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From a thousand learners to a thousand markers: Scaling peer feedback with Adaptive Comparative Judgement

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A method of ranking artefacts by making relative judgements, rather than absolute ones

An alternative name:

Adaptive Pairwise Ranking?

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Adaptive Comparative Judgement

- The software has been built, tested, and used; and by more than one person / organisation. (Also done for conference talk refereeing at UofG.)
- A major experiment has been done and published, using professional markers; supporting the key claims (Pollitt, 2012).
- This paper additionally reports an important qualitative datum: that the markers were highly sceptical (did the experiment for the money, at standard professional rates for marking) but came to see it as better as well as faster than their traditional way of doing marking).

https://learn.gla.ac.uk/acjdemo/

This demonstration lets you try out ACJ by comparing photographs of wildlife and flowers. (It uses a development version of the software that doesn't require a login)

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Case Study

Functional Programming in Haskell: Supercharge Your Coding

- Futurelearn MOOC (n=1000)
- COMPSCI4021 (n=80)

Future Learn

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Students received:

1. problem spec (to implement)
2. quality guidelines (to assess)
3. ranking (afterwards)
4. sample solution (afterwards)

Sample solution

```haskell
-- | The 'wordPhrase' function spells out an individual word
-- For example, "a is for apple"
wordPhrase :: String -> String
wordPhrase x = (head x) : " is for " ++ x


-- | The 'speller' function generates text for a spelling book
-- from a list of words
speller :: [String] -> String
speller [] = []
speller [x] = wordPhrase x
speller [x,y] = xPhrase ++ ", and " ++ yPhrase
  where
    xPhrase = wordPhrase x
    yPhrase = wordPhrase y
speller (x:xs) = wordPhrase x ++ ", " ++ speller xs
```

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Our ACJ Implementation: the software

- A simple IMS LTI (NGDLE) application that can be linked from Moodle, Futurelearn or any other LTI host.
- Submissions can be text, source code, PDFs, images or YouTube URLs.
- Submissions can be added by staff for a review only exercise, or by each student.
- Like *Moodle Workshop* and *Aropä*, it has separate submission and review phases

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Our ACJ Implementation: the algorithm

- Sorting done in ‘rounds’
- New pairing allocated at start of each round
- Three different ‘scoring’ methods as sort improves
- A simulation (using random errors in comparison) was used to refine the algorithm

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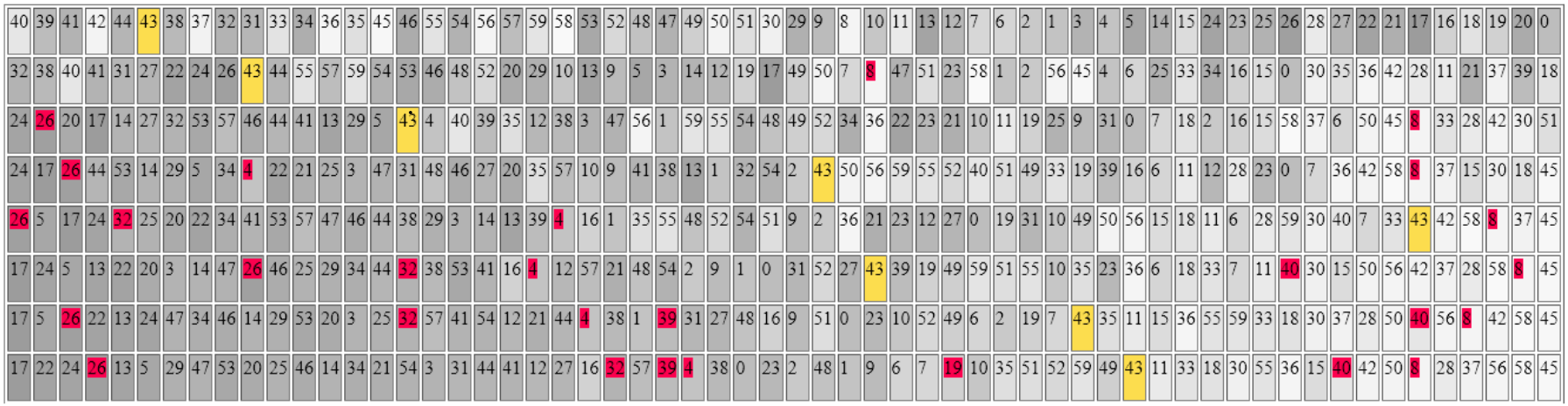

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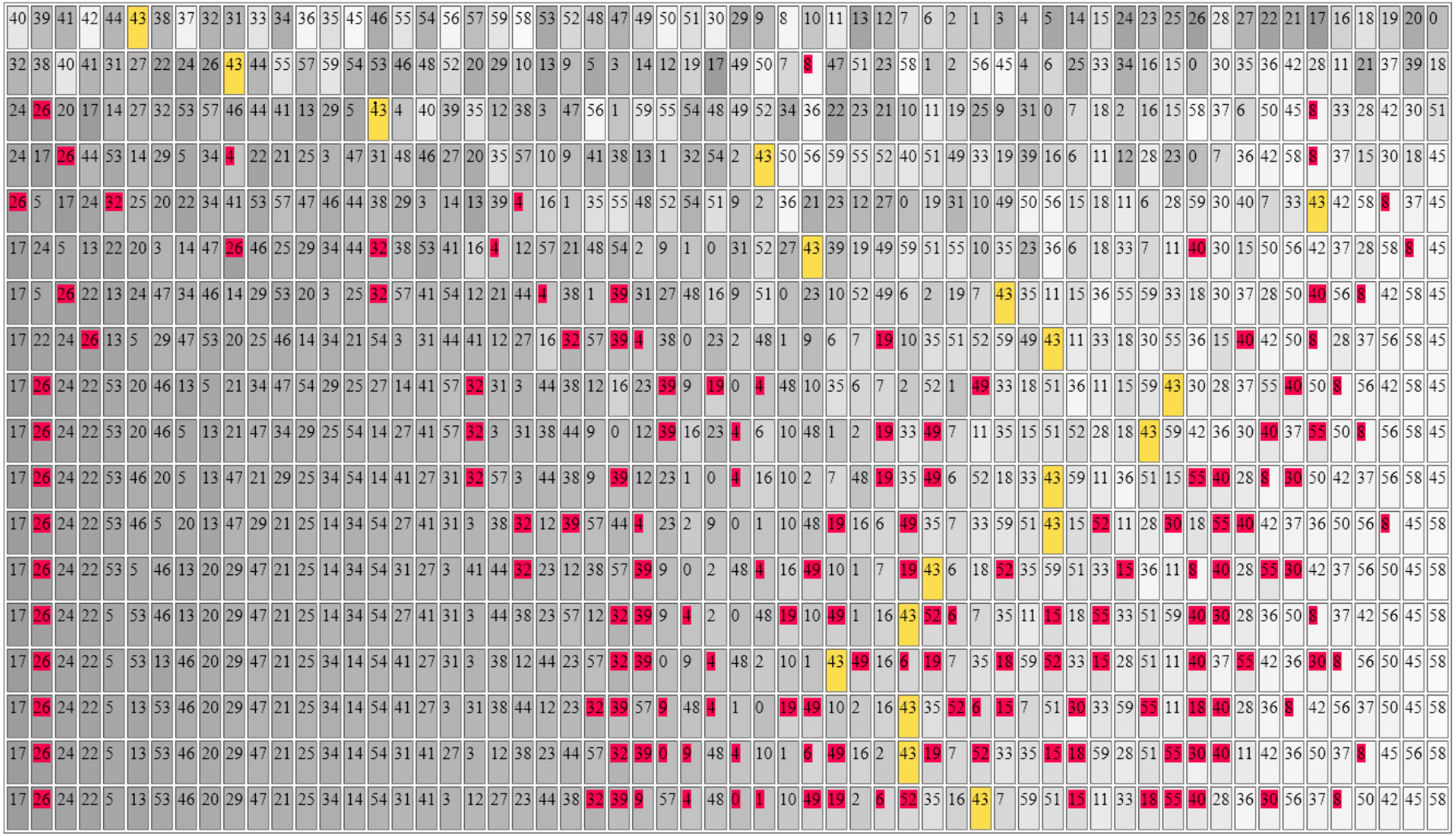

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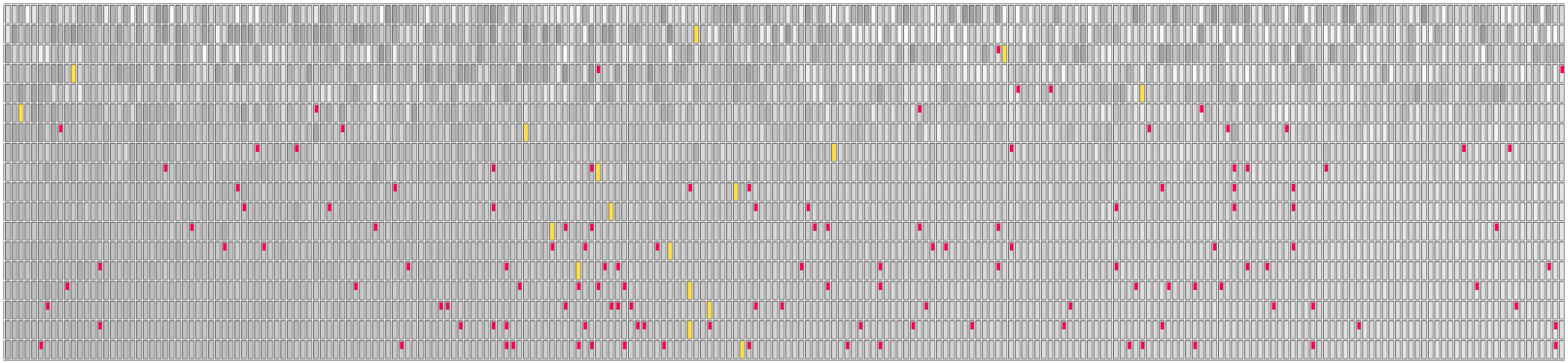
Scaling

- The same simulation with 600 ‘artefacts’
- After 17 round sorting is very good
- (Image shows middle ~1/3 with one ‘artefact’ highlighted)



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Student comments

- I can see different ways of thinking and I try to understand which one is better(more efficient) and I hope that I will be able to make my own codes more efficient in the future.
- The approach forces you to think differently. This can only be trained by doing it.
- Being able to compare your own work against lots of others lets you see roughly how well/poorly you are progressing in the course compared to your classmates as a whole.
- I think that it is a very useful exercise (both writing a code and comparing the codes of other students) and it is organised in a great way. I would like to thank the course educators.
- As you start comparing you can see the different approaches students started using and everything could be compared faster.

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Features of this approach

- Method “scales”
- Compelling naturalness
- Can be used with sets of markers
- Can be used for peer review
- Can easily mark cross-media
- Can easily be used for/with unusual, subjective, and implicit marking criteria
- Can be used by matching against exemplars

- http://www.psy.gla.ac.uk/~steve/apr/apr.html#usp

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Where next?

- Still a development / pilot tool
  - Further refinement possible
- Could this be useful in your teaching?
  - Scholarship / research
  - Not a ‘Service’

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References

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- Thurstone, L. L., 1927. A law of comparative judgment. *Psychological Review, 34*(4), pp.273-286.
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