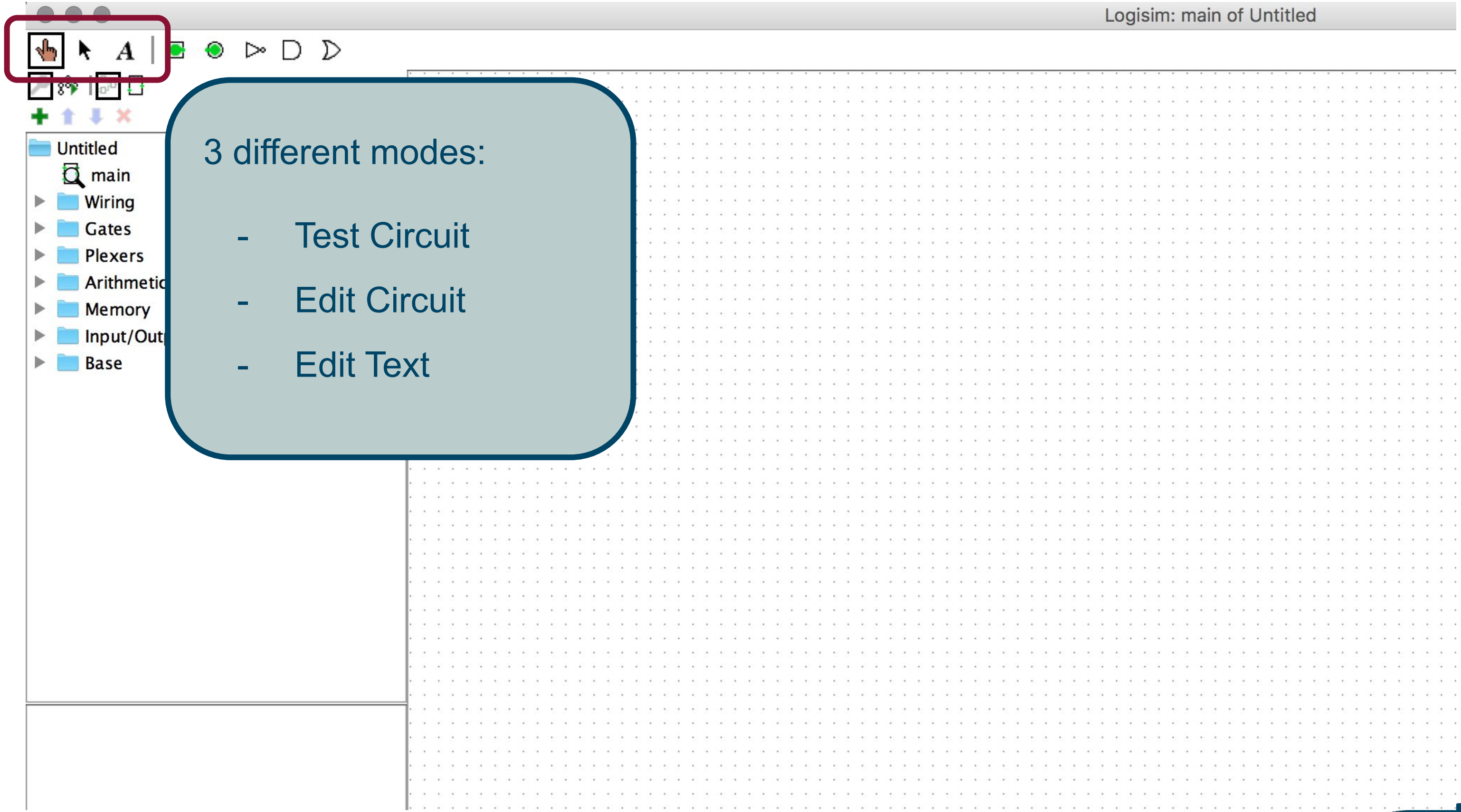
Logisim



Logisim: main of Untitled

Untitled
- main
- Wiring
- Gates
- Plexers
- Arithmetic
- Memory
- Input/Output
- Base

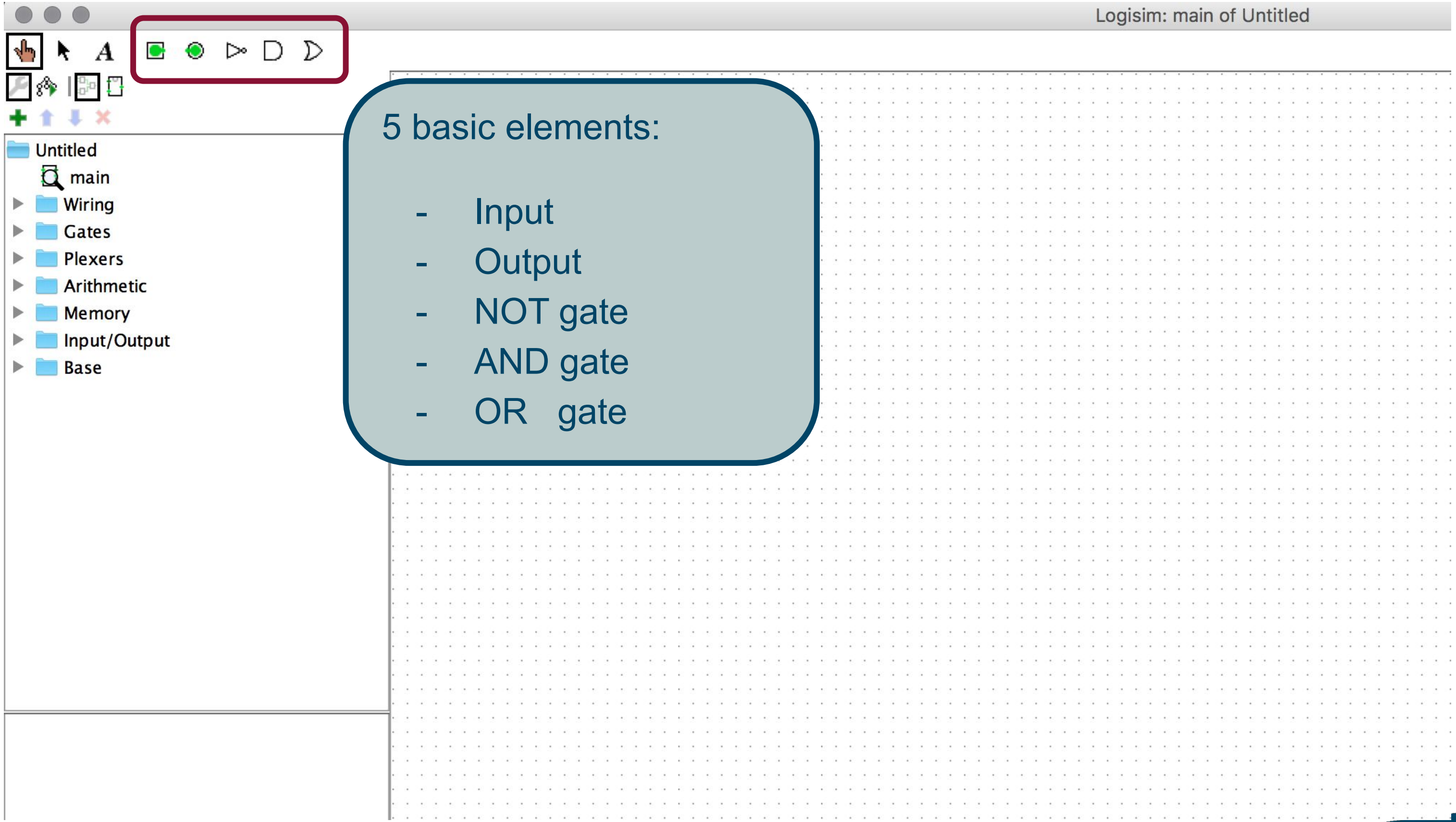
Logisim



3 different modes:

- Test Circuit
- Edit Circuit
- Edit Text

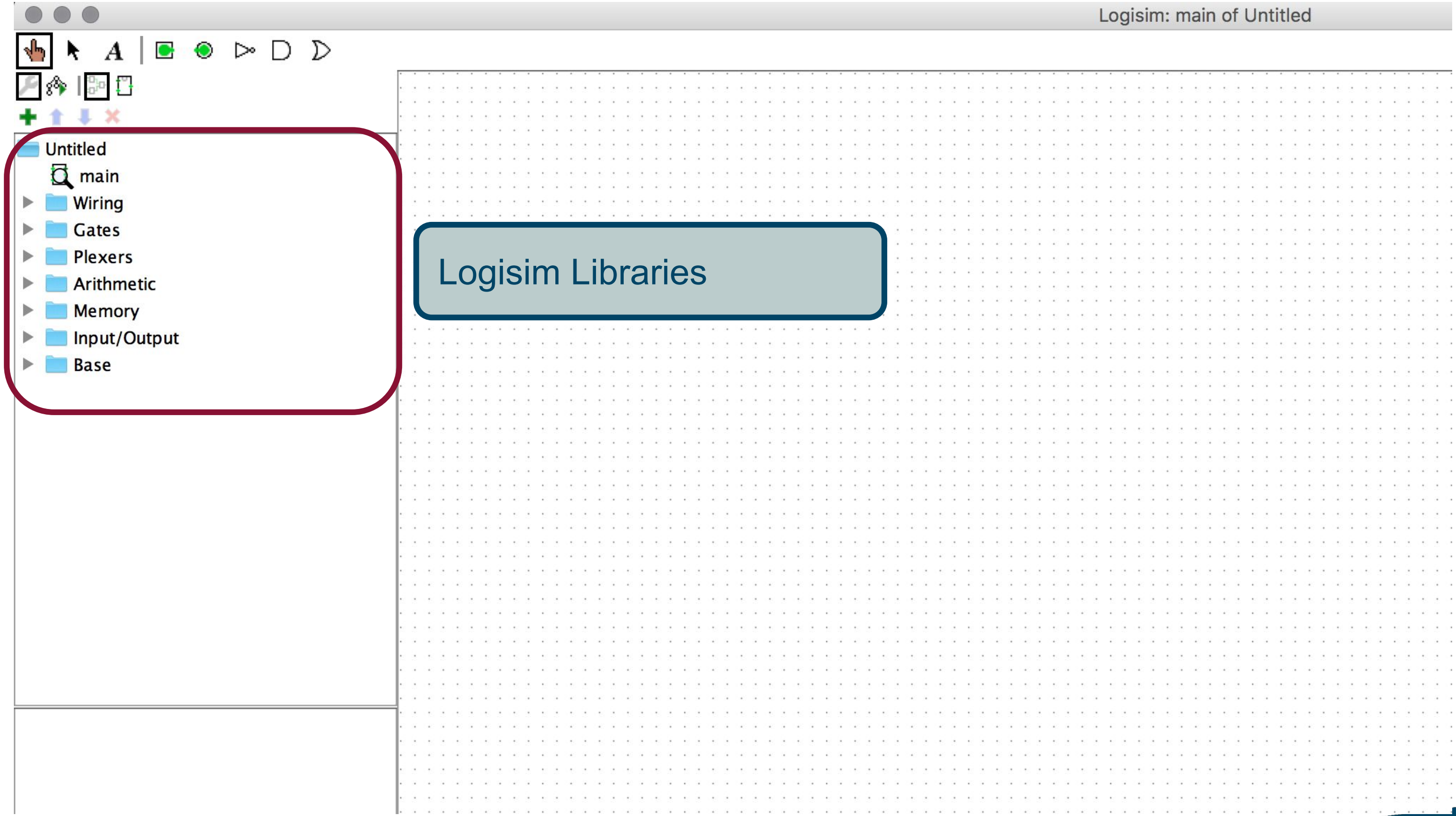
Logisim



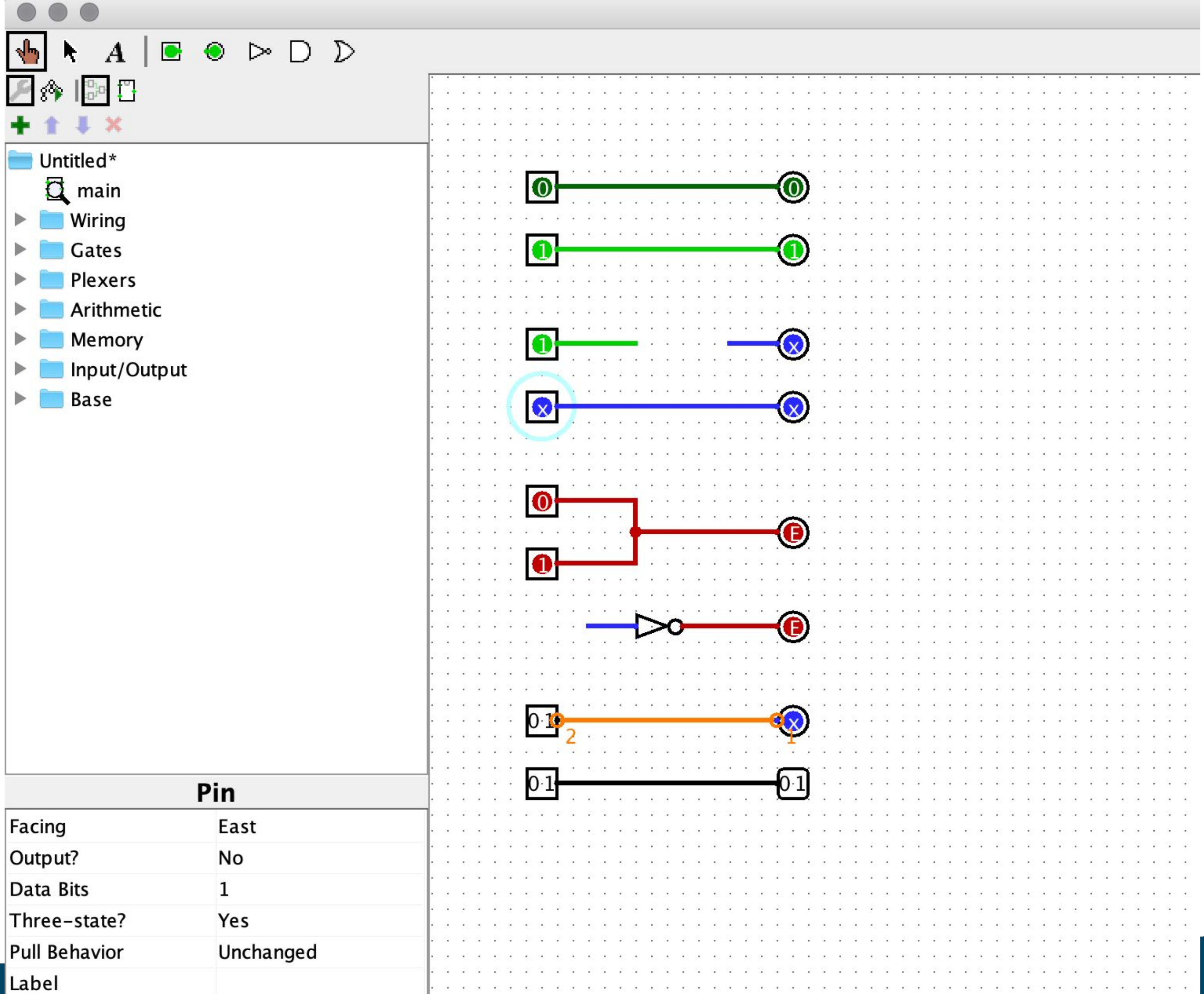
5 basic elements:

- Input
- Output
- NOT gate
- AND gate
- OR gate

Logisim

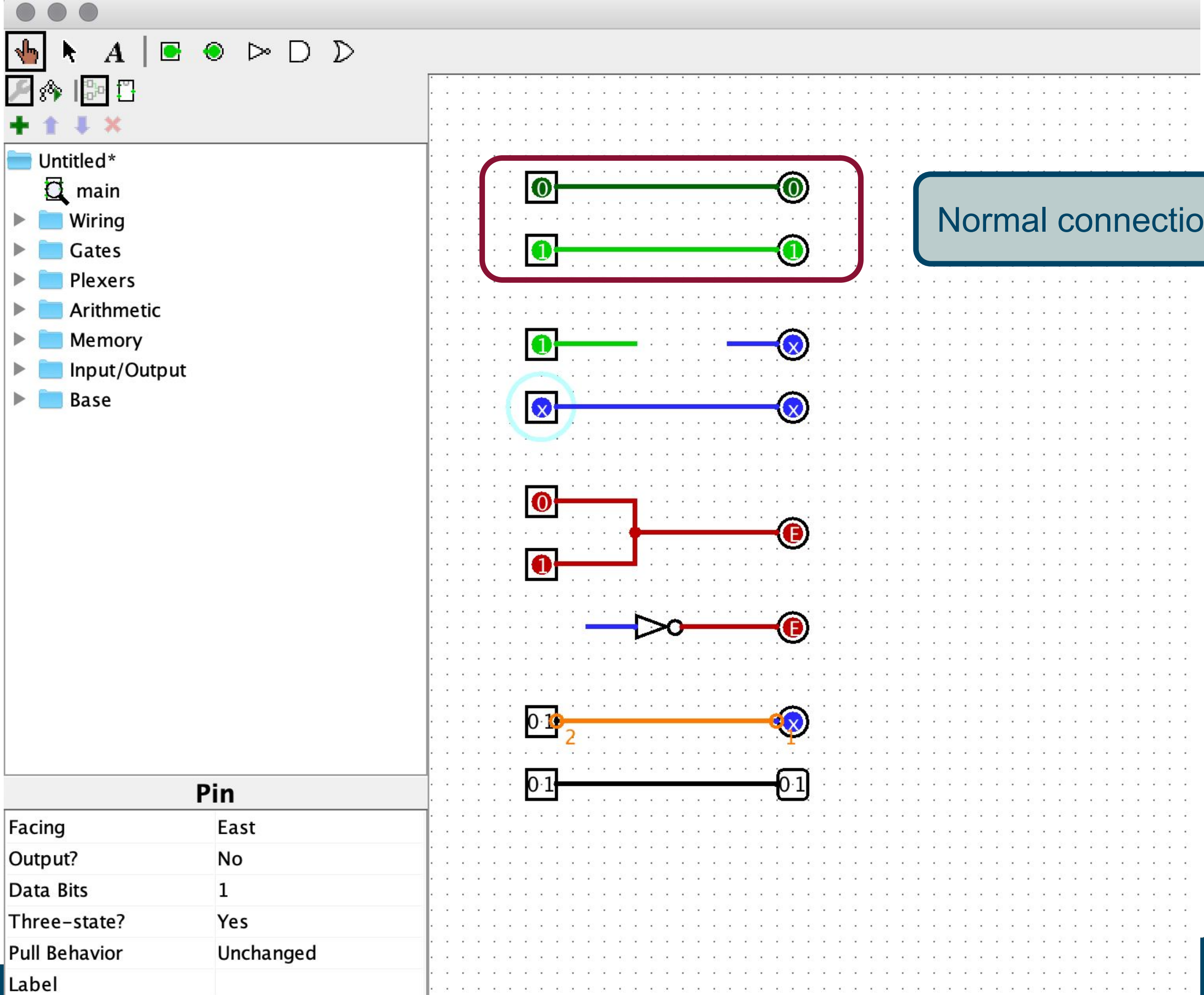


Logisim Libraries



Pin

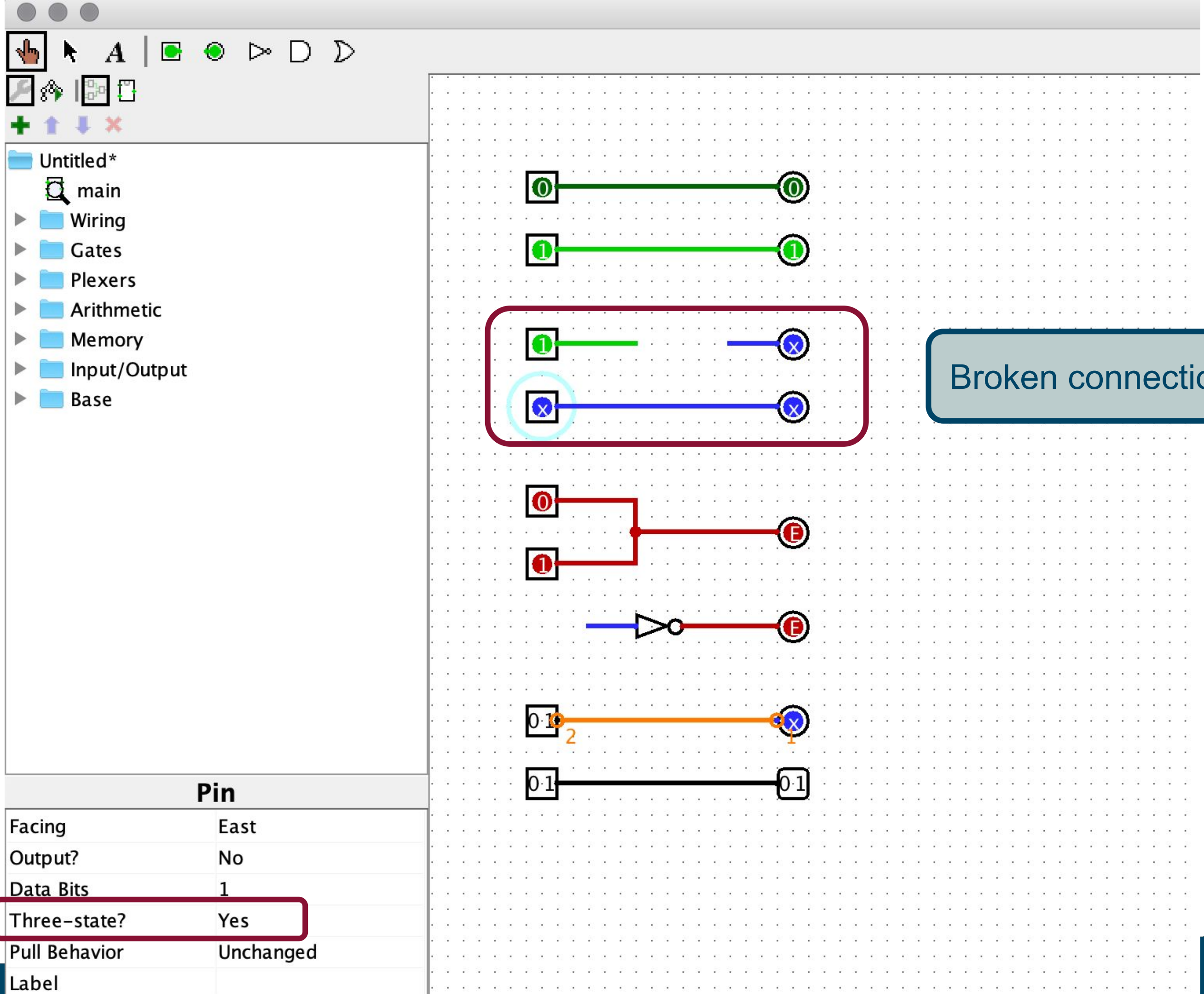
Facing	East
Output?	No
Data Bits	1
Three-state?	Yes
Pull Behavior	Unchanged
Label	



Pin

Facing	East
Output?	No
Data Bits	1
Three-state?	Yes
Pull Behavior	Unchanged
Label	

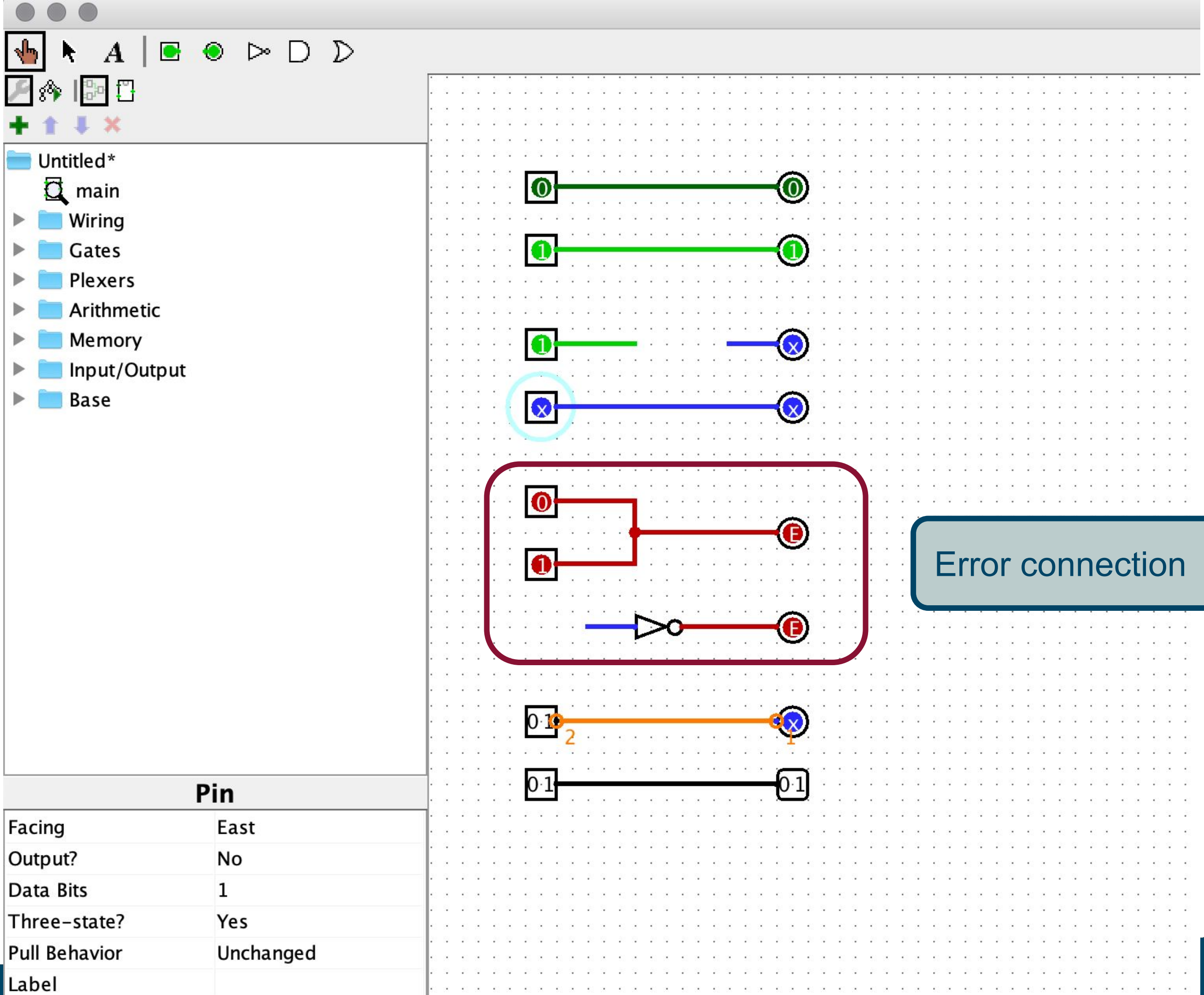
Normal connection: 0 or 1



Pin

Facing	East
Output?	No
Data Bits	1
Three-state?	Yes
Pull Behavior	Unchanged
Label	

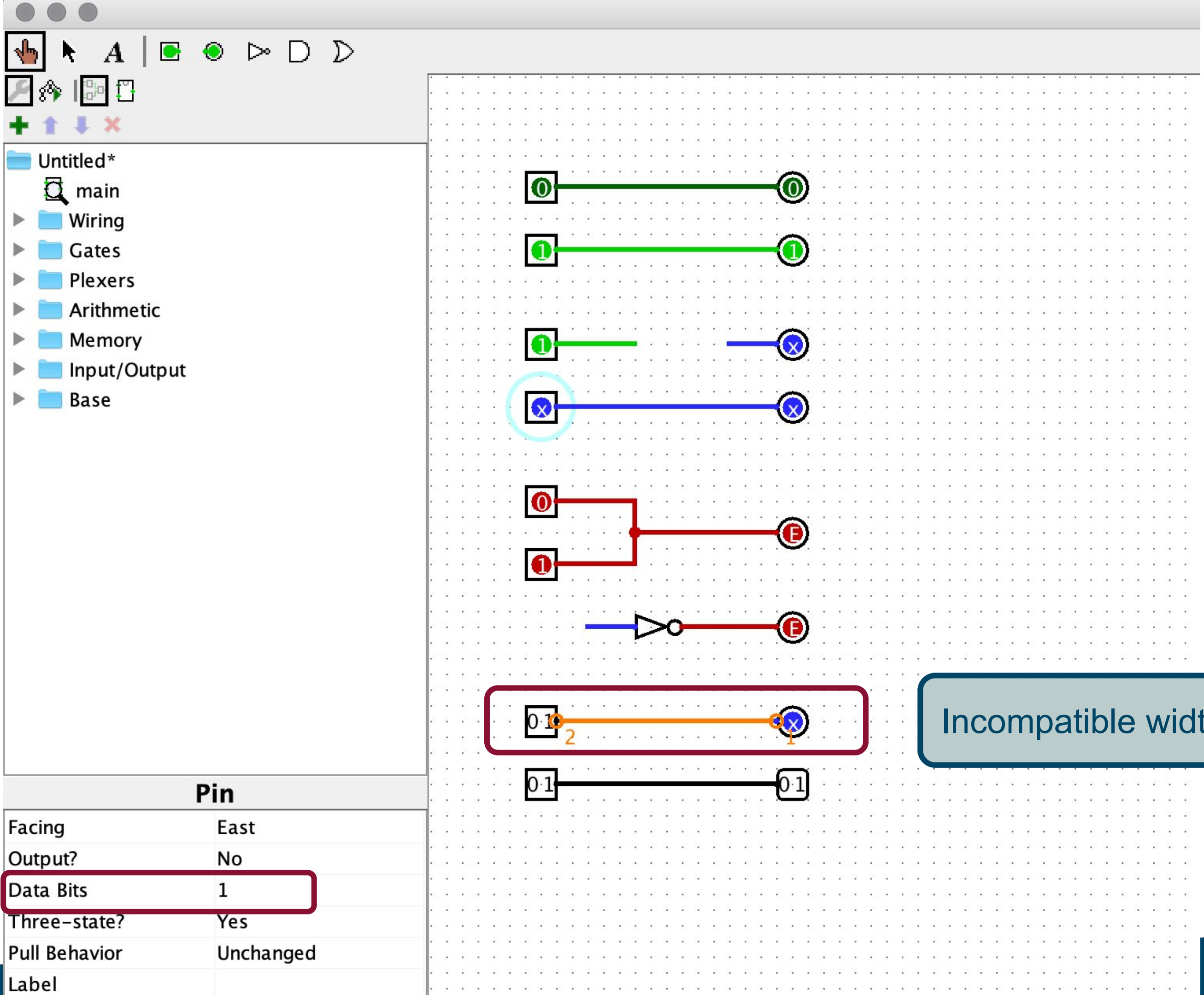
Broken connection



Pin

Facing	East
Output?	No
Data Bits	1
Three-state?	Yes
Pull Behavior	Unchanged
Label	

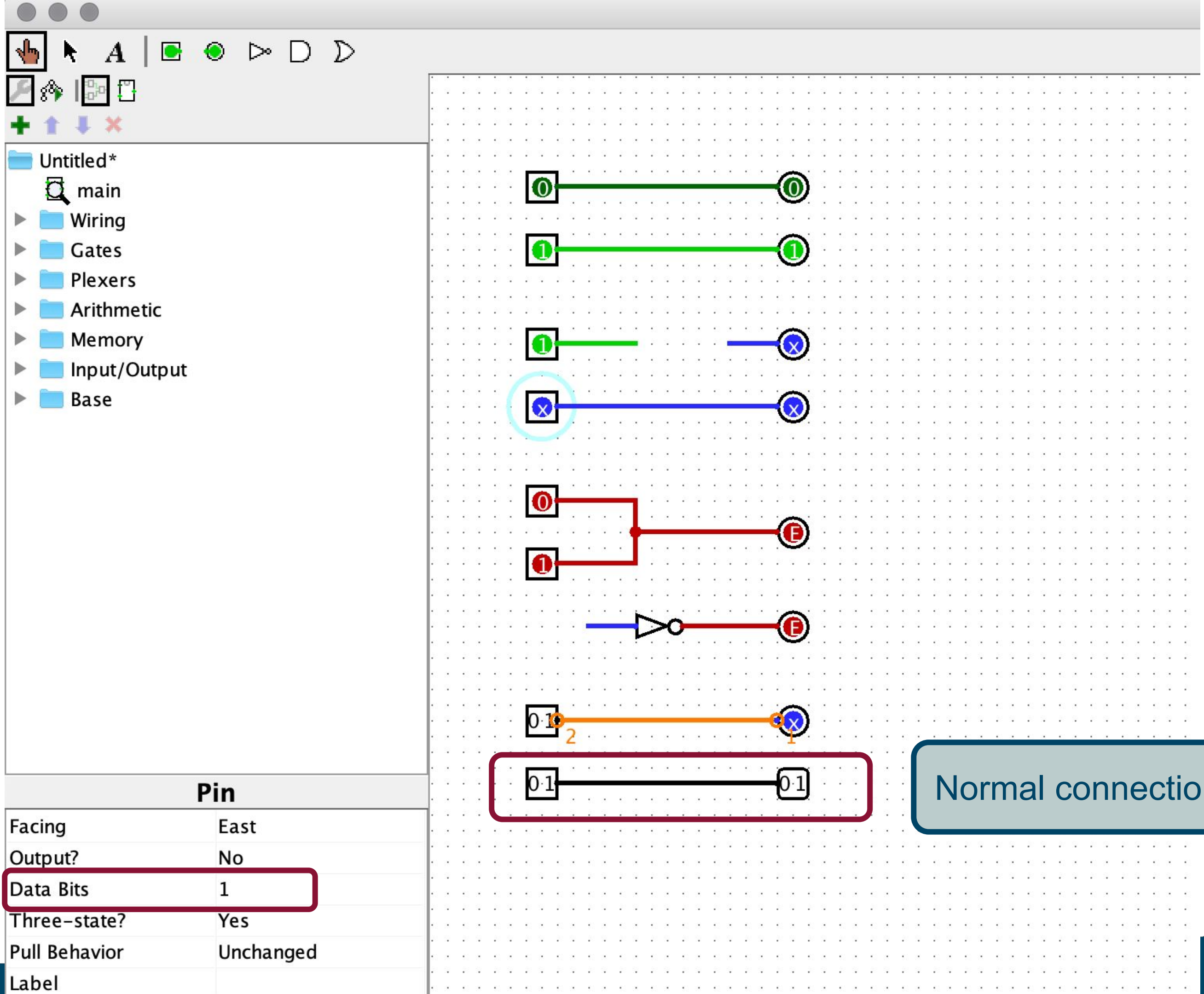
Error connection



Pin

Facing	East
Output?	No
Data Bits	1
Three-state?	Yes
Pull Behavior	Unchanged
Label	

Incompatible width

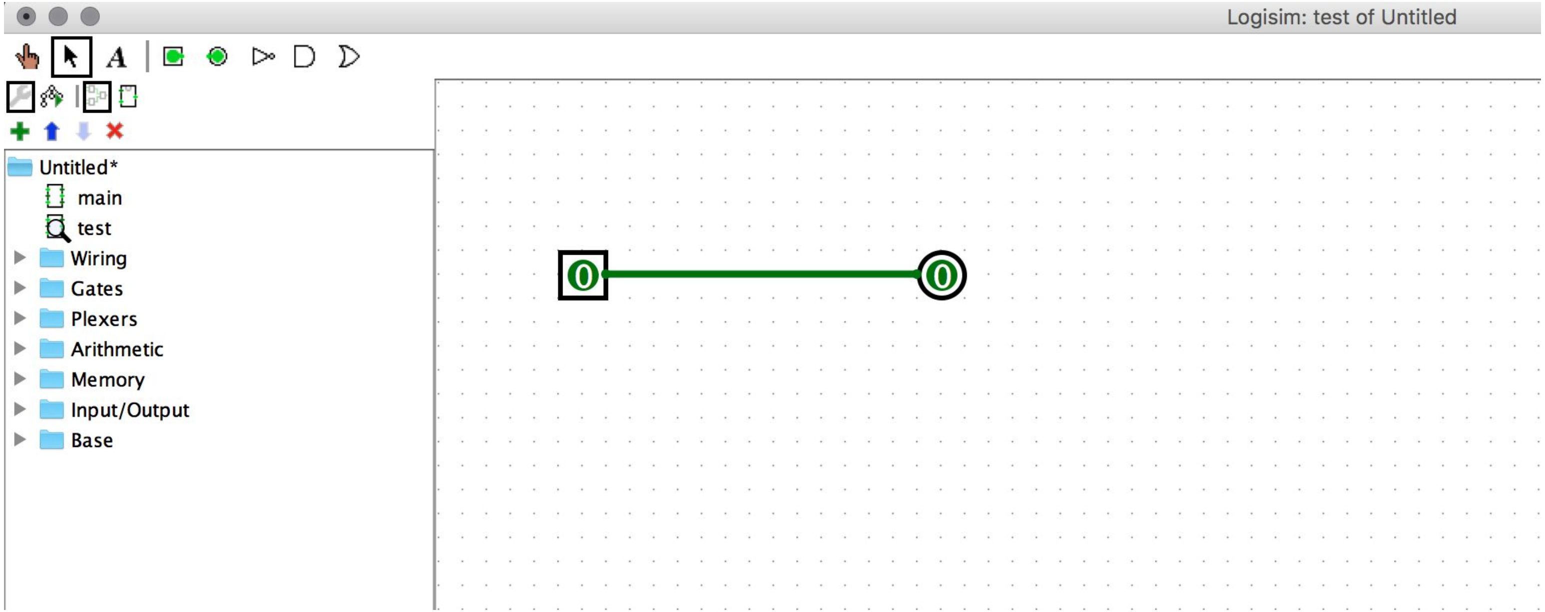


Pin

Facing	East
Output?	No
Data Bits	1
Three-state?	Yes
Pull Behavior	Unchanged
Label	

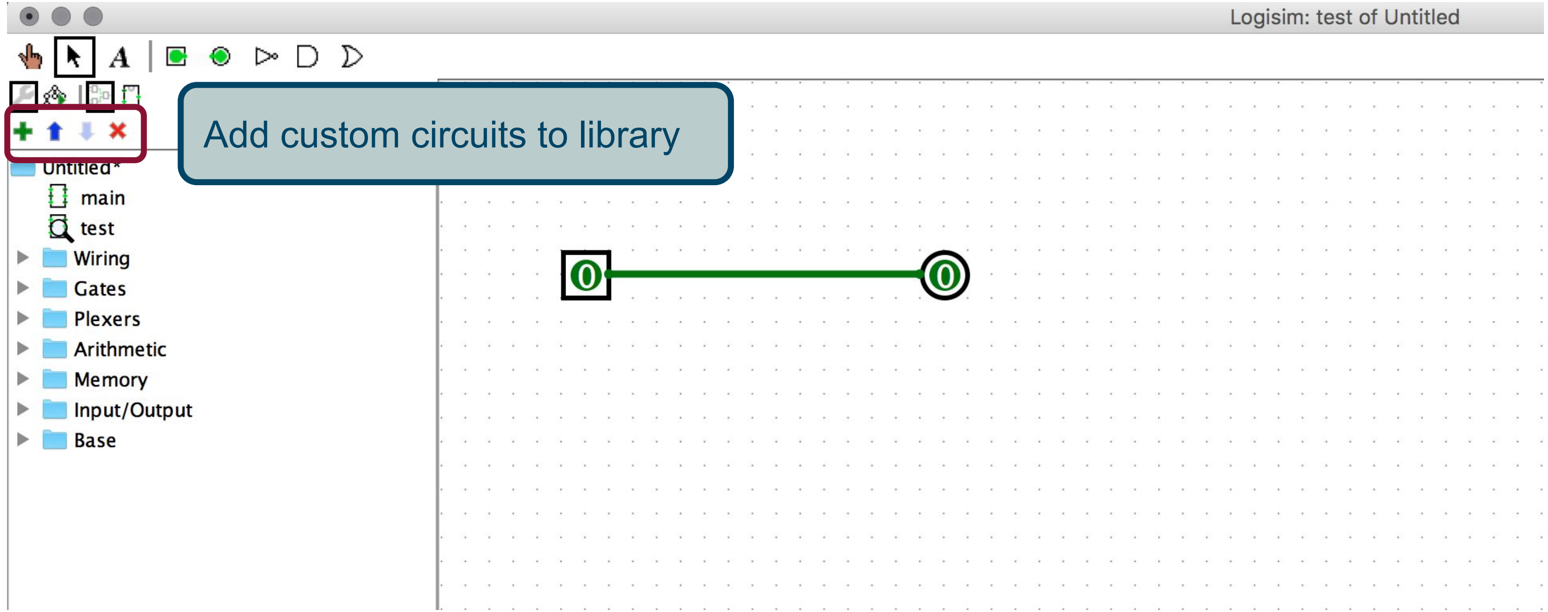
Normal connection: 2 bit

Logisim



Logisim: test of Untitled
Untitled*
main
test
Wiring
Gates
Plexers
Arithmetic
Memory
Input/Output
Base
0
0

Logisim



Logisim: test of Untitled

Untitled*

- main
- test
- Wiring
- Gates
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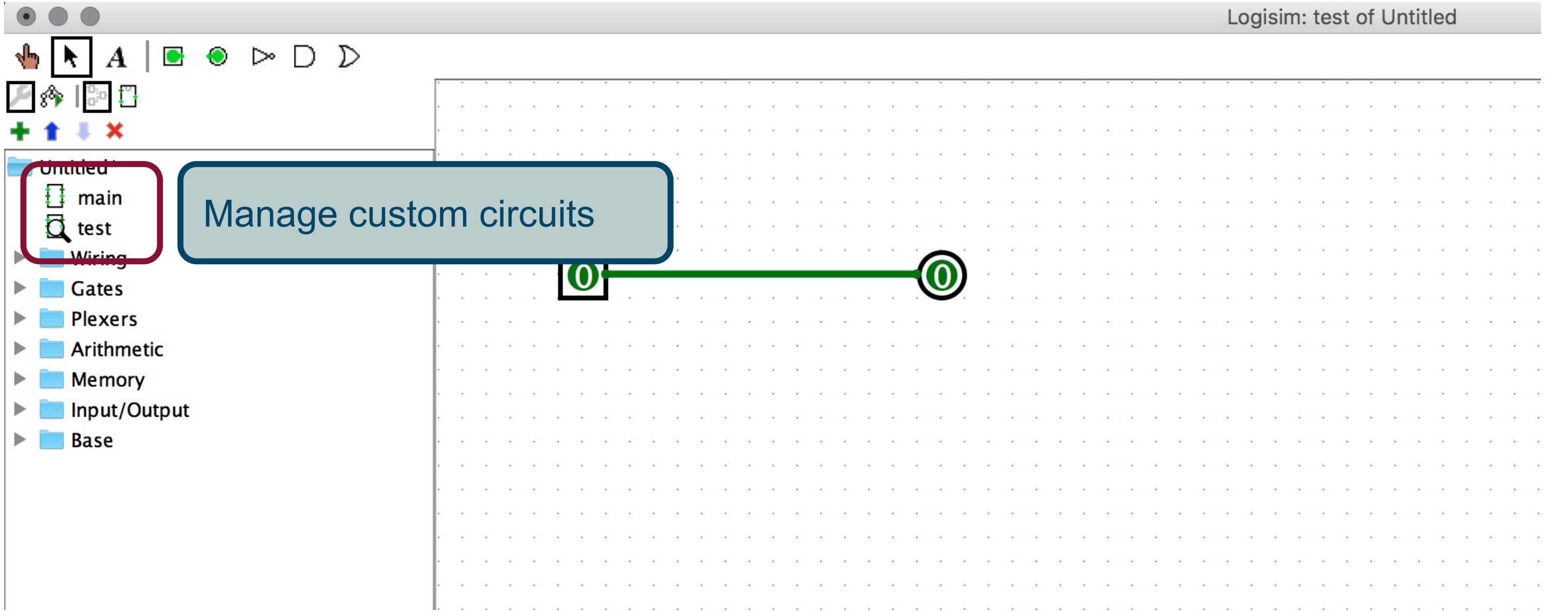
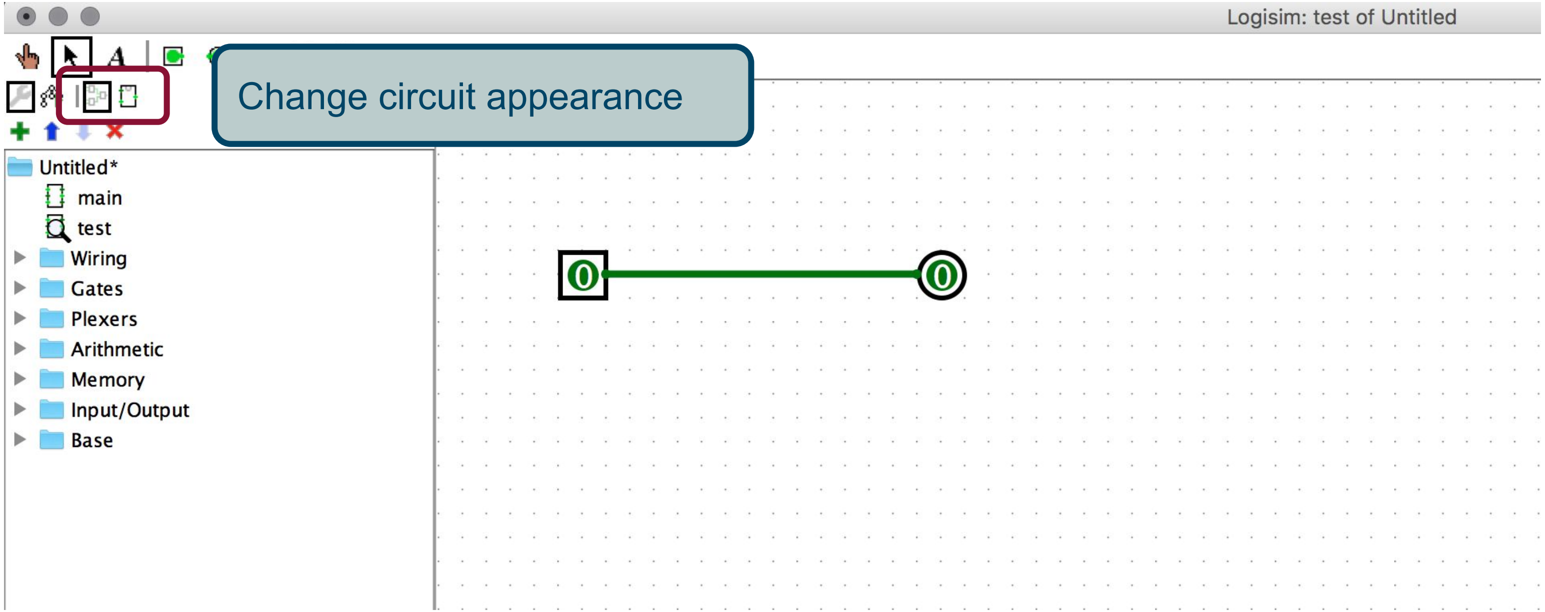
Add custom circuits to library

Logisim



Manage custom circuits

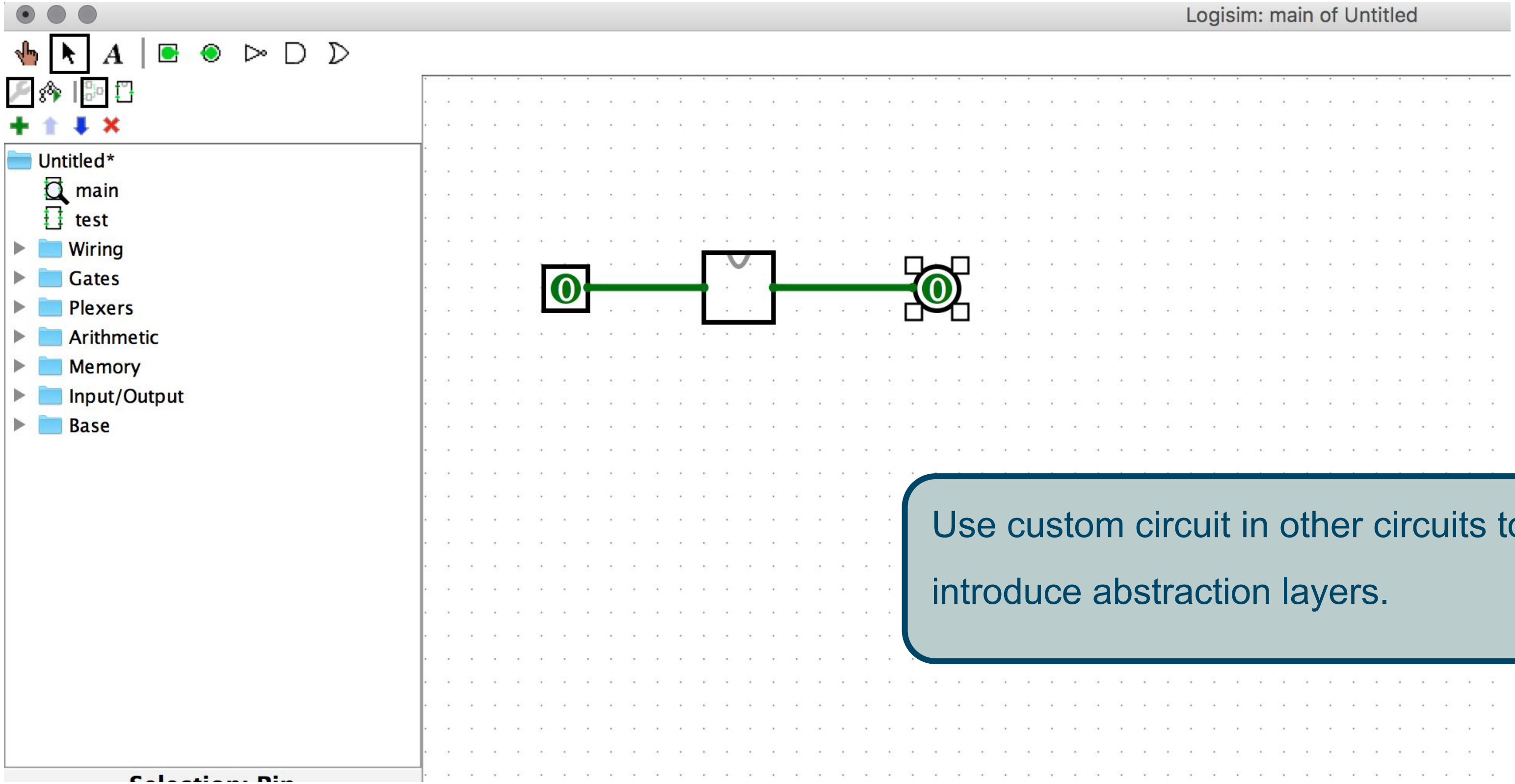
Logisim



Logisim: test of Untitled

Change circuit appearance

Logisim



Use custom circuit in other circuits to introduce abstraction layers.

Computer Systems and Architecture

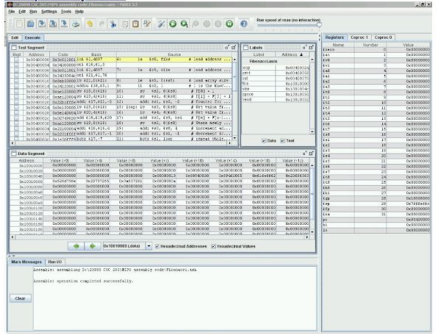
On this page you will find information about the course "Computersystemen en -architectuur" (1001WETCAR) for the first semester of the 2018-2019 academic year at the University of Antwerp.

This page is under construction! You will still find some of last year's material (such as assignments).

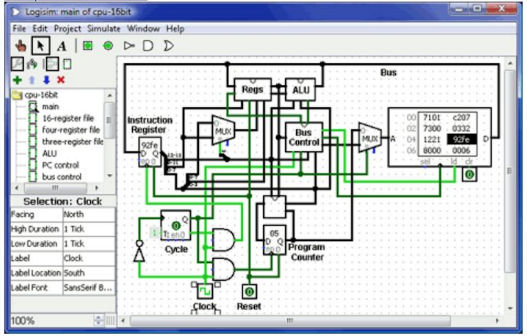
This page is written in English for the benefit of foreign Erasmus students. Note that the course is taught in Dutch however!

This course consists of two interwoven parts:

Computer Systems



Computer Architecture



Selection: Clock

Facing	North
High Duration	1 Tick
Low Duration	1 Tick
Label	Clock
Label Location	South
Label Font	SansSerif B...

For which parts of the book correspond to the lectures, have a look at the overview of what to study for the exam.

Exams

First Session

Your total score for this course is calculated as follows:

- During the semester: permanent evaluation counts for 55% of the course grade.
  - Permanent evaluation: Assignments Computer Systems
  - Permanent evaluation: Projects Computer Architecture

  Assignments and Projects are handed in via Blackboard. Projects are evaluated during an oral defense.
- Examination period: the Theory exam counts for 25% of the course grade.
  The course material covered by the theory exam is described in this overview of what to study for the exam.
- Examination period: the practical exam together with its oral defense counts for 20% of the course grade.
  - Examination period: Practical exam (in computer lab: preparation of the design of a datapath as well as translating a high-level program to that architecture)
  - Examination period: Defense of practical exam with questions to test Computer Systems background
- To pass the course, you need to attend or submit *every part* that will be graded (if not, your grade will be "AFW" - absent). Additionally, you need to get an overall score of at least 50%, *and* a score of at least 40% on the theory exam, *and* a score of at least 40% on the practical exam, *and* a score of at least 40% on the year projects (architecture and systems combined). If not, your grade will be `min(7, your_score)`. `your_score` is the score you would get when applying the weights given above.

Second Session

- The weights of the different parts of the course remain the same as during the January session:
  - 25% theory-exam
  - 20% practical-exam