

University of Toronto, CSC303, Winter 2023

*An optional, but encouraged, activity: Learning with Digital Spaced Repetition*

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In my opinion, a common pitfall we (or at least I) make when learning, is to focus on the *what*, rather than the *how*. While it's true that we do need to learn the *what*, it is also true that we can also learn a lot, *from how well we're learning*. Although we may not profit from learning the exact contents of a course, we will always profit from learning how better to learn, because we *never* stop learning: be it scientific papers, APIs, medical knowledge, history, languages, music, or anything else around us.

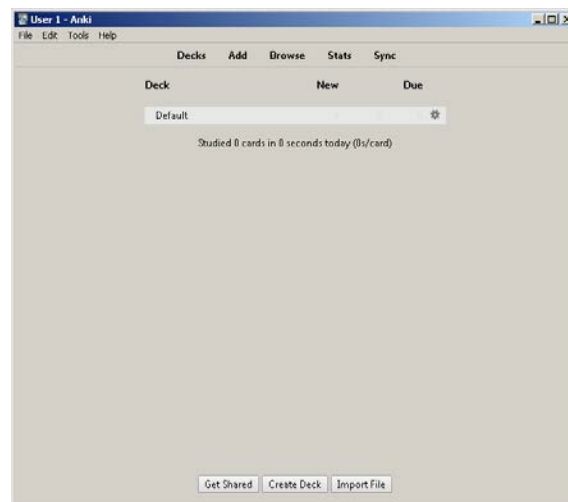
In this spirit, I would like to introduce a technique for learning that I have found useful, use in my everyday life, and which I wish I had been exposed to earlier: electronically managed spaced repetition (i.e., digital flashcards).

As part of the weekly quiz, I will ask you to type into Quercus three simple flash cards containing what you think is an important part of the week's material. It could be a definition, proof, or simply an insight. I then strongly recommend that you put these flashcards into Anki (a free spaced repetition program), and practice these cards for 5 minutes (or less), every day until the end of the course.

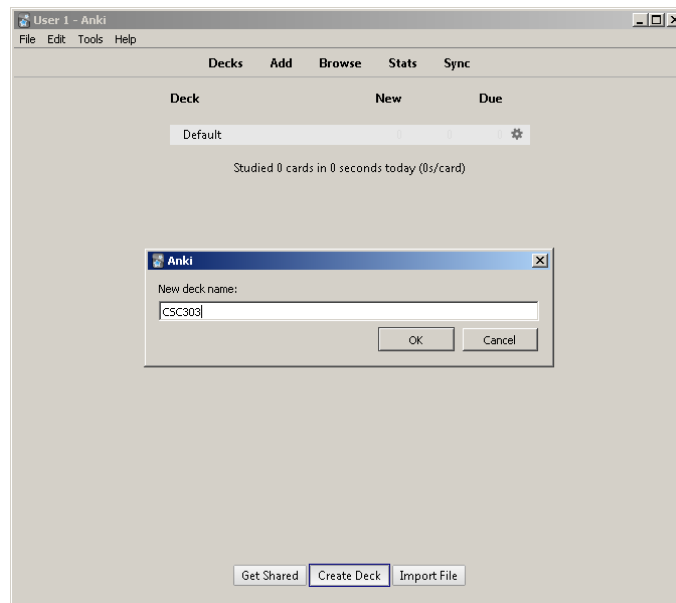
Anki is a free, multi-platform, open source, spaced repetition program. It helps you retain information by asking you questions in the form of flashcards. It is motivated by the Ebbinghaus forgetting curve, as well as studies suggesting the effectiveness of spaced (rather than grouped) studying, and the relative effectiveness of recall over reading as a studying method.

Anki can be freely downloaded here: <https://apps.ankiweb.net/>

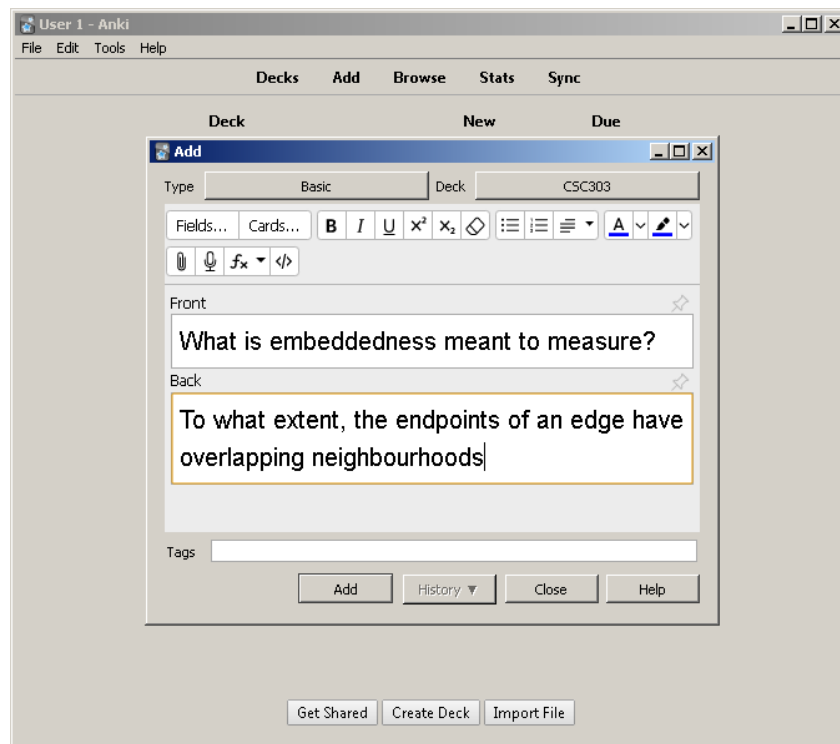
Once you've installed and run Anki, you will see the following window:



At this point, simply click “Create Deck”, and give the collection of cards a name (e.g., CSC303).

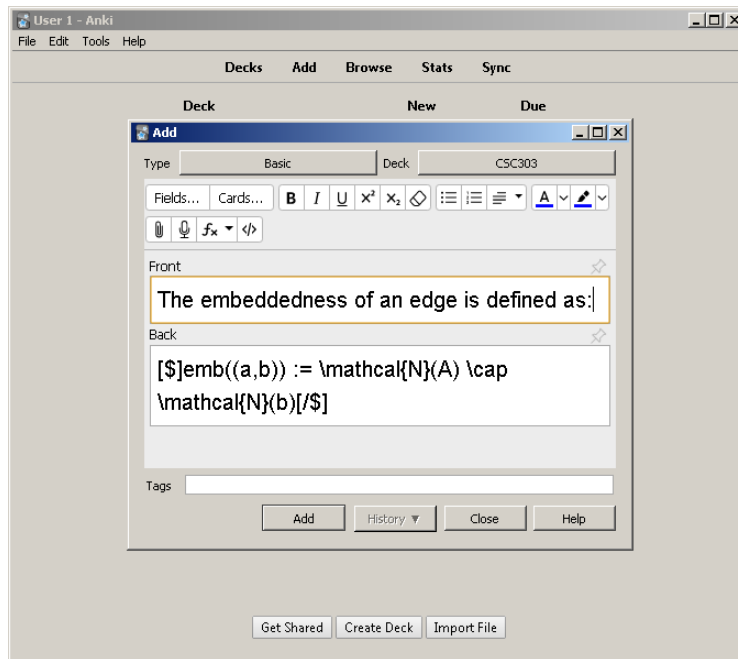


Now just click “Add” on the top ribbon, and you’re all ready to start creating flashcards! For example:

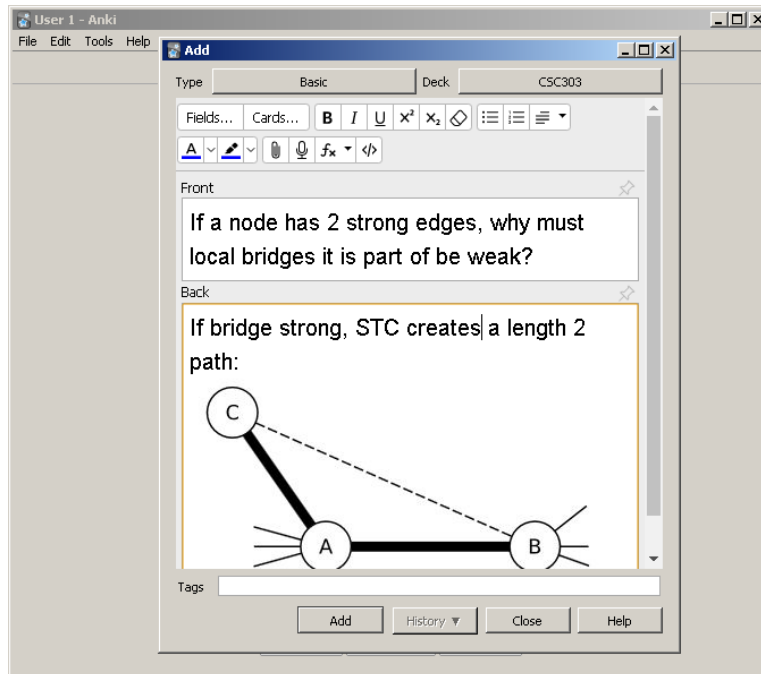


Once you’ve finished typing, just press “Add” in the bottom of the sub-window, and you’re done!

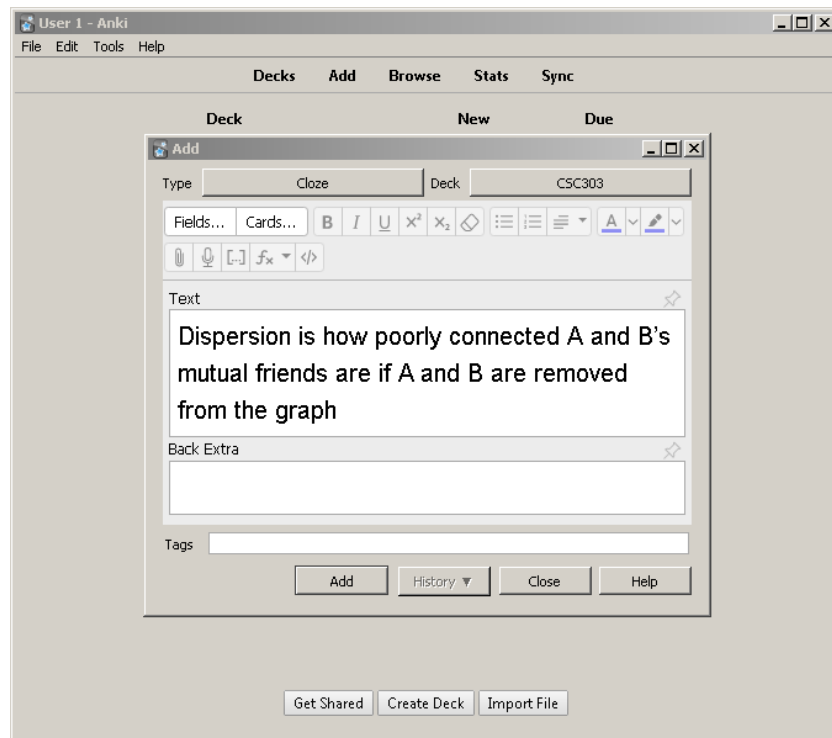
As another example, we can also include LaTeX:



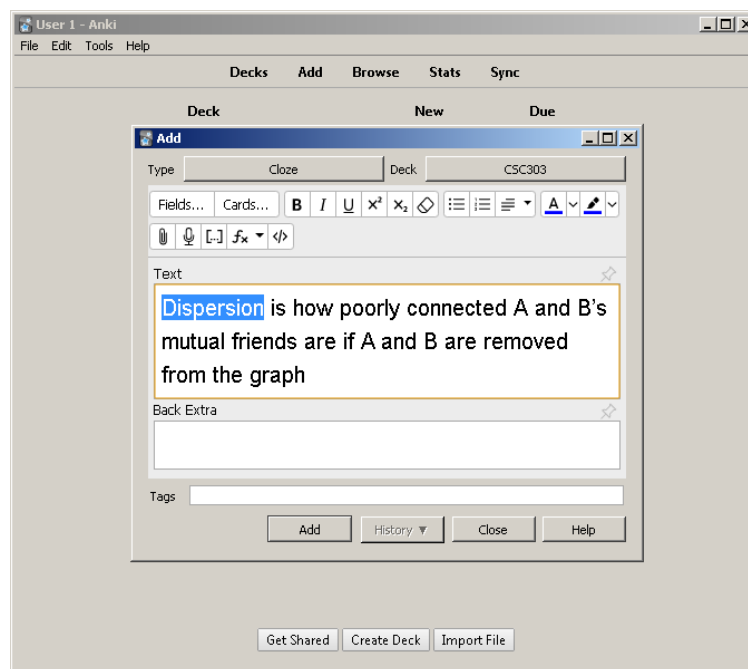
... or we can include images: (hint: such as images taken from slides):



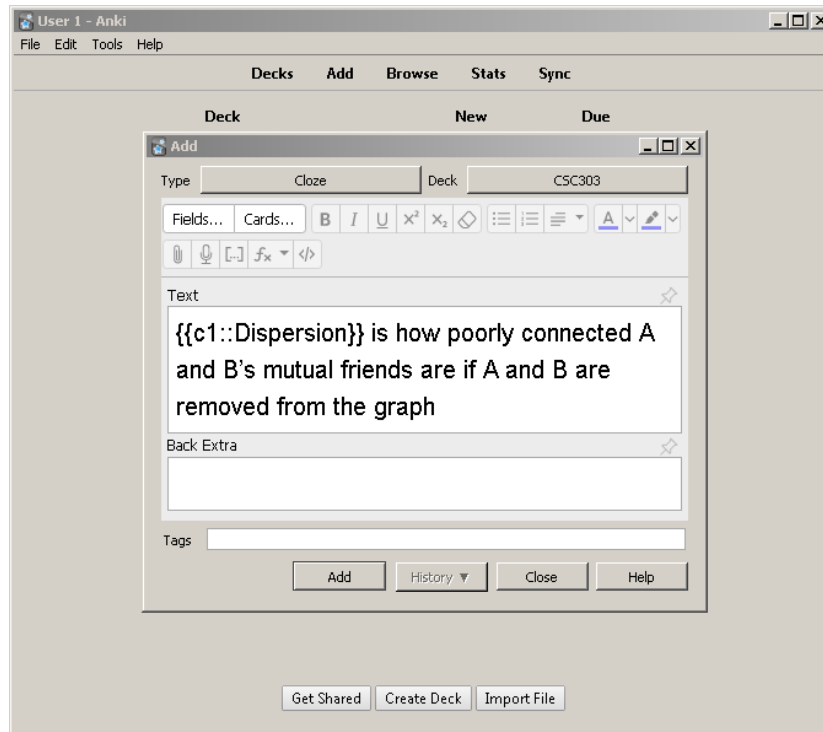
We can also create “fill in the blank questions from text” (this is called a cloze deletion). Just change the “Type” (top left) from *Basic* to *Cloze*. For example, if we start with the following line copied from the slides:



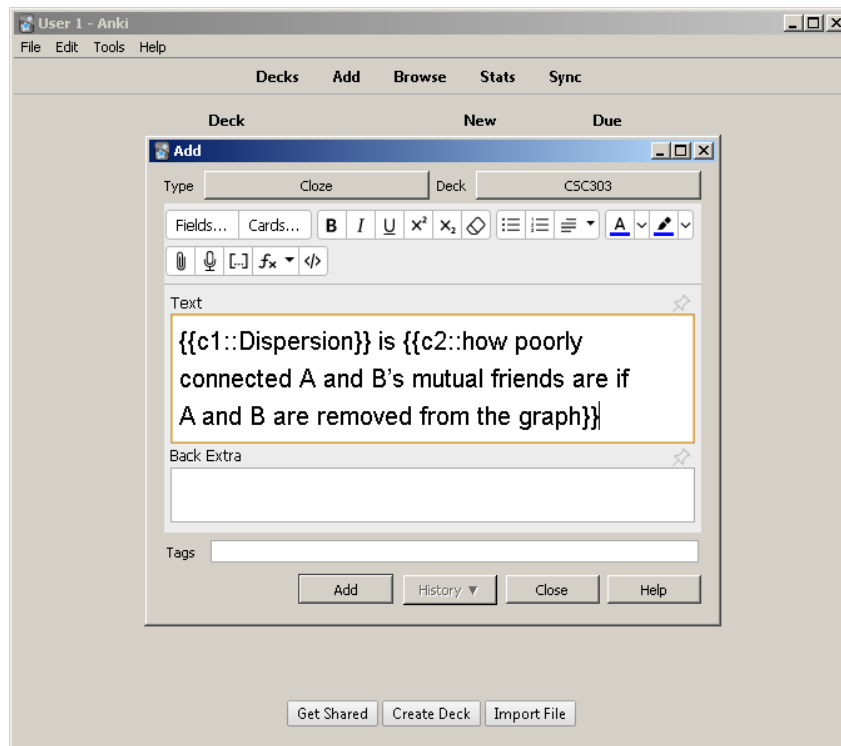
We can then select a section of the text to turn into a blank...



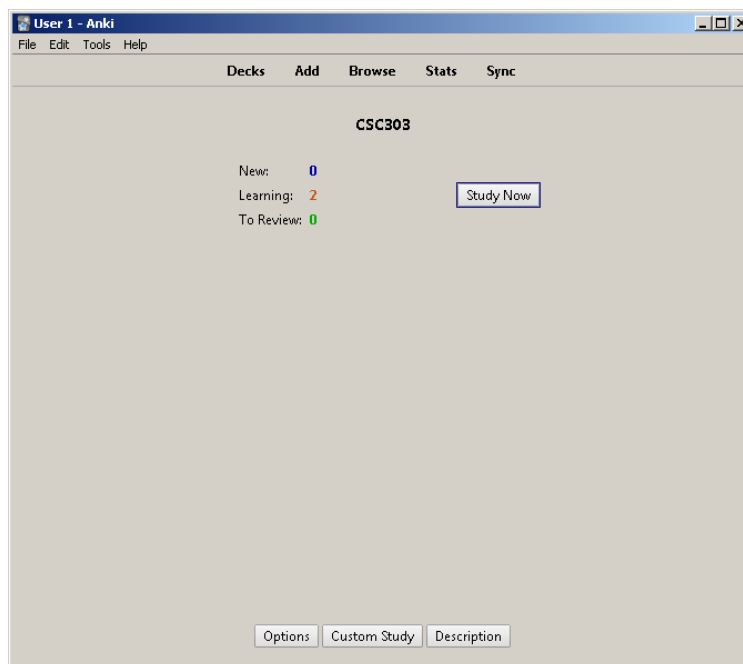
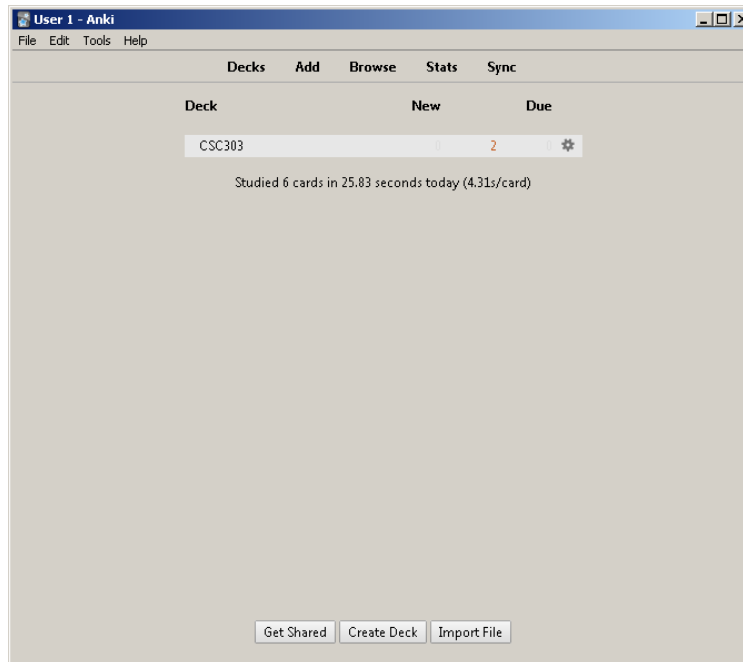
... and then click on the [...] icon to create a Cloze (note the selection is now surrounded by curly braces):



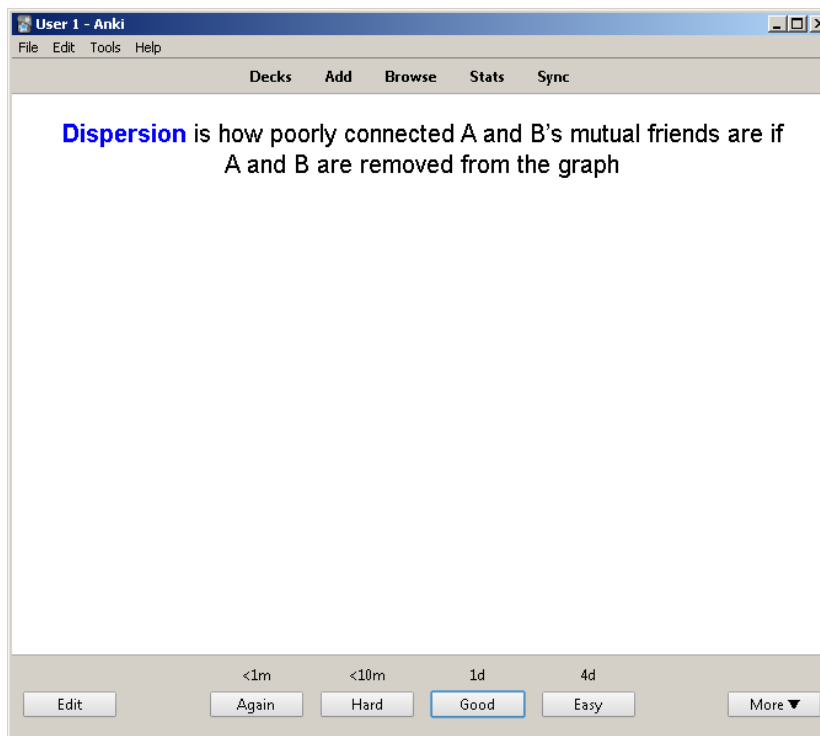
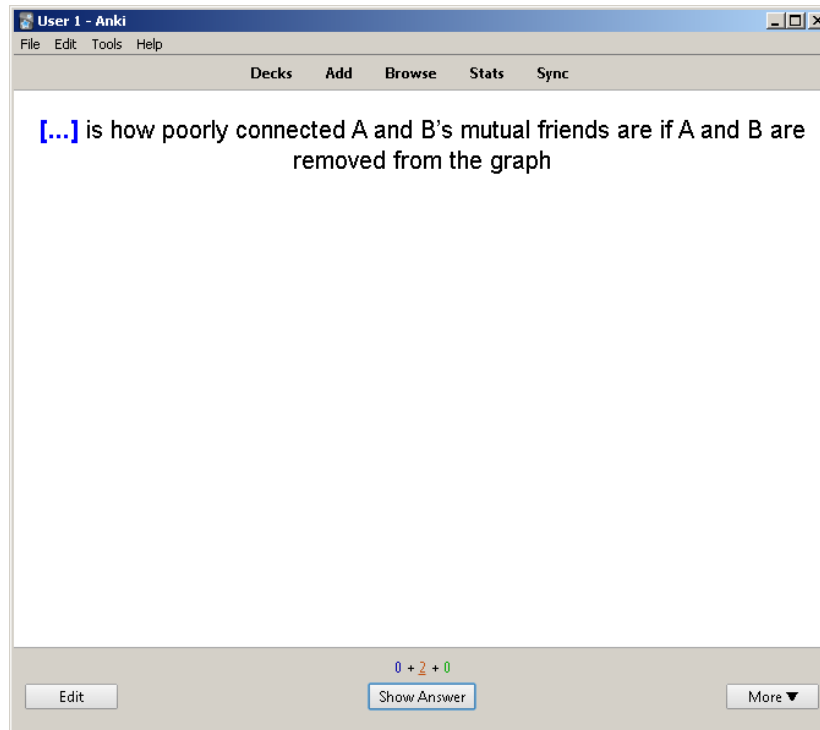
Furthermore, we can create several clozes from the same piece of text!



Finally, whenever you want (ideally daily), open Anki, click on the deck, and answer/rate the questions



Next, click "study now" to go through the slides for the day that have been scheduled by Anki



Note how the time between repetitions (<1m, <10m, 1day, 4 days) adjusts based on how well you remembered! Further successful repetitions decrease the time between repeats even further.

For those of you who want to learn more, a very interesting (if admittedly long) discussion by Michael Nielson on the use of Anki (discussing such topics as covering computer science papers, art, and APIs) can be found here: <http://augmentingcognition.com/ltn.html>

You can also find 20 (relatively) simple pieces of advice for writing good spaced repetition questions here: <https://www.supermemo.com/en/archives1990-2015/articles/20rules>