Guide to Mandatory Homework for System Modeling

Critical Systems Research Group

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Contents

Preface

The goal of this guide is to demonstrate the installation of Yakindu and the usage of the Homework Portal to help solve the homework of the System Modeling course.

1 Installing Yakindu

This section is a guide to install the necessary software environment (sections 1.1. - 1.4.). As an alternative, we provide a virtual machine to simplify the installation process (section 1.5.)

1.1 Installing Java

Yakindu is built on top of Eclipse, an IDE that primarily focuses on Java Developement. As the matter of fact, Yakindu was written in Java to be able to work with Eclipse, so first a Java environment must be installed. The JDK version should be at least 8, and at most 11.

The installation kit of Java Development Kit can be downloaded from the site of AdoptOpenJDK[1]. On Unix based systems the package manager tends to have prebuilt packages to install the JDK, so check it first, if applicable.

> **Attention!** The JDK version to use is not the latest available JDK. It is important to use this older version, as the newer editions are not compatible with the specified Eclipse version.

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[1] `https://adoptopenjdk.net/?variant=openjdk11&jvmVariant=hotspot`

1.2   Installing Eclipse

The 18-12 version of Eclipse can be downloaded from the official site[2]. During installation, select the *Eclipse IDE for Java Developers* option. The installation sequence after that follows the *Next, Next, Finish* scheme, every settings value can be left on default.

> **Attention!** The Eclipse version to use (18-12) is not the latest available Eclipse version. It is important to use this older version, as the newer editions are not compatible with the specified Yakindu version.

Comment. The installer does not always register a link in the Start Menu. If such scenario happens, you should open the installation folder in the file explorer, and open the `eclipse.exe`/`eclipse`/`eclipse.app` executable manually.

1.3   Installing Yakindu itself

To install Yakindu, open up Eclipse first. After opening Eclipse, click on **Help > Install new Software...** option from the menubar.
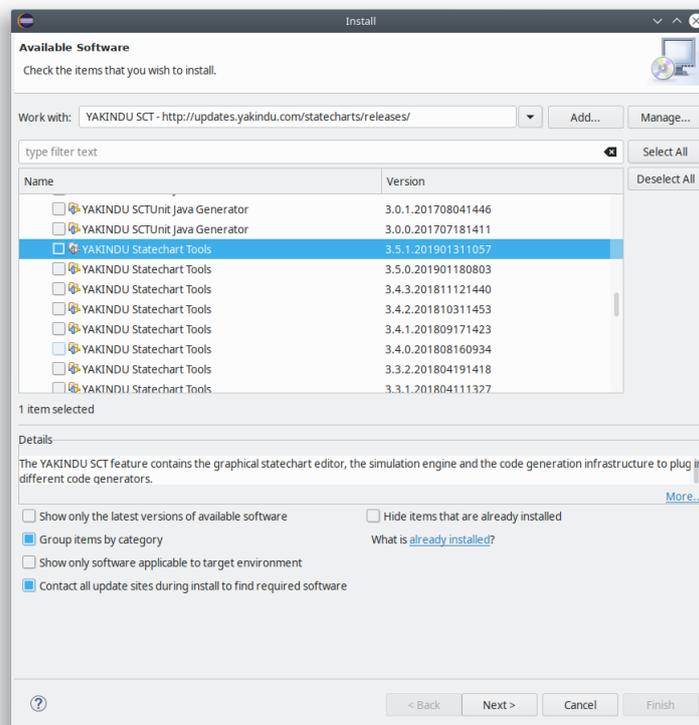
Figure 1: Installing Yakindu in menu *Install new Software...*

The next step is to add a new source. To do so, click on the **Add...** button on the right. In the popup fill the fields with the following values, then click on **Add**

  – **Name**: Yakindu
  – **Location**: http://updates.yakindu.com/statecharts/releases/

After adding the source choose the Yakindu source in the *Work with* field. Before continuing make sure, that the *Show only the latest versions of available software* checkbox is **not** checked!

Now be extra careful! Choose **only and exclusively** the following packages to install:

  – YAKINDU Statechart Tools Standard Edition > YAKINDU Statechart Tools version **3.5.2**
  – YAKINDU Statechart Tools Standard Edition > YAKINDU Statechart Tools Base version **3.5.2**

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[2]`https://www.eclipse.org/downloads/packages/release/2018-12/r`

– YAKINDU Statechart Tools Standard Edition > YAKINDU Statechart Tools Java Code Generator version **3.5.2**

> **Attention!** It is imperative to **only** install the packages mentioned above, and with the **version** mention above. Our infrastructure was only tested with Yakindu version 3.5.2, using different version can cause malfunction (happened before). Also, if you install any other package you risk, that Licensemanagement package will be installed as a dependency. If that happens, Yakindu will lock your installation until you provide a valid license. It that happens, uninstall Eclipse, and start again from section 1.2.

After choosing the three packages mentioned above, the installation follows the Next, Next, Finish scheme.

1.4   Checking the installation

It is recommended to check if the correct version of Yakindu was installed. To do so, click on **Help > About Eclipse IDE** then on the **Installation details** button.

In the popup you can see the installed Eclipse plugins, including the different Yakindu packages. Verify, that **only** the following packages are installed:

– Yakindu Statechart Tools version **3.5.2**
– Yakindu Statechart Tools Base version **3.5.2**
– Yakindu Statechart Tools Java Code Generator version **3.5.2**

1.5   Yakindu Virtual Machine

To simplify the installation process, we provide a virtual machine[3], that can be downloaded from this link[4]. The virtual machine has all the required software components installed. To run the virtual machine, VirtualBox[5] version 6.0 or above, or the latest version of VMware Workstation Player[6] is needed. The virtual machine might work with older versions, but it was not tested!

Comment. The virtual machine only has 2GB of RAM allocated. If the host machine has enough RAM, it might be a good idea to allocate more!

2   Meeting the project

2.1   Importing the project

The downloaded `.zip` file contains a preconfigured Eclipse project that needs to be used to solve the homework. To import it do the following:

– Click on **File > Import...**
– Choose in folder **General** option **Existing Projects into Workspace**
– Choose option *Select archive file* and browse for the downloaded `.zip` file. After choosing the file, the project must appear in the panel in the middle part of the window.
– Click on **Finish**

After a successful import, the project must appear in the Project Explorer (usually on the left side).

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[3]Credentials: `remo`/`remo`
[4]`https://share.mit.bme.hu/index.php/s/eyrWx7tPwk4rGAf/download?path=%2F&files=REMO.ova`
[5]`https://www.virtualbox.org/`
[6]`https://www.vmware.com/hu/products/workstation-player/workstation-player-evaluation.html`

2.2   Structure of project

The preconfigured project has many files in it.

- **tests**: This folder contains the test cases. Please do not edit anything inside this folder, or you might break something!
- **yakindu**: This folder contains Yakindu configuration files. Please do not edit anything inside this folder, or you might break something!
- **homework.sct**: This is the Yakindu model you need to finish during your homework. You **must** work in this file.
- **homeworkEN.pdf**: Your individual task. Read this, and not others', because every homework is different.
- **Application.launch**: Right clicking and selecting *Run As > Application* will GUI that you can use to test your solution. (This file is only present in the project of the mandatory homework assignment.)
- **Simulation.launch**: Right clicking and selecting *Run As > Simulation* will launch simulation mode.
- **Tests.launch**: Right clicking and selecting *Run As > Tests* will launch the test evaluator. See the results in the Console view.

> **Attention!** Be advised, if your model contains errors (depicted as a small red `x` next to the projet name), the tests will not launch (or if they do, they will give invalid results).

Comment. If something does not seem to work, make sure, that the **Project > Build Automatically** option is checked.

2.3   Exporting your solution

After completing your solution, make sure that it is saved (Ctrl+S). After doing so, the `.sct` file must be uploaded to the Homework Portal.

You must first find your `.sct` file in a file explorer. By right clicking on *homework.sct* and clicking *Properties*, choose *Resource* tab and check the *Location* field. This field contains the path to your file. Use this to find your file, and compress it, before uploading.

3   Downloading, submitting, evaluating

First and foremost check the System Modeling course page on the Moodle site[7] of the faculty for detailed information about requirements and deadlines.

3.1   Homework Portal

To download your homework, first log in to Homework Portal[8] using *BME EduID / BME Címtár / BME Central Login System.* If the site is Hungarian, change it to English by clicking on the flag in the upper right corner.

After logging in, choose the System Modeling course, then select the appropriate homework assignment (warm-up or mandatory). After selecting the homework, the following information can be found on the left hand side panel:

- **URL:** You can download your homework from this link.
- **Deadline:** The deadline until you can submit your homework. Be advised, the portal closes the submission on time!

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[7]`https://edu.vik.bme.hu`
[8]`https://hf.mit.bme.hu/hallgato/vimiaa00`

– **Late deadline:** You can submit your homework late until this deadline (if applicable). Be advised, you might have to pay, if you submit your solution late.
– **Individual task title:** This is the unique identifier of your homework. Please always attach this ID, if you report an error.

Figure 2: Homework Portal

You can use the bottom left panel to submit your solution. Your submission must be a `.zip` file and **must not** contain anything else but the `.sct` file containing your solution. So the `.zip` file most not contain any other project files like `.java` or `.sgen` files, and your `.sct` must not be inside subfolders; it must be in he root of the `.zip`.

> **Attention!** If the `.zip` file contains anything else than the `.sct` file, your submission will be rejected!

> **Attention!** Submitting a new solution irrecoverably deletes your former solution!

> **Attention!** Make sure, you upload the `.sct` file you have been working on, and not the one in the starting project. For more information check section 2.3.

3.2 Automatic evaluation

The evaluation of the submitted homeworks is automatic and happens every 2 or 3 days. This automatic evaluator script will award your points.

Like every program, the automatic evaluator can be mistaken as well. If you feel, that the given evaluation is wrong, you can apply for a defense at the end of the semester. Check the course page on the Moodle site[9] of the faculty for further details.

> **Attention!** We will run automated **plagiarism test** on all submitted solution. Plagiarism is a serious offense, and results in instant failure of the entire course!

The automated evaluator script is a tool that can help you if you use it in time. Do not leave your submission for the last 48 ours, because we cannot guarantee 24–7 support operating the evaluator.

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[9]`https://edu.vik.bme.hu`

3.3   Forbidden elements

Yakindu supports a wider set of language that is allowed during the System Modeling course. These elements usually offer functionality for other use cases which are not discussed in this course, so we forbid them.

Be advised, that the presence of forbidden elements is automatically checked by the automatic evaluator script. Submissions containing forbidden elements will be automatically **rejected**!

The list of **forbidden elements**:

  – `always`
  – `oncycle`
  – Triggerless transitions (in Yakindu this is equivalent to the two above)
  – `after 0s` / `after 0ms` / `every 0s` ...
  – `[trigger && condition]` as a transition trigger

3.4   Known problems

3.4.1   Increment operators

Yakindu supports the `++`/`--` preincrement, postincrement, predecrement, postdecrement operators. However the Java code generator emits source code with syntax errors if they are used in a model, which will result in build error. Please use `+=1`/`-=1` instead.

3.4.2   New line characters

Make sure to check whether there are new line characters in strings you enter. The code generator does not escape the new line characters and as a result it emits code with syntax errors.