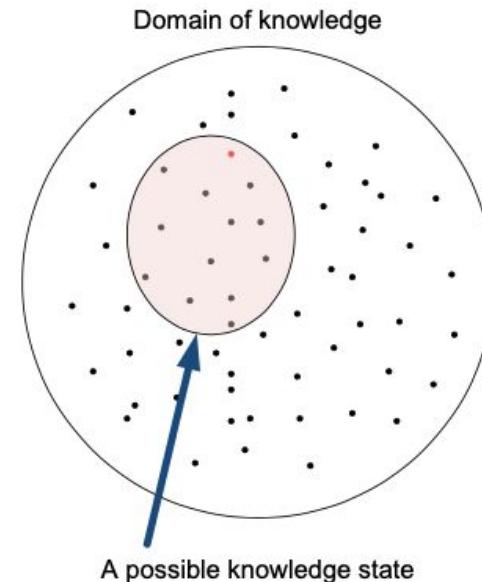

KST: Working With Dataframes in R

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What is Knowledge Space Theory? (KST)

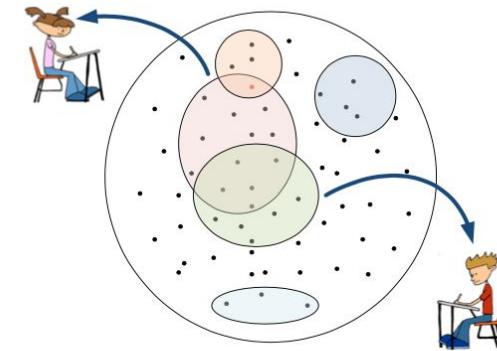
- Initial objective: to construct **an efficient tool for assessment** of knowledge
- E.g. the ALEKS system

- Assigns one knowledge state to every student
- The whole population contains a collection of knowledge states
- This large collection is the **knowledge structure**
- Knowledge structure is represented by the subset of the questions in the tool

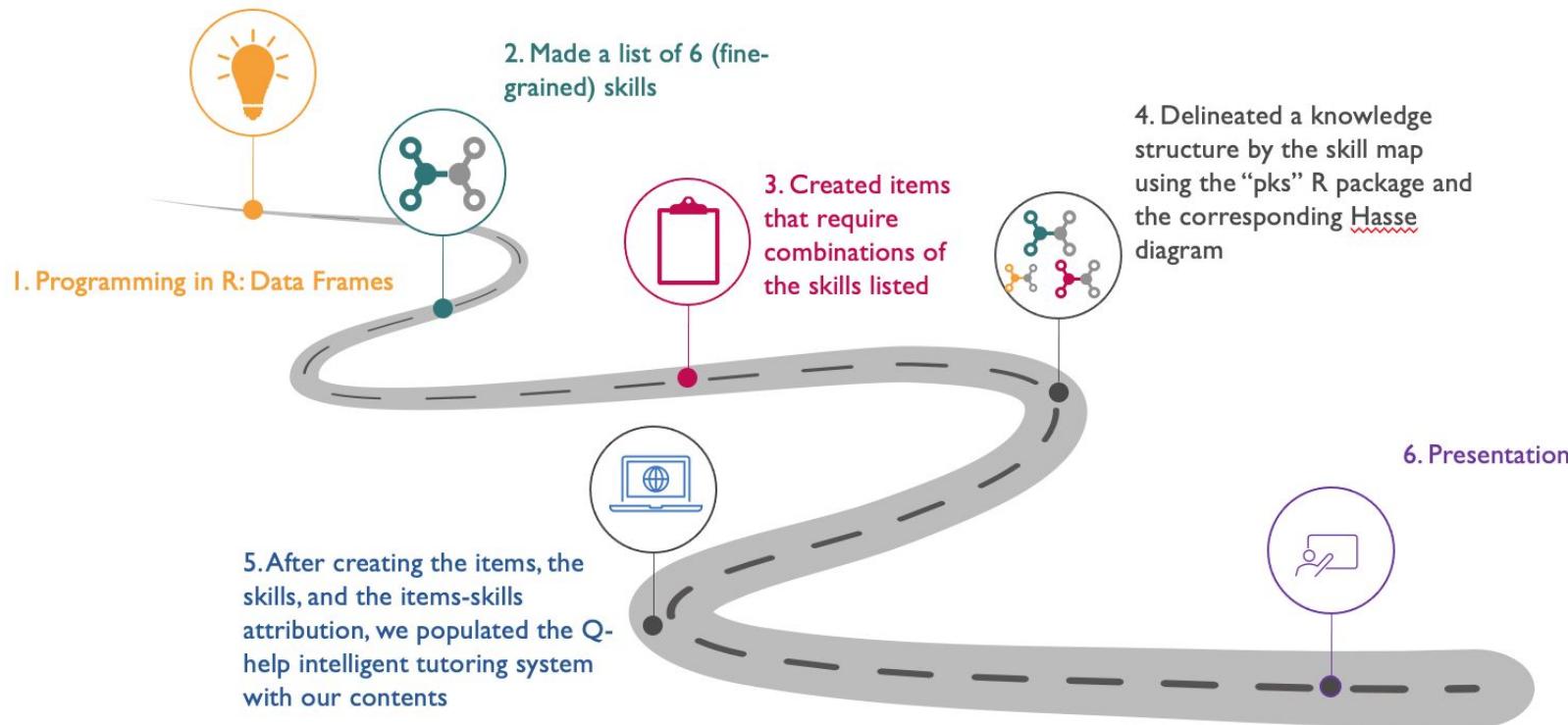


Why KST?

- Not a numerical score for assessing the learning trajectory, but **precise description** of what the student knows/does not know (skills in the tool have descriptions)
- Purely **behavioristic**, no cognitive interpretations
- To build an adaptive assessment tool called “**Dataframes in R**” based on KST in the Q-help intelligent tutoring system



Method



About exercises

Basic skills for dealing with data frames in R:

- **Sorting** elements in a numerical variable: `sort(DATA$X1)`
- **Finding** elements within a variable using relational operators: `which(DATA$X2 <= 5)`
- **Adding** columns and rows to data frames: `DATA = cbind(DATA, X3)`
- Obtaining **frequencies** in a particular column or row: `table(DATA$X2)`
- **Applying** functions by row and column: `apply(DATA, 1, mean)`
- **Merging** two data frames: `merge(DATA1, DATA2, by = "ID")`

Prior knowledge

- Reading datasets (from base R packages)
- Creating variables
- Printing objects (variables, matrices, dataframes, list)
- Finding elements in a data.frame (\$, [,])
- Deleting Elements (variables and cleaning the workspace; rm())
- Be able to handle different types of variables (e.g., categorical, ordinal and “numerical” variables);
 - a. defining class (class(), str())
 - b. finding and missing values [which(is.na(VECTOR))]
- Working with sequences (rep() and seq())
- Basic operations with numerical vectors (adding, subtracting, multiplying, ...)
- Assign value to an element (DATA[1,3] = 4)
- Coercing one class of variable to another (as.numeric, as.character)

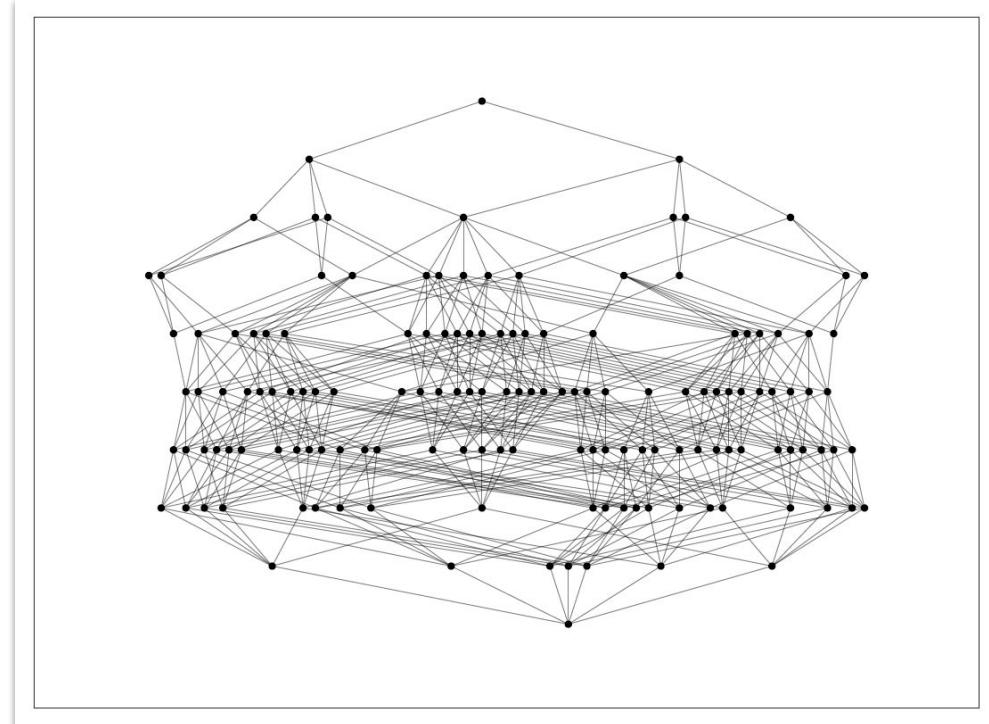


About the exercises

- 12 multiple choice items.
- 4 options.

They cover 6 skills.

Hasse diagram: relations between
Knowledge states.



What is KST?

Why KST?

Method

About The Exercises

Prior Knowledge

Test

Questions?

Test:

<http://qhelp-knowlab.eu/klab/index.php>



Questions?

Thank you for your attention!