University of Florida   EEL 3701   Dr. Eric M. Schwartz
Department of Electrical & Computer Engineering   Revision **0**   Matthew Hershfield, PI
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Last Updated for Questa 21.1.1

QuestaSim is Intel's successor to ModelSim, and it is the default simulator for Quartus 21.1 and newer. While ModelSim is 32-bit software and has dependencies from the early 2010's (just look at the Linux installation), QuestaSim is modern, 64-bit software. Since QuestaSim shares most of its CLI with ModelSim, you can nearly use Questa as a drop-in replacement for ModelSim. You just have to get a license first.

Part 1: Installing QuestaSim

1. Go to the Intel Download Center's page for Quartus Prime Lite 21.1.1

2. Select the "Individual Files" Tab and download QuestaSetup-21.1.1.850-windows.exe. See the below screenshot. Accept the license agreement to download the installer.


3. Run the QuestaSetup executable you just downloaded. When the option comes up, select that you want to install Questa Starter Edition (see below screenshot). Leave every other option as the default.

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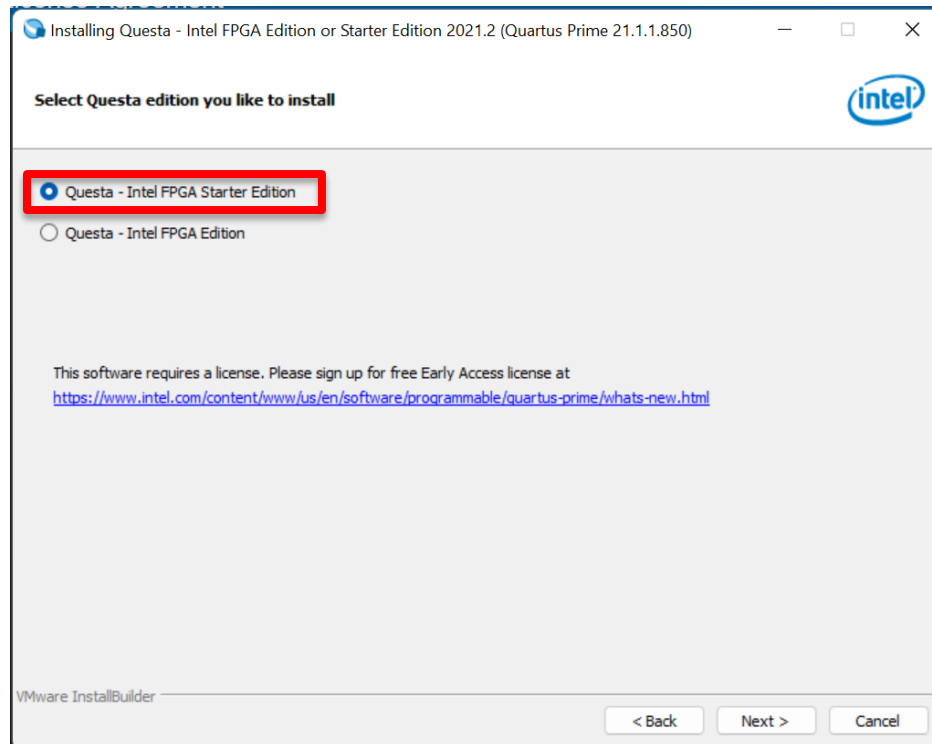
Part 2: Licensing QuestaSim

1. Using Google Chrome, navigate to the Intel Self-Service Licensing Center. I had issues while using Firefox. Create an Intel account if you don't have one already. Once you have logged in, choose "Sign up for Evaluation or Free Licenses" from the top menu bar.
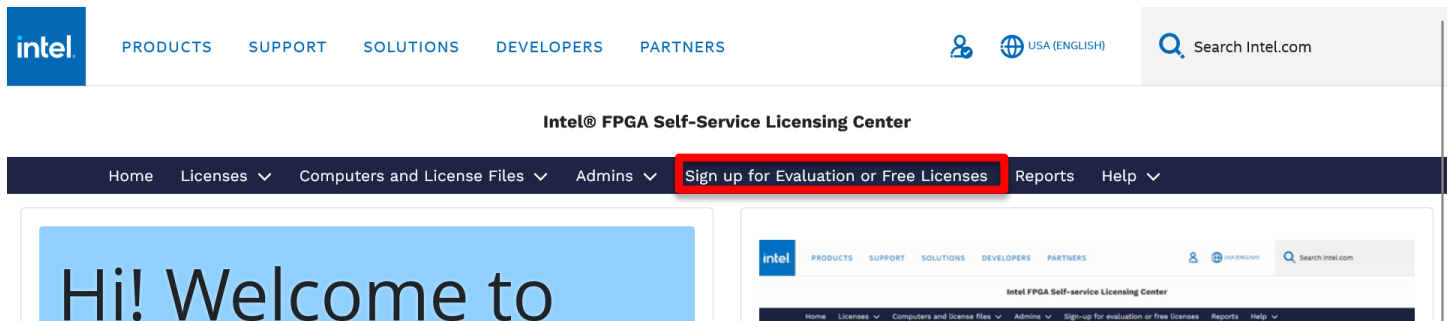
2. Click the radio button next to "Questa*-Intel FPGA Starter Edition". Click the pencil icon next to "Questa*-Intel FPGA Starter Edition" in the "# of Seats" column and type in 1. Use the pencil icon and backspace out the 1 seat that was automatically selected for "Intel Quartus II Software". You must do these steps in exactly this order or the page will automatically refresh. See the below screenshot. Check the license agreement checkboxes below the table and click "Get License".

	Product		# of Seats		Maintenance expiration		License expiration
1	Intel® Quartus® II Software SW-QUARTUS-WE-FIX	✓		✏	2023-07-06	✓	
2	Questa*-Intel® FPGA Starter Edition SW-QUESTA		1	✏	2023-07-06		
3	Intel® FPGA MAXPLUS2WEB			✏	2023-07-06		
4	Intel® FPGA IP PLS-WEB			✏	2023-07-06		
5	Intel® FPGA EVALUATION-LIC			✏	2022-10-06		2022-10-04
6	Intel® FPGA IP IP-NIOSVM			✏	2023-07-06		

☑ I have read and agree to the terms of use of this license as listed below

Maintenance for this license is valid for 12 months from the date you sign up for this license. Terms of Use

☑ Check this box if you don't want Intel to contact you for feedback. Your feedback helps us improve the product.

[Get License]

3. Click "+New Computer" under "Create a New Computer"

📄 Generate License

📄 Create a New Computer

+New computer

📄 Assign an Existing Computer

Enter Computer Name/Primary Computer ID

Search Host Information... 🔍

[Cancel] [Generate]

4. Give the computer a memorable name. Under "License Type", select "Fixed". This creates a single-user license tied to your individual computer. Under "Computer Type", select "NIC ID". This will tell Intel that your computer will be identified by its network card. The form should look like the below screenshot.

Create Computer

* Computer Name

Matthew's Laptop

* Computer Type

NIC ID ▼

ℹ How to determine Computer Type?

* License Type ℹ

FIXED ▼

* Primary Computer ID ℹ

Companion Computer ID 1 ℹ

Companion Computer ID 2 ℹ

* Primary Admin

👤 Matthew Hershfield ✕

[Cancel] [Generate License]

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5. To find your computer's NIC ID, open up Command Prompt from the Start menu and type "`ipconfig /all`" without the quotation marks. This will list all of the network adapters connected to your computer. Look for your laptop's WiFi card in this list, and locate its Physical Address. The NIC ID that you will put into the Intel website is your network adapter's Physical Address ==with the dashes removed==. Type your NIC ID into the Intel website under "Primary Computer ID". If you would like, you can optionally add NIC IDs for other network adapters under Companion Computer ID 1 and ID 2. Finally, click "Generate License".

```
Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . : attlocal.net
   Description . . . . . . . . . . . : Killer(R) Wi-Fi 6 AX1650s 160MHz Wireless Network Adapter
   Physical Address. . . . . . . . . : C4-23-60-9F-3C-29
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
```

6. Look for an email from authorization@intel.com sent to the address you used to create your Intel account. A file named LR-XXXXXX_License.dat should be attached to the email. Download that file and move it to a place where it will not be accidentally deleted. I created the folder C:\intelFPGA\21.1\licenses and copied my license file there.

7. In the Start menu, search for "Edit the system environment variables". Click the "Environment Variables" button in the bottom right corner of the window that appears. Under the "System Variables" section (bottom half of the window), click "New". In the window that appears, type in "LM_LICENSE_FILE" (without the quotation marks) for the variable name. To set the variable's value, click the "Browse File" button in the bottom left corner of the window and navigate to where you stored your license data file. Click OK to confirm the new environment variable.
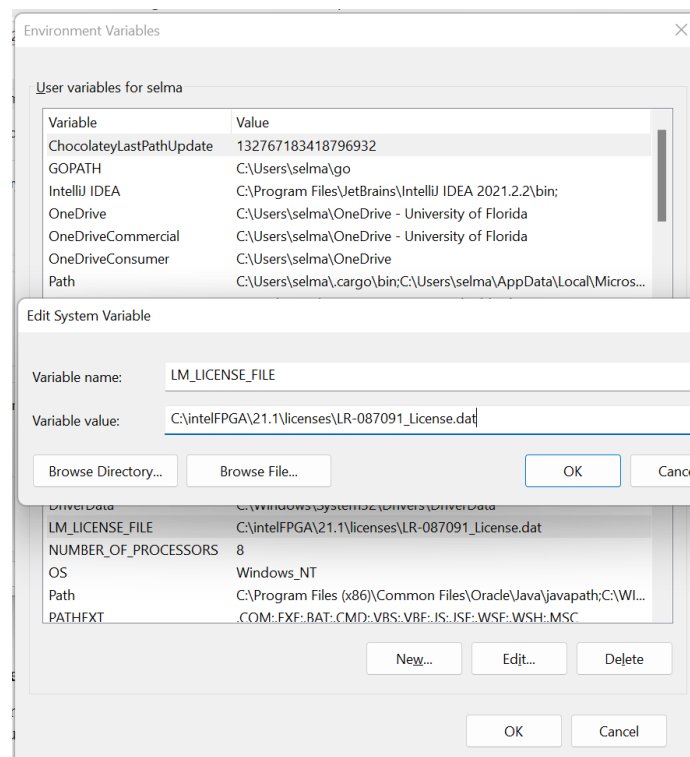
8. **Restart your computer for your changes to take effect.**

9. Once your computer reboots, open a command prompt and run "`lmutil lmdiag`" (without the quotation marks) and confirm that your license is found correctly. If your license cannot be verified, double check that your LM_LICENSE_FILE environment variable is set correctly.

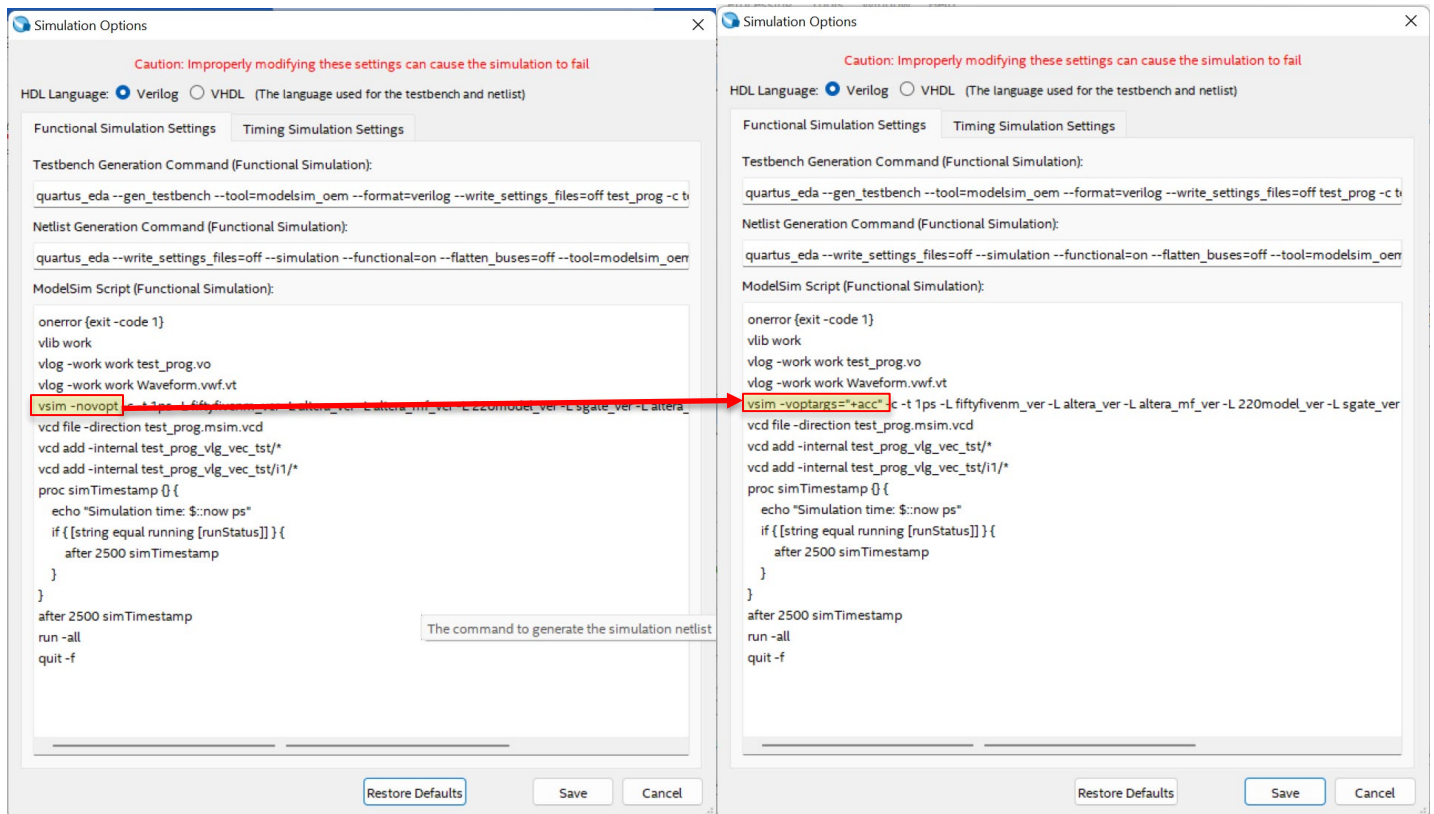## Part 3: Updating Quartus to use QuestaSim

For this tutorial, we are assuming that you have installed Quartus Prime 19.1 using the Quartus installation instructions. The University Program VWF program is hardcoded to use ModelSim-Altera (even when you change your project to use QuestaSim by default), so we will have to trick Quartus into using QuestaSim instead of ModelSim for this program.

1. Open Quartus. Navigate to Tools -> Options. In the left menu bar, click "EDA Tool Options".

2. In the EDA Tool Options menu, click on the "…" button next to the ModelSim-Altera. In the file picker, navigate to "C:\intelFPGA\21.1\questa_fse\win64" (assuming default QuestaSim installation) and choose "Select Folder". Click OK to save your changes.
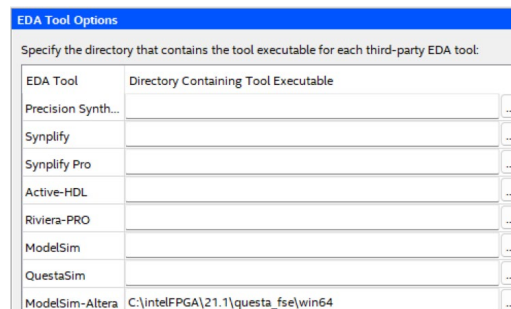
3. You should now be set up to use QuestaSim instead of ModelSim with your University Program VWF simulations. Set up your Quartus projects as you did while using ModelSim: choose ModelSim for the simulation program and set the HDL to VHDL. Before you run a simulation, you have to go to the simulation's settings (Simulation->Simulation Settings) and change the first argument of the `vsim` command from `-novopt` to `-voptargs="+acc"`. This makes it so that the simulation viewer can see every signal in your simulation. If you do not set this argument, the simulation will either fail to run or will display every output signal as unknown values.

Sources

https://www.intel.com/content/www/us/en/docs/programmable/691278/21-3/prerequisites.html

https://www.intel.com/content/www/us/en/support/programmable/licensing/quartus-licenses.html

https://community.intel.com/t5/Intel-Quartus-Prime-Software/When-I-try-to-make-and-run-University-Program-VWF-it-gives-this/m-p/678829

https://community.intel.com/t5/Intel-Quartus-Prime-Software/Questa-option-voptargs-quot-acc-quot/m-p/1362284