Stateful

Not bad for STACK, I promise...

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30 April 2019

Who is this guy?

- Not a math teacher, not even a mathematician. But did study control theory, so some understanding of the situation.
- Long time member of the STACK development team, guilty for example:
    - Initial versions of units & significant-figures.
    - Support for `"strings"`, some security features.
    - CASText blocks, conditional rendering. JSXGraph-block.
- Has forked the STACK code-base more than once and is getting withdrawal issues since the last major fork was merged to STACK 4. Dealing with that by creating something new in the form of *Stateful*.

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What is Stateful?

- *Stateful* is a new question-type based on the "STACK with state" concept presented at EAMS 2016.

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- *Stateful* is a new question-type based on the "STACK with state" concept presented at EAMS 2016.
- Basically, a *Stateful* question is just a collection of STACK like questions, that share a common memory/state, which can be modified based on the input so that the question being presented can change in reaction to input.

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- Here changing the question being presented means both changing the parameters of the question and switching to another question in the collection.

- In *Stateful* terms the questions of the collection are called *scenes*. In some sense they could be considered as the states of a state-machine but things are not quite that simple.

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Recap the EAMS example question.

For those that were not there or have forgotten. Lets look at a question of the *Stateful* type.

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Why Stateful, why not just STACK with state?

It would be nice to bring state-variables and memory to STACK itself and avoid having to create a new question-type but things are not that simple.

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- Adding state to a question-type changes the behaviour of a question quite a lot and for example STACK with state would not work with the current Moodle question-behaviours. *Stateful* has its own question-behaviour but it does not work with STACK nor any other question-type.

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- The objectives of authoring are quite different and providing editing tools that could deal with the addition of state without complicating authoring for those that do not use it is an issue.

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- They just are different and it does no good for either to compromise just so that they could fit in the same mould.

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Why claim that this is not bad for STACK? 1/2

Surely, adding a new question-type adds competition and fragments things?

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- *Stateful* is by its nature more resource intensive and therefore much work in its development goes into performance optimisation. Much if not all of that work can be copied directly to STACK or is done directly to STACK as *Stateful* uses STACKs engine as its engine.

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- It expands the scale and scope of STACK based question-types, if the thing that you want to do is not possible in STACK it might be possible in *Stateful* where you can use your STACK authoring skills and do not need to learn all new things for some completely different system.

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Why claim that this is not bad for STACK? 2/2

- *Stateful* question authoring is more complex therefore much development effort has gone to authoring tools. Some of those features are coming into STACK very soon indeed, sorry not the editor you are about to see.

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- *Stateful* provides a proving ground for major technical changes and is expected to guide the design of future major versions of STACK.

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- What STACK and *Stateful* share is the engine that Chris has built, and in there they have no conflicts. I have seriously tried to imagine any conflict for the last two years and have to say that there is no difference in their needs for that engine.

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Some details

Just in case we run out of time. While we look behind the scenes of a question.

- *Stateful* will be released late this year, but under no circumstances before a STACK version which incorporates the so called iss324-branch has been released. Basically, parser based Maxima-statement processing is one feature developed in *Stateful* but being migrated to STACK and it does not make sense to have it in both.

- If you wonder why we haven't gotten further since EAMS 2016, it is due to funding materialising just last summer. Programming takes time and if someone does not pay for that the boss looks at you badly[1].

- No, you cannot have access to a test system just yet.

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[1]especially, if your title is not research or teaching related

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