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Computer Architecture

Lab 1 – Performance measurement

Computer Architecture course

Lab Experiments

Expectations

Introduction SIM-PL

Kickstart Lab 1

Lab Experiments

Expectations

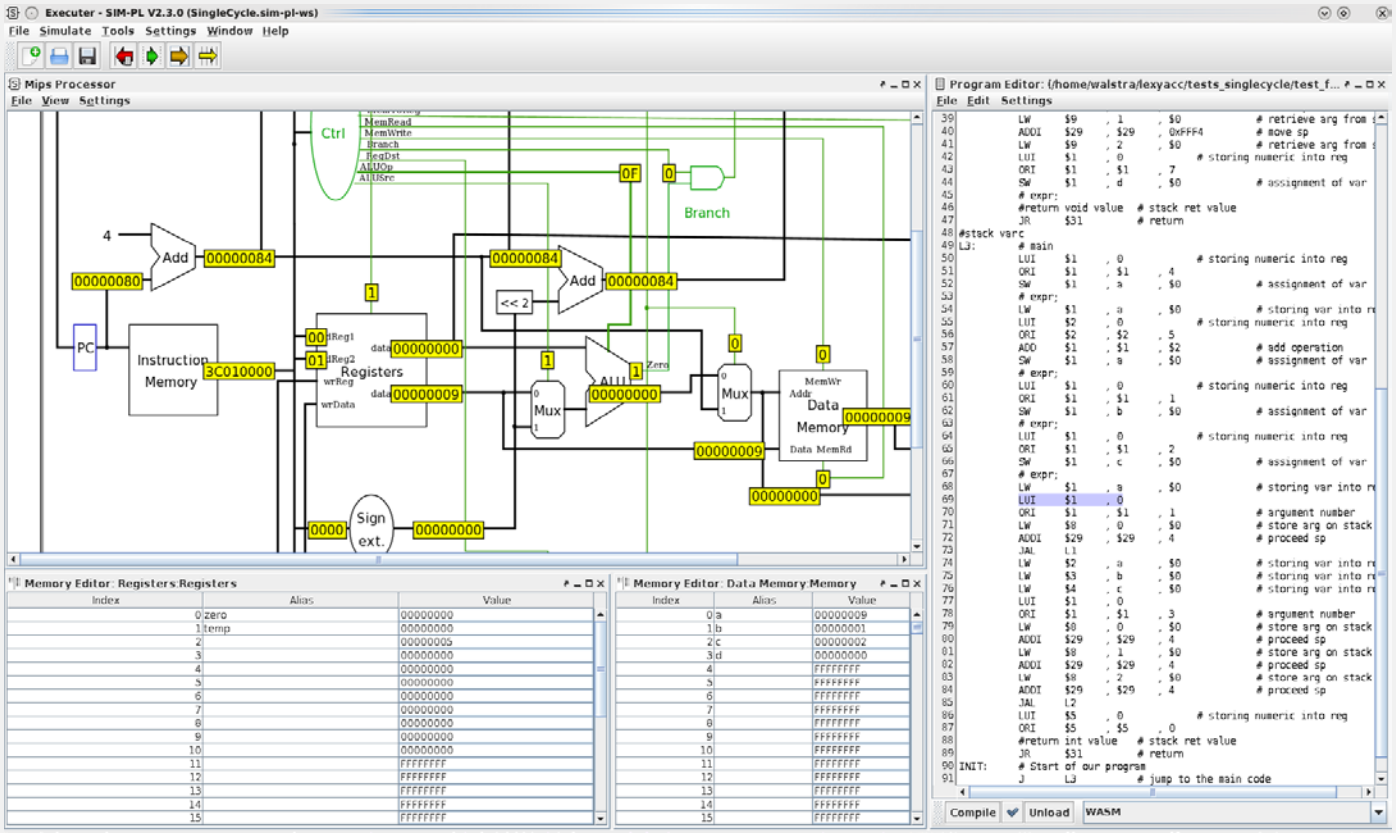
- Labs are compulsory.
- Lab descriptions and quizzes are on Canvas.
- Lab-notes are handed in via Canvas before each deadline.

- Dedication, curious, critical and active.
- Respect your fellow students.
- No loud talking, music or gaming!
- Tidiness and don’t leave without cleaning up your mess!

Introduction SIM-PL
Logic simulator

SIM-PL

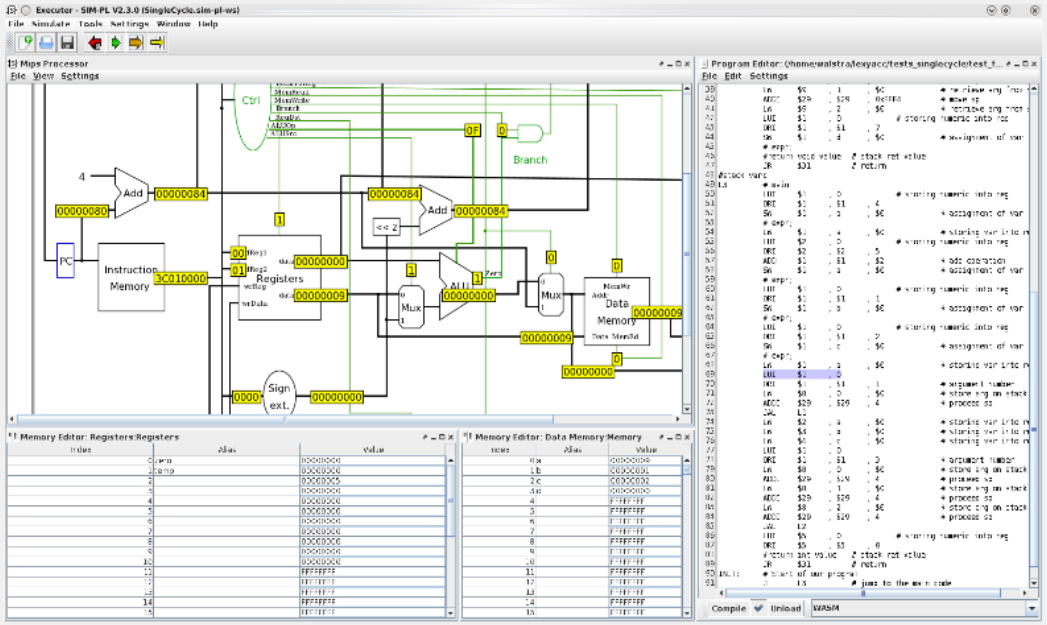
build and simulate computer architectures



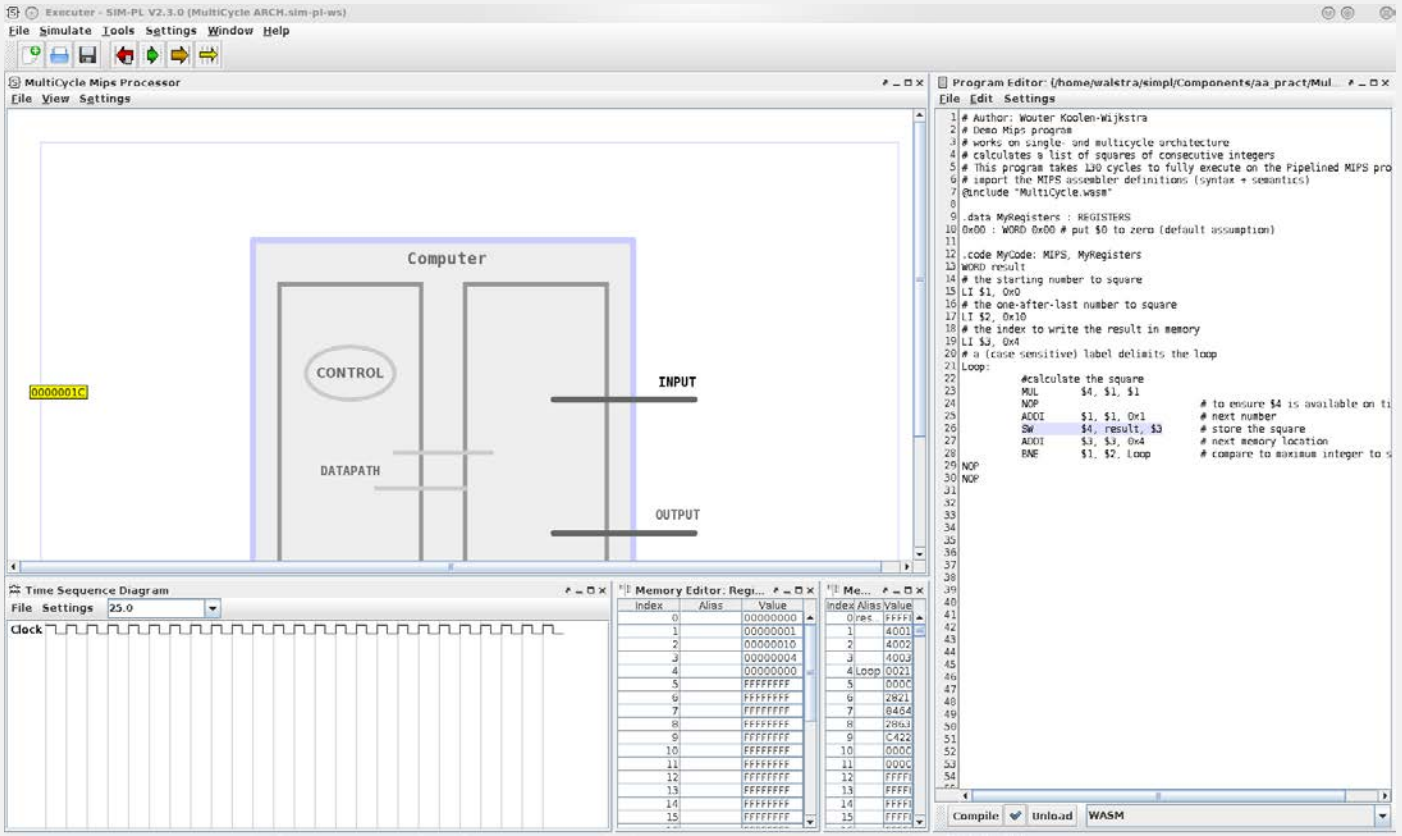
SIM-PL
building and simulate computer architectures

- **Editor** application for building (complex) components and architectures.
- **Executer** application for simulating architectures

- Developed in Java



SIM-PL - Executer



SIM-PL - Executer

Executer is started at the command prompt

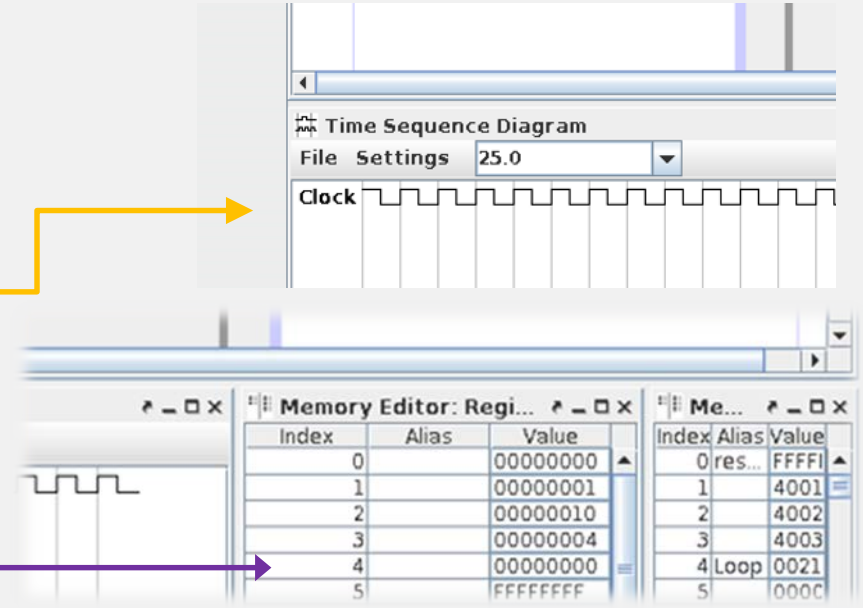
java –jar Executer.jar

Architectures are loaded in the **Component view**.

Programs are loaded in the **Program editor**.

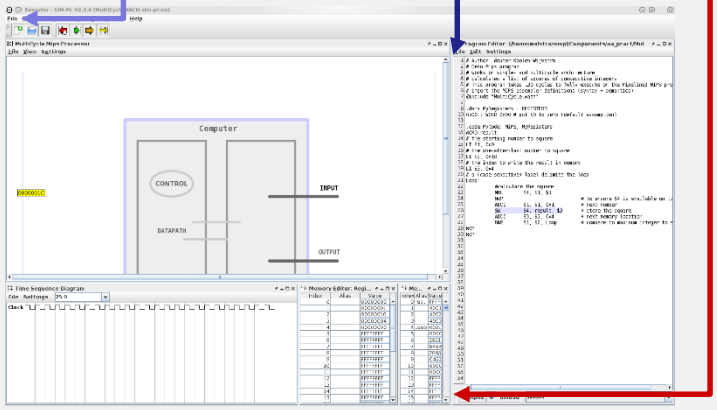
Simulation results are shown in the

- Time sequence diagram
- Memory editor
- Register editor



SIM-PL – Executer Running Simulations

- Designs are loaded in the “Component view”.
  - File -> open or new
- Programs are loaded in the “Program editor”.
  - File -> open
  - Compile
- Compiled code transferred to the design
  - Press the Red arrow button
- Simulation starts by pressing the
  - Green or Yellow or Orange button.



Downloads available

Manual

SIM-PL 2.3.2

Additional components

@Canvas

Lab 1

Performance of Computer Architectures

Lab 1 experiment - Performance

- Goal

  To understand how performance is measured.

- How

  By doing experiments in SIM-PL the logic simulator.
  Researching by running three small programs on three architectures

- Tools

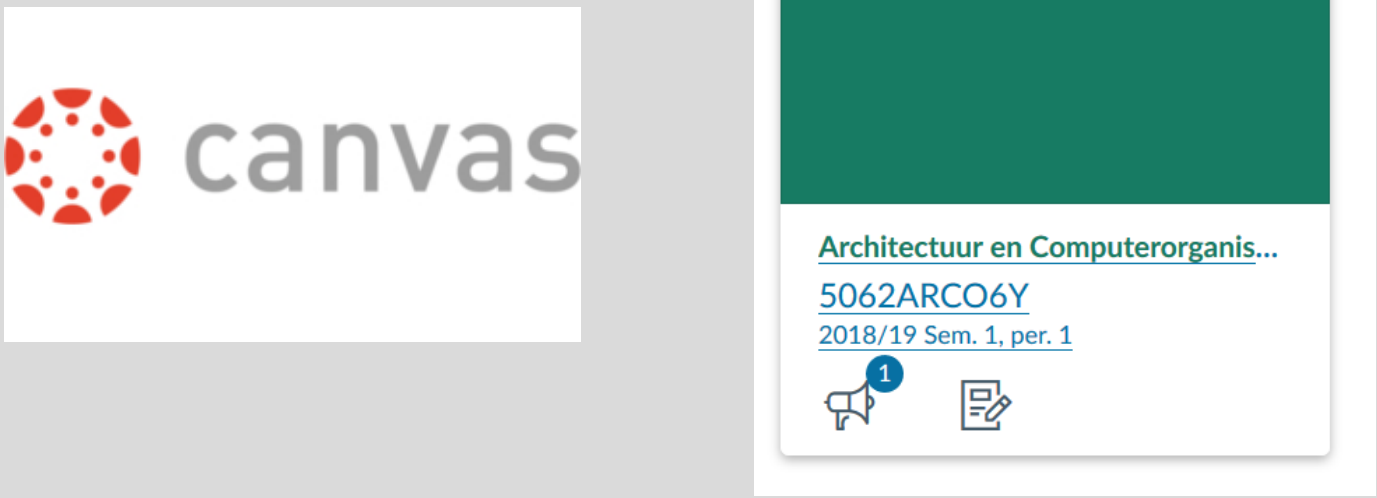
  SIM-PL (Logic simulator)

- Results

  The results of the experiments are used to answer the questions in the Canvas quiz.

Kick-start Lab 1

Description and Quiz



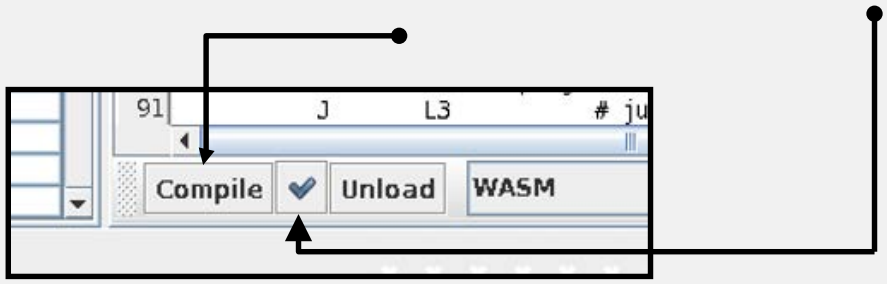
Lab 1 – Experiment 1

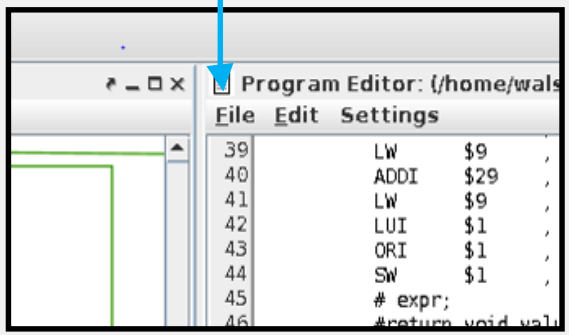
- Goal
  - Calculating the **CPI** of a computer architecture.

- How ?
  - Load an architecture in SIM-PL.
  - Execute a program.
  - Count the clock cycles and instructions until the program ends.
  - Determine the CPI (#clocks / #instructions).

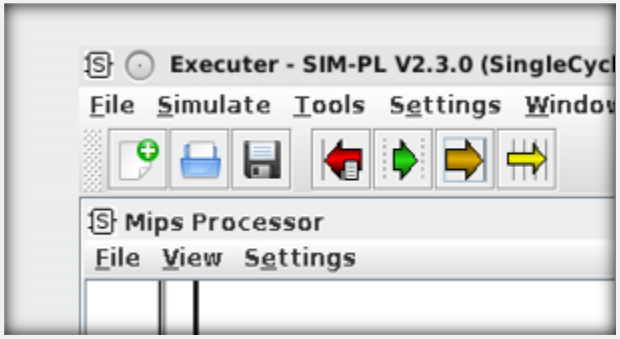
Lab 1 – Loading an architecture

- Start the SIM-PL executer.
  - java –jar executer.jar (Linux case sensitive)
- Load the **SingleCycle** architecture worksheet.
  - File->Open -> SingleCycle-architecture.sim-pl-ws
- Let's start with an addition of two numbers.
- Load the assembly program **addition.wasm** in the Program Editor.
  - File->Open -> addition.wasm
- Press the button "Compile" and wait for the checkmark





Lab 1 – Running the source code



- Load the compiled source code
  - Press the “Red arrow” button
  - First instruction is highlighted
- Execute the first instruction
  - Press the “Orange arrow” button
  - Clock cycle appears in Timing window
- Continue until all instructions are executed
  - No more highlighted instructions is end of program.
  - Don’t forget to count !

- Write down the results in your lab-notes.
- Continue with the other programs and architectures.
- And complete this answer answer the Canvas quiz.

End of kick start session

Are there any questions ?

See you next time

Success !