Setting up Leela Zero

To set up Leela Zero, you need the following:

1. A Leela binary (lc0.exe) which is the search component.
2. A Leela net which is the evaluation component.
3. A program capable of running the engine as part of a graphical user interface. In this case, we will use the Chessbase Fritz 17 program.

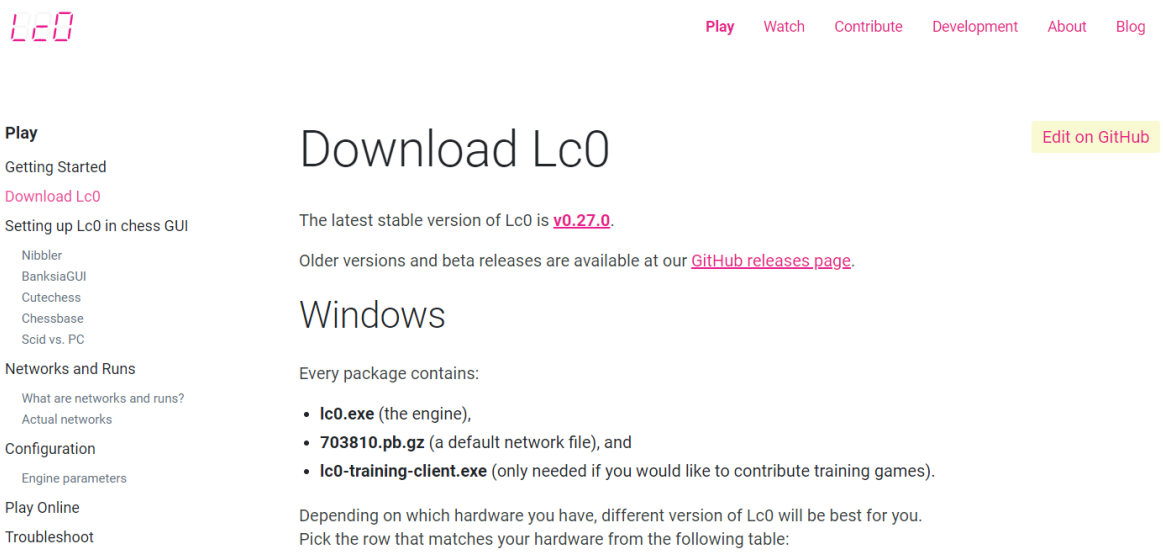
You should also know

1. The graphics card you have on your PC. In principle, an Nvidia card such as a laptop1060 GTX is the minimum you should have for running Leela at a decent strength.

Downloading Leela components

For the purpose of this work instruction, I will assume that you are running Leela on Windows 10 and that you have a laptop with an Nvidia RTX 3080 card. Note that I am not going necessarily for the optimal net. Feel free to shop around with all the different options on the Leela website once you have got to grips with the installation technique.

1. Go to https://lczero.org/play/download/



2. Scroll down a little to see the choices of Leela binary (dependent on the graphics card that you have).

Hardware	Backend
Newest (2018+) NVidia GPUs: RTX 20xx, RTX 30xx and so on (but not GTX 16xx)	CUDA
Newer (2014-2018) NVidia GPUs: GTX 7xx, GTX 8xx, GTX 9xx, GTX 10xx and also GTX 16xx	CUDNN
Newer non-NVidia GPUs (only for latest versions of Windows 10)	DirectX 12
Older GPUs or Windows versions. Note: Recent AMD GPUs might have driver issues.	OpenCL
Computers without GPUs, but with modern CPUs	DNNL BLAS
Older CPUs	OpenBLAS

3. My card fits into the top category from the top so I click on CUDA and the Leela binary is downloaded
4. Click on actual networks.

Size versus Recommended Purpose

- 30b: Recommended for multi-GPU (RTX), long analysis, or when speed isn't a major factor
- 24b: Recommended for TC > 1 minute per move with an RTX card
- 20b: Recommended for running on non-RTX cards or TC on the order of seconds (with RTX)
- 10b: Recommended for running on CPU
- <10b: Recommended for sparring vs humans

5. My card is an RTX card, so I should go for a 30b network (30b refers to the size of the network. The larger the network, the stronger the engine but the heavier your graphics card needs to be). Scroll down a little to look at the 30b networks:

30 blocks x 384 filters:

Name	Source for Download	Notes
Latest T60 after 66512	lczero.org run 1 networks	Current main run
J94-100	Contributed networks on Lc0 data	Based on Sergio-V networks, trained on T60 data + value repair method. TCEC22 DivP+SuFi net
Latest 30b SV net (outdated)	Sergio-V repository	Trained on T60 data
SV-3972+jio-20k (outdated)	removed	Submitted for TCEC 18 Superfinal
384x30-t60-3010 (outdated)	Sergio-V repository	Won CCC13 and TCEC 17
384x30-t40-1705 (outdated)	Sergio-V repository	Trained on T40 data

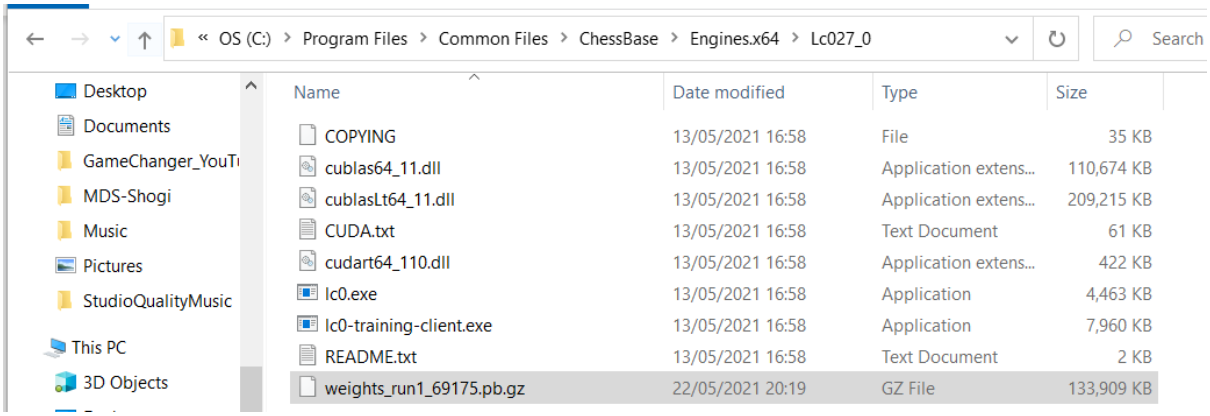
6. Click on the link next to Latest T60 after 66512. You are taken to the following page:

Networks

Number	Run	Network	Elo	Games	Blocks	Filters	Time	Ordo Elo
69182	1	8a94fd8b	3059.00	0	30	384	2021-05-22 18:28:44 +00:00	0
69181	1	7d3f50f5	3059.00	27270	30	384	2021-05-22 14:44:41 +00:00	3059
69180	1	4c2c3c10	3065.00	20303	30	384	2021-05-22 12:00:46 +00:00	3065
69179	1	3d59b0e7	3060.00	21905	30	384	2021-05-22 09:08:41 +00:00	3060
69178	1	e3799f8e	3068.00	26842	30	384	2021-05-22 06:29:41 +00:00	3068
69177	1	9c784ab9	3066.00	23755	30	384	2021-05-22 03:47:44 +00:00	3066
69176	1	4c8730a4	3064.00	27467	30	384	2021-05-21 23:56:40 +00:00	3064
69175	1	6e3653f7	3072.00	20362	30	384	2021-05-21 20:52:41 +00:00	3072
69174	1	b364ba7b	3064.00	28068	30	384	2021-05-21 17:03:42 +00:00	3064
69173	1	256e7799	3060.00	23870	30	384	2021-05-21 13:33:42 +00:00	3060
69172	1	4496ca0e	3070.00	23810	30	384	2021-05-21 10:01:40 +00:00	3070
69171	1	44390f0b	3061.00	24326	30	384	2021-05-21 06:45:41 +00:00	3061
69170	1	ea779da3	3061.00	24476	30	384	2021-05-21 03:22:40 +00:00	3061
69169	1	c59eed7e	3065.00	24599	30	384	2021-05-20 23:44:35 +00:00	3065
69168	1	b76e49a6	3064.00	22802	30	384	2021-05-20 19:27:43 +00:00	3064
69167	1	f3f07708	3065.00	25530	30	384	2021-05-20 14:44:53 +00:00	3065
69166	1	4457cf01	3066.00	24838	30	384	2021-05-20 08:55:41 +00:00	3066

I tend to choose a network towards the top of the list that has a high elo and plenty of games. In this case I will choose the 69175 network. Click on the network link to download it.

7. Extract the Leela binary zip file to a folder. Then place the network file in the same folder.

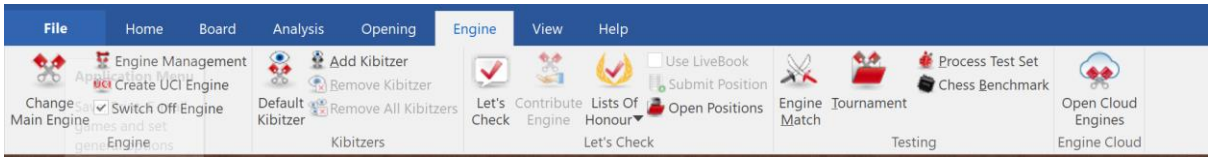


8. If another default net is present in the folder (e.g. 703810.pb.gz) then delete this.

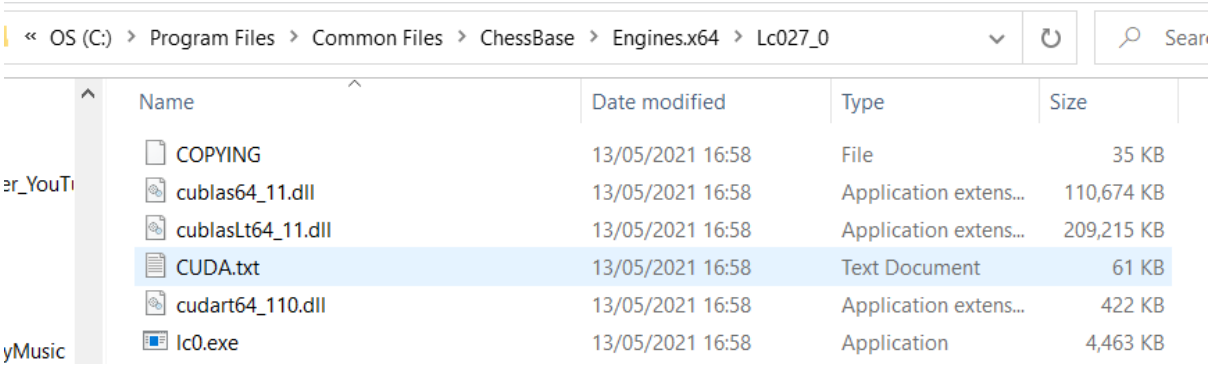
Configuring Leela as a UCI engine

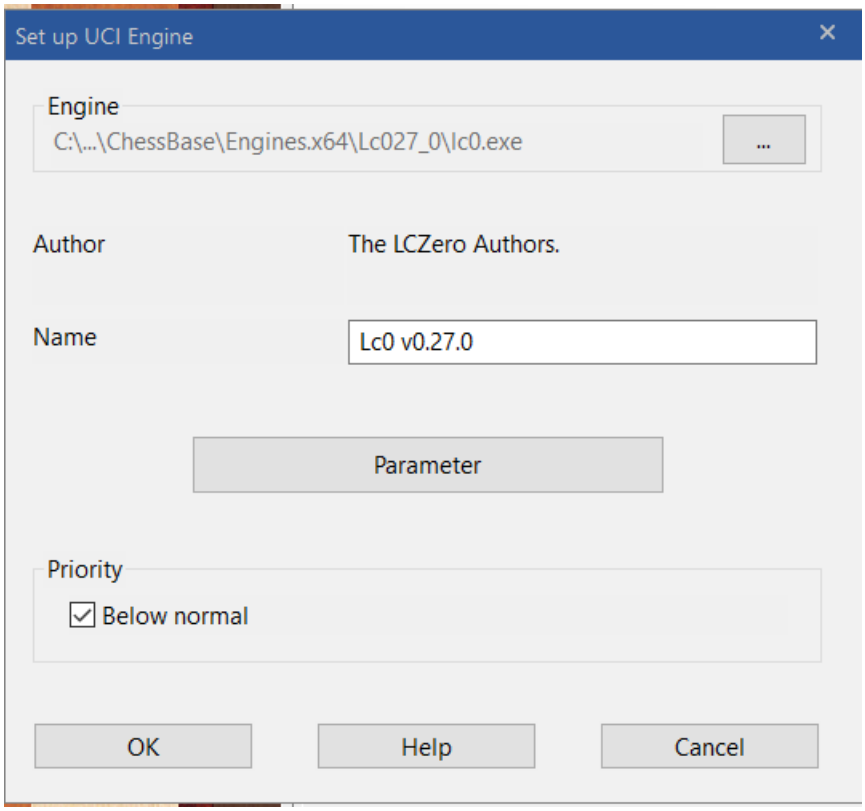
Note: this same procedure can be used to set up other engines such as Stockfish or Komodo Dragon in Chessbase or Fritz.

1. Open your Chessbase Fritz 17 program.
2. Click on Enter and Analyse at the initial menu
3. Go to engine and click on the option Create UCI engine

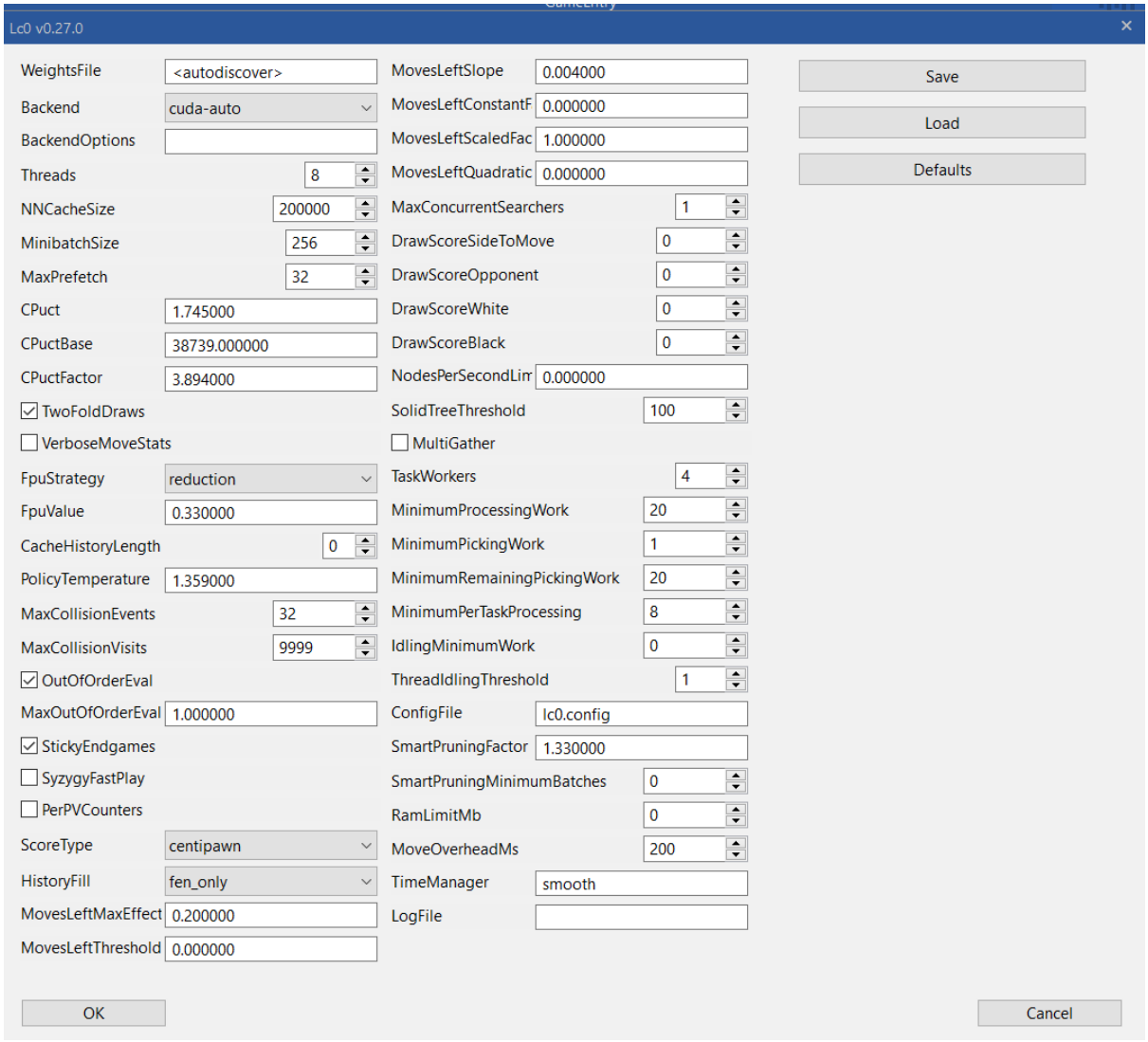


4. Browse for the folder in which you placed your Leela binary and select lc0.exe and click on Open.





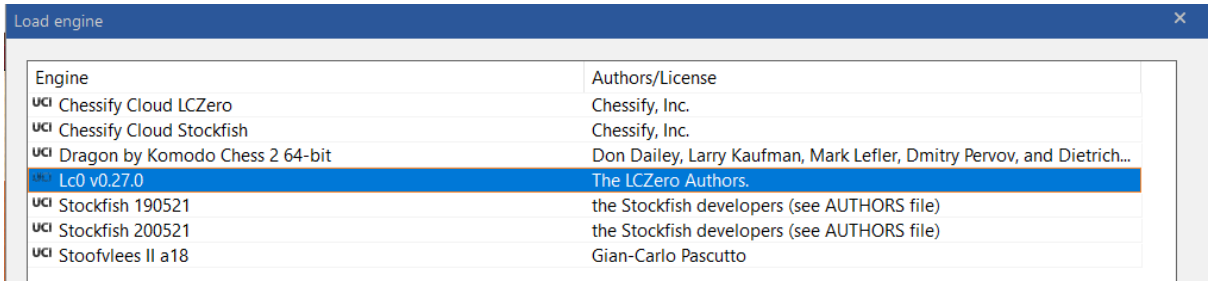
5. Click on Parameter



6. A lot of options there! I always set Threads to 2 since I read that Leela doesn't use lots of CPU cores. All seems to work pretty well like this!
7. Click on Save, then Create New and then on OK twice.

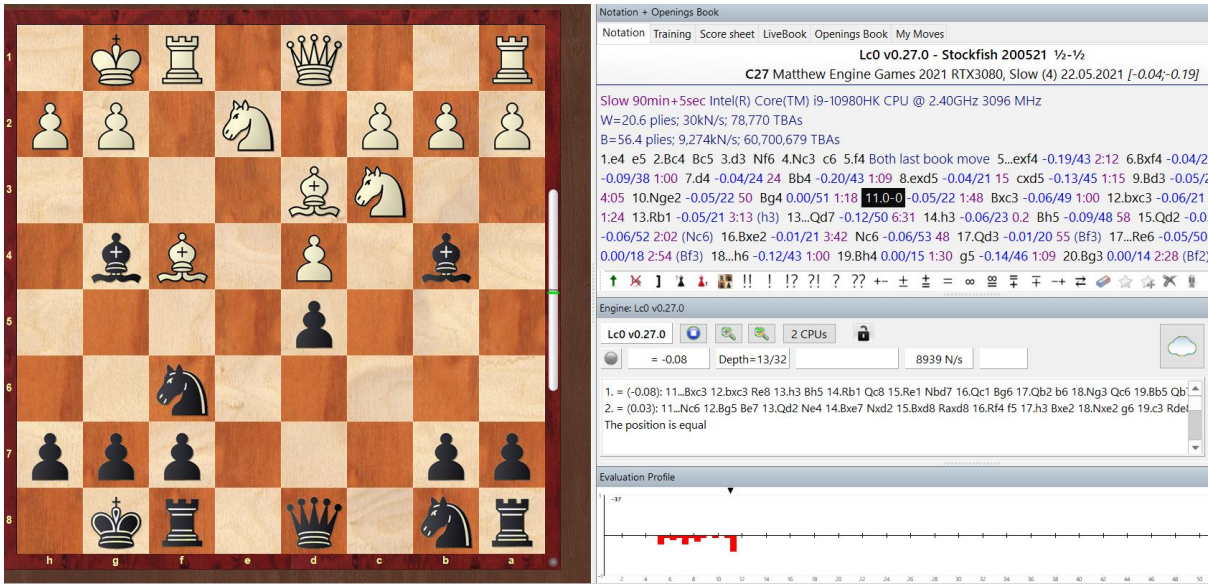
(Optional) Setting Leela Zero to be the default analysis engine

1. From the Engine tab, click on Change Main Engine



2. Select Lc0 v0.27.0
3. Click on OK.

Leela is running!



Other components you may need

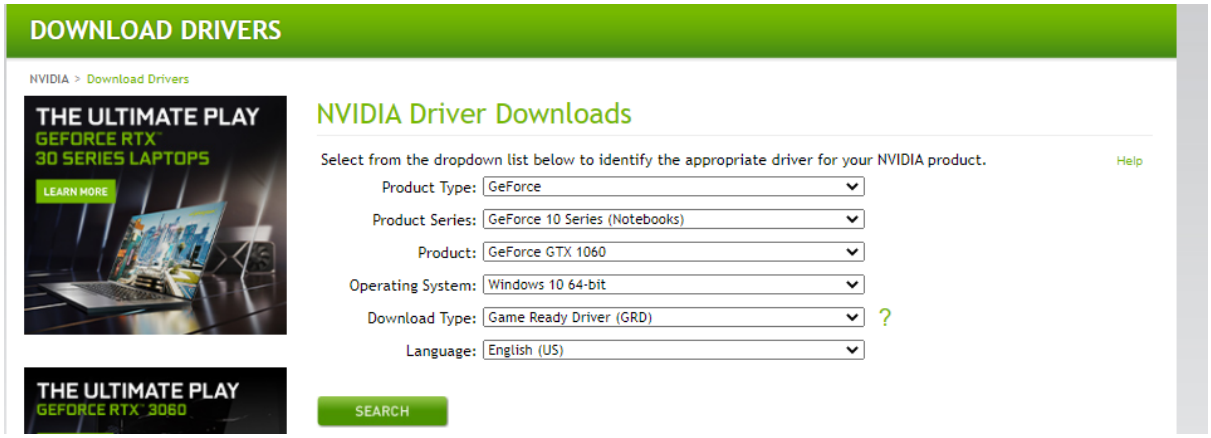
CUDA

It is possible that you may also need to download an extra component called the CUDA. The latest version at the time of writing (11.3) is a chunky package that you can download from the Nvidia website: https://developer.nvidia.com/cuda-downloads

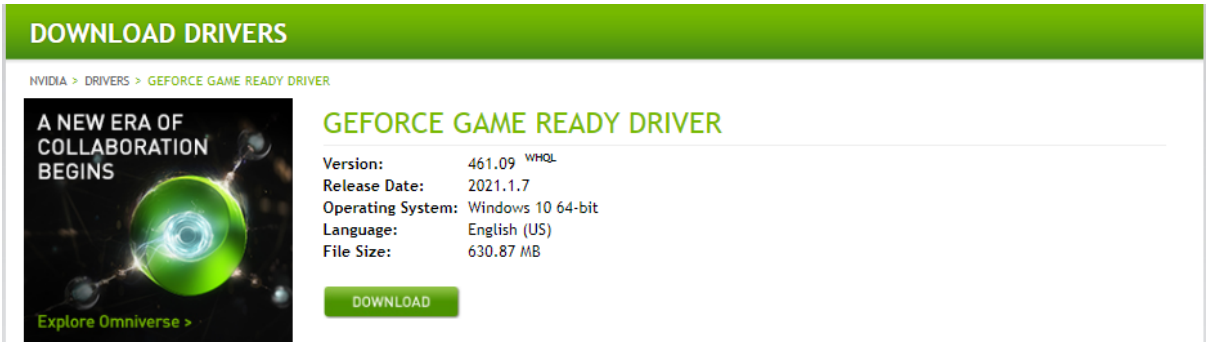
Nvidia drivers

The more recent the driver for your graphics card, the better it will perform. You can specify your graphics card here to search for the best driver:

https://www.nvidia.com/Download/index.aspx?lang=en-us



I have filled in the details of a card on another of my laptops and I click on Search:



And that gives me the driver I can download for my graphics card.

As always, upgrades are at your own risk! Make sure that you have backups and contingency plans before you start!