

Informática Industrial



Tools introduction and installation

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Mestrado Integrado em Engenharia e Gestão Industrial

2 Lazarus IDE

Codesys

Factory IO

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The automation pyramid according to the ISA 95 model:



A little the shop floor...



RC1, RC2, P&P
AWI, SA, CO, AWO
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Transformation Cells:

- RC1 production of "bases" from "raw" materials;
- RC2 production of "lids" from "raw" materials;
- P&P generation of complex parts by aggregating a "base" plus a "lid' product;

Products can have different colors (e.g., green, blue and gray) that represent distinct part's material.



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Tools that will be approached at INFI.



The project will include:



Lazarus IDE

Lazarus IDE

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Lazarus strives for write once compile anywhere.

Lazarus is a free and open source development tool. A cross-platform IDE for **Free Pascal** programming language.

What it means?

- Runs on Linux, macOS and Windows.
- Uses the Free Pascal Compiler.
- The GUI is being developed to be totally and completely API independent.

The code for Free Pascal Compiler (FPC) is licensed under the GPL_{Mestrado} Integrado em Engenharia e Gestão Industrial

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Helpful links: Lazarus IDE https://www.lazarus-ide.org Free Pascal Wiki https://wiki.freepascal.org Free Pascal Instalation Guide https://www.freepascal.org/ docs-html/user/usersu3.html Free Pascal Language Reference Manual ftp: //ftp.freepascal.org/pub/fpc/docs-pdf/ref.pdf

A video for installing Lazarus & FPC on: Windows https://youtu.be/MlJORg41NIY macOS https://youtu.be/QE_IAjkXElg

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Select "File-New" and then "Project/Application".

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Open the File menu and click Save All.

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The Lazarus files:

- .lpr is the project file;
- .pas is the unit that contains the code for the form, and is usually the file that the application programmer needs to edit or inspect.
- There are many more files:
 - .exe is main program binary executable (Windows OS);
 - .lpi is the main information file of a Lazarus project (a XML format);
 - .lpr is the main program source file or master file;

.lfm is a human readable form to store the layout of the form unit; .ppu is the compiled unit (linked into the executable file together with any other units named in the Uses section).

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The GUI of Lazarus is formed by several windows will appear on the desktop:

- Editor Windows/Component Palette on the top;
- Object Inspector on the left;
- Source Editor on the center;
- Form Editor on the right;
- Messages on the bottom.

The "Unit1" is the name of the unit that goes with Form1. The file Unit1.pas contains the source code for Form1, the main form of your application.

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Keyboard shortcuts:

- **Ctrl+F9** will compile the program;
- **F9** will run the program;
- F12 will change between the "Source Editor" and the "Form Editor".
- **Ctrl + Space** will make an auto-completion;
- Ctrl + Alt + UP jumps between a procedure body (begin..end) and the procedure definition (procedure Name).

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Getting Started

Let's install and run the Lazarus IDE ...

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Codesys

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A tool for programming PLC (that has a softPLC). It is compliant to IEC 1131-3 in the programming languages:

- Instruction List (IL)
- Ladder diagram (LD)
- Function block diagram (FBD)
- Sequential function chart (SFC)
- Structured text (ST)

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https://www.codesys.com
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Codesys includes:

a GUI for programming and upload programs to devices, e.g., sofPLC.

a runtime (softPLC) that executes programs.



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Getting Started

Let's install and run the Codesys ...

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Factory IO

Factory IO

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Getting Started

Factory I/O is a 3D factory simulation:

- to validate control programs for PLCs.
- to communicate with several controllers (using drivers).
- to create a virtual factory using a selection of common industrial parts.
- to be used with microcontrollers, SoftPLC, Modbus, among many other technologies.



Getting Started

Let's install and run the FIO ...

https://docs.factoryio.com/installing/

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Questions / Dúvidas ?

Thank you!

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