Assembling and Running Programs with Sigma16

Software Tools

Assembly language program

The Assembler

Assembler listing

... language program

Dump and trace

The Emulator

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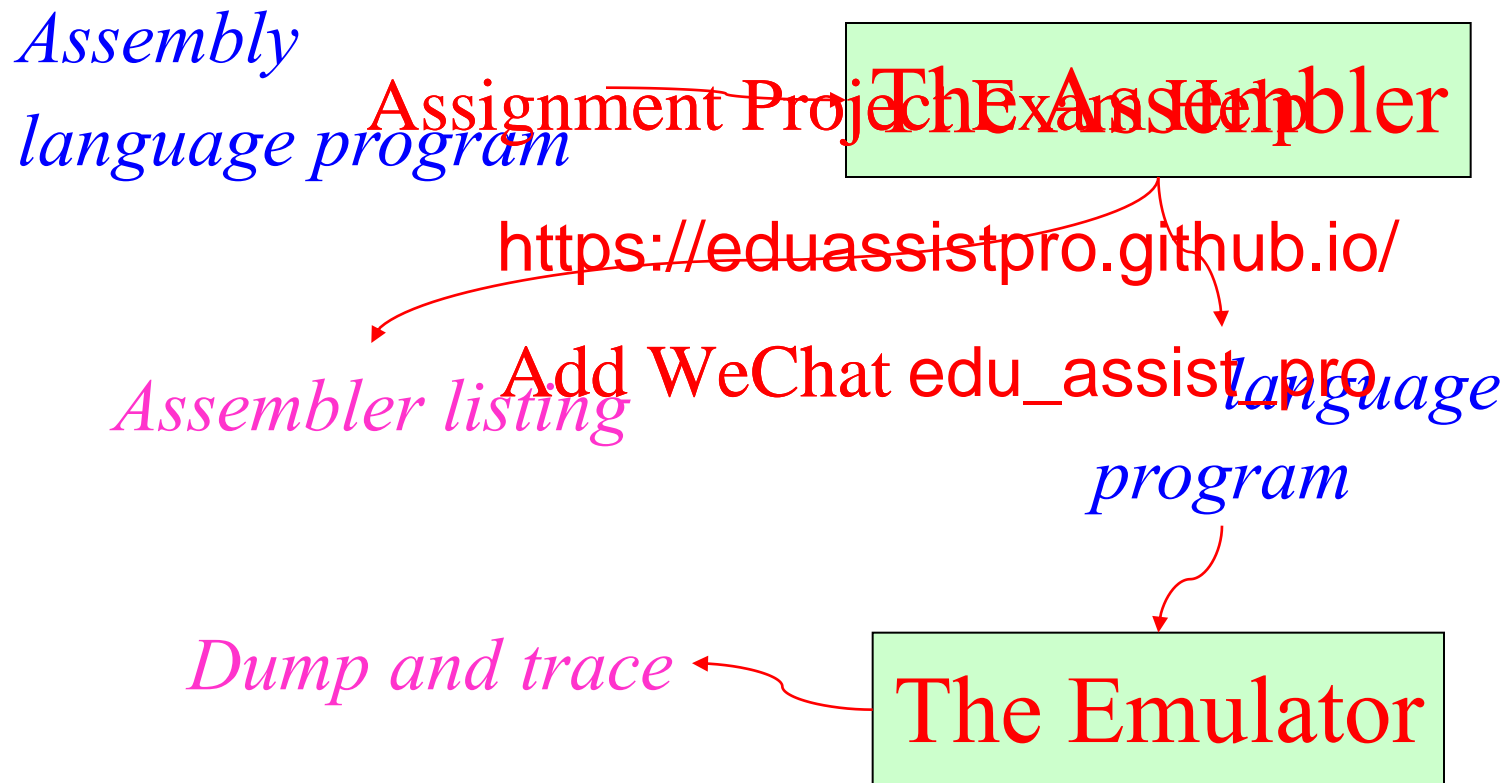
Welcome Screen

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The Editor

- Open the file add.asm.txt in the Examples folder:

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Editing the program

- You can use an external editor (e.g. WordPad), save the document after making changes, and open it.
  - You must save as plain text
  - Do not try to save inside the Sigma16 folder itself
- Alternatively, yo   ditor pane of Sigma16.
- The examples don't need any editin
- Whatever editor you use, save your   time to time!
- Now the program needs to be assembled
- Go to the Assembler page, and click Assemble

Assembly Listing

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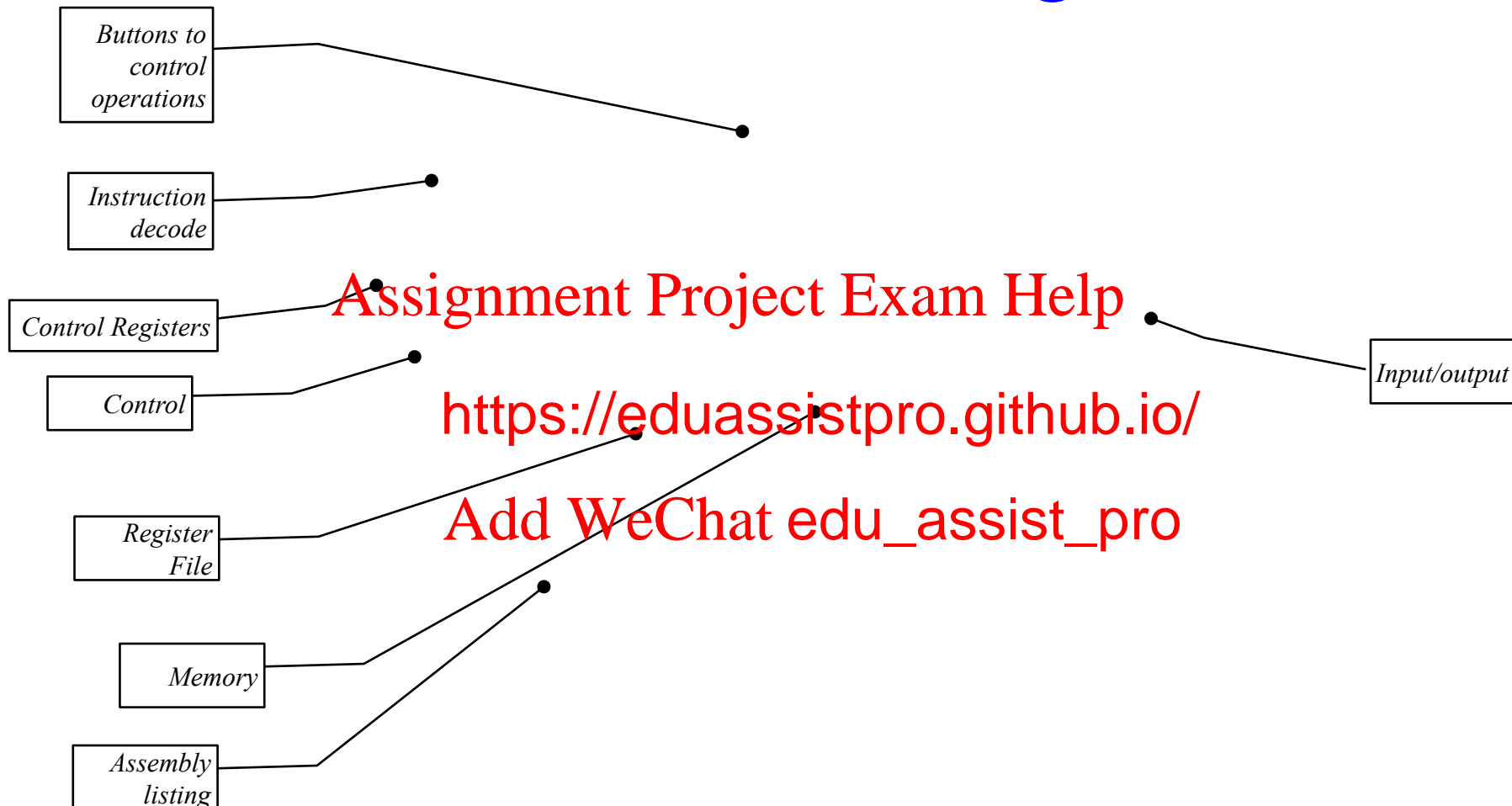
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Linker

- The linker page shows your object code

- This is essentially what gets saved on disk as the result of compiling a program; it is raw machine language

- Actually, the linker d major work: it combin separately compiled modules into an executable

- But we are working with single-module programs, so you don't have to worry about the linker

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The Processor Page

Buttons to control operations

Instruction decode

Control Registers

Control

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Input/output

Register File

Memory

Assembly listing

Loading (click "Load")

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Click Step button

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Click Step again

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And again...

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Yet again...

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One last instruction to do...

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Look at the Trace page

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Letting the machine run

- To re-run a program,

  – Go to Processor page

  – Click Load (this reloads the executable program into memory)

- To run auto   button

- Adjust the execution spee   speed slider

- To stop execution, click Stop; resume with Step or Run

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Trace of Machine Instructions

The emulator provides a readable trace showing each instruction that it executes. It can also catc   rs.

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This is a big advantage o   emulator!

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Computer hardware doesn't do this. The emulator trace shows you what the hardware does.

Coping With Errors

There are two ways you can go wrong:

- If there is a syntax error in the program, the Assembler will indicate an error and the program

- If the program is well-   e system will launch it. But it's still   at the program contains a bug—this means that blindly doing what the instructions say to do produces chaos.

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Assembly language syntax

- Look at the examples to see what correct statements & instructions look like

- For operations, load LOAD Load are all ok

- For names VAR are considered distinctive)

- ; indicates that the rest of the line is a comment

Using comments

- Give a preliminary comment identifying the program
- Give the algorithm as pseudocode, or Java etc.
- Use blank lines to group instructions into blocks
- Use full-line comments to say what a block of code does
- Use detailed comments on every instruction