LMS with simple modeling developed by extended CindyJS and Maxima

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Conclusive Example

- **You can find lots of samples at 'ketcindy sample'**

  https://s-takato.github.io/ketcindysample/

- **Search 'ketcindy home' (English).**

  https://s-takato.github.io/ketcindyorg/indexe.html

- **Select 'Sample3'.**

- **Try to answer the questions.**

History of KeTCindy

- **KeTpic** **2006-**
- **KeTCindy=KeTpic+Cinderella(Cindy)** **2014-**
- **KeTCindyJS=KeTCindy+CindyJS** **2016-**

KeTCindy

- KeTCindy is a Cindy function library.
- It generates files consisting of graphic codes of TEX.
- It uses Cindy screen as a GUI, CindyScript as a general purpose programming language.
- It has over 500 functions.
- It can externally call Maxima, gcc and R.

KeTCindyJS

- CindyJS https://cindyjs.org/
  - 'A framework to create interactive content for the web'.
  - 'It aims to be compatible with Cindy'.

    To a large extent, but not perfect.
- KeTCindyJS https://s-takato.github.io/ketcindyorg/indexe.html
  - It adds functions of KeTCindy libraries selectively to the HTML generated by CindyJS.

KeTMath

- The pandemic prompted us to move our classes online.
- It is essential to exchange formulas in math.
- T⇒ S is easy, wheras S ⇒T is not.
- So we developed KeTMath, which converts two dimensional formulas to one line text.
- KeTMath uses a TeX-based simpler formula expression rule.

https://s-takato.github.io/specialclass/ACA2023/ketmathmaxE.html

KeT-LMS

- Moreover, we have developed a system that creates files that integrates Q/A and KeTMath.
- kettask.html : For students. KeTMath format.
  The URL is distributed to them.
- ketscore.html : For teachers. KeTMath format.
  The HTML is used when scoring.

Steps of KeT-LMS

1. Teachers produce kettask.html from only 2 files, question.txt and student.txt, then upload it to their website.
2. Students open the URL, answer the questions in KeTMath format and send it to teachers.
3. Teachers create a file with a list of student answers, then produce ketscore.html.
4. Teachers score the answers using Maxima or manually.

How to Produce kettask(q-n).html

- Prepare question(q-n).txt and student(y).txt.
- Push ‘taskline’ and ‘kettask’ in toolketmath.cdy. then kettask(q-n).html will be generated.
- Describe the KeTCindy scripts in draw(q-n).txt.
- Launch tooldraw.cdy, select ‘Draw’.
- Decide the Center and Scale and push ‘embed‘.

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1. When scoring with KeTScore.
2. When teachers check their (correct) answers.
3. When complex formulas required in KeTTask.

In any of these cases Maxima can be run from within KeTCindy.

Conclusions

- As a result of repeated improvements, KeT-LMS has become sufficiently practical.
- It is expected that many practices will lead to a better system.
- Runtime errors in Maxima are drastically reduced. However, it is a future task to make KeT-LMS error-free when using Maxima.