# Slides with slide steps

**Modules that have slide steps**

10 different modules with slide steps were identified. All belong to the challenge-newbies-2018 challenge. For most of these problems (exc. w4p2 and w5p2), all the slides have steps that can be completed.

1. Challenge-newbies-2018-w1p1
   * Total: 13 slides
   * Total number of interactive slides: 13
   * Interactive slides: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12]
2. Challenge-newbies-2018-w1p2
   * 14 slides
   * Total number of interactive slides: 14
   * Interactive slides: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13]
3. Challenge-newbies-2018-w2p1
   * 10 slides
   * Total number of interactive slides: 10
   * Interactive slides: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
4. Challenge-newbies-2018-w2p2
   * 12 slides
   * Total number of interactive slides: 12
   * Interactive slides: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
5. Challenge-newbies-2018-w3p1
   * 12 slides
   * Total number of interactive slides: 12
   * Interactive slides: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
6. Challenge-newbies-2018-w3p2
   * 16 slides
   * Total number of interactive slides: 16
   * Interactive slides: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]
7. Challenge-newbies-2018-w4p1
   * 23 slides
   * Total number of interactive slides: 12
   * Interactive slides: [0, 1, 2, 3, 4, 5, 6, 7, 8 ,9, 10, 11]
8. Challenge-newbies-2018-w4p2
   * 24 slides
   * Total number of interactive slides: 14
   * Interactive slides: [0, 1, 2, 3, 4, 5, 6, 7, 8 ,9, 10, 11, 12, 13]
9. Challenge-newbies-2018-w5p1
   * 16 slides
   * Total number of interactive slides: 16
   * Interactive slides: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]
10. Challenge-newbies-2018-w5p2
    * 23 slides
    * Total number of interactive slides: 11
    * Interactive slides: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
    * Total number of interactive slides: 14
    * Interactive slides: [0, 1, 2, 3, 4, 5, 6, 7, 8 ,9, 10, 11, 12, 13]

# Slide Completion Insights

* Students complete problem slides at a significantly higher rate (more than double) than step slides (slides with steps). (diamond instead of circle)
* Students tend to skip slides that only have narration (also counted as a step slide), step slides that are similar to each other, and step slides that are basic – e.g. changing values.
* **Hypothesis:** 
  + For most slide steps, you do not see a general trend of increased / decreased completion as you progress along the slides.
  + Students tend to be discerning in the slides that they choose to complete. They do not tend to waste time completing slides that are simple or similar to slides that they have encountered before.

# Relating Slide Completion with Outcomes

Q: How are we going to define successful completion?

Completion: Diamonds are problems and all the others are regular slides. Any sort of metric for completion needs to factor in problems. Problems are paired up.

We could differentiate between how we do on first set of problems, and then how we do overall across all 4 problems.

* Not attempted
* Running code but encountering an error
* submitting code but getting an error
* Third outcome is to pass the test

You could have 16 possible outcomes. Most of the outcomes would settle into 4 or 5 of the 16 outcomes.

NOTE: There is a limit to how many times you can submit a code before you start losing points. This encourages students to run code before submitting.

NOTE: In some cases there will be no difference between students who run code and get error and those who submit code and get error.

If students never get past the run step, it suggests that they gave up on syntax level. If they never got past submitting code, suggests that they never got past the correctness criteria.

Work out how many of each we have. If we work out these events are too small we could aggregate.

Keep in the back of your mind: ultimately, be able to make some statement about the value of the attempted interactive steps. **Broadly, does having those interactive slides improve learning outcomes.** Right now, we narrow it down to does completing interactive slides improve outcomes for a particular problem. We have hidden away assumptions about a student’s knowledge beforehand.

**What extra information would be helpful to give a more refined answer.**

It is useful to think: is this answering this question. What more information do I need to answer that information better. That self-reflection is useful for the paper and feed into the further work.

**Skip next meeting:** Send these notes in advance before the meeting. Make everything available in a Dropbox / OneDrive.

Across 2 weeks:

1. Improve analysis of the data is the first thing. Build up your X’s and Y’s.
2. Put them into a classifier and evaluate them – Naive Bayes.

Gareth

* On subcommittee
* Have a GM for the Open Data Regulation – might be a better fit for the regulation subcommittee
* Really excited to learn and get involved

Process:

1. Find out how many you get of each outcome
2. Roll in similar ones together – rather than classifying things that are quite rare

Each student has an outcome (Y). You have a vector X of what did they do at each of the slides prior.

After this, look at the predictive power of completing a particular slide vs the outcome. We could simplify the problem by looking at what the predictive power of passing the first problem is.

NB: Could think of activity of each slide is independent – use Naive Bayes assumption. Can we build a predictive classifier of some of these outcomes? In reality, the activities would be correlated.

1. Module completion: Of the students who completed a particular slide for a given module, how many passed the module (got all problems within the module correct)?
2. Problem completion: Of the students who completed a particular slide for a given module, how many passed both of the two problems that directly proceed the slide?
3. Overall completion: Of the students who completed a particular slide for a given module, how many passed each of the problems in the module, evaluated individually?

Chart, bar chart

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Colour these by the different outcomes. 16 colours for the 16 options. For each of the slides plot how many of the outcomes are in this.

Think about what the relevant information that you should use when considering the different outcomes?

You would want to compare it to the number of people who didn’t complete that slide. Any student who makes any sort of attempt. Look at the outcome of that problem look at that activity and their slides prior.

Criticism: Students aren’t coming to these slides with the same background information. Ideally, we want to identify a learning effect from doing these slides.

**Comments:** Slides 4, 5, 10, 12 are all problem slides. Other slides receive a more even distribution of slide completion. Slide 0 contains narration only and receives fewer completions. Would be interesting to know if it’s the same half of students.

Q: Would be interesting to predict how well do students perform on the worst and most complicated problem? Note: get a lot of attrition. Only a quarter of students get to the last module. It would be interesting to know if it’s the slide completers who get to the last slide, or the ones who skipped stuff.

It would be interesting to see if it’s the people who don’t do the slides who complete the actual problem. Says something about the value of those slides.

Addition: We could look at past courses where there wasn’t an interactive slide. Once we have the stats for this course we could re-apply the same analysis to a different course without interactive slides and deduce any intervention effects.

Chart, bar chart, histogram

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**Comments:** Slides 5, 6 and 11 are problem slides. Slide 10 is also a problem slide, but 10 is slightly easier and less complex than 11. Slide 3 is a very simple, non-problem slide. Some people may not complete if they deem it to be a lot easier.

Chart, bar chart

Description automatically generated

**Comments:** Slides 3, 4 are problem slides, as are slides 8, 9.

Chart, bar chart

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**Comments:** Slides 2, 6 are quite simple examples. Just need to run instead of changing things up. Slide 10 is a problem, relatively simple.

Chart, bar chart, histogram

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Comments: Slides 5 and 6 are problem slides, as are 13 and 14. However, while Slides 13 and 14 are different, Slide 6 is very similar to Slide 5. Slides 7-12 are all narration slides.

Chart, bar chart

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Comments: Slides 5 and 10 are the problem slides.

Chart, bar chart

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Comments: Slides 7-8 are similar problem slides but 7 has higher proportion of views. Slides 11-12 are problem slides.

Chart, bar chart, histogram

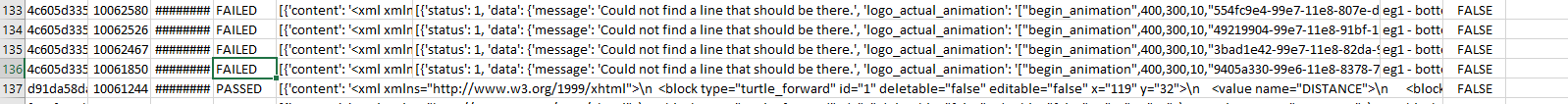
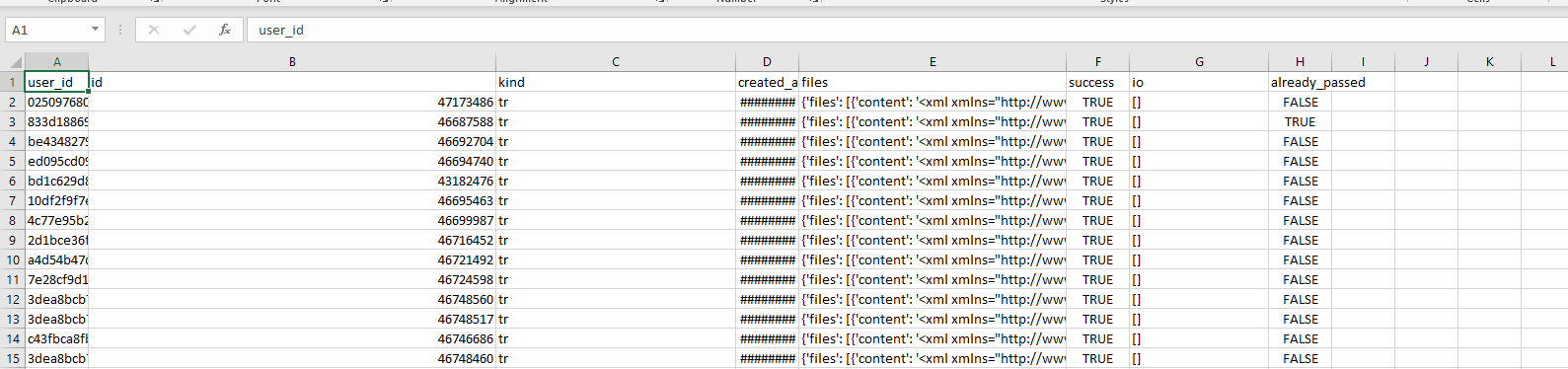
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Comment: Slides 7-11 all narration. Students tend to do harder exercises that appear later, as well as harder slide steps.

Chart, bar chart

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Comments: Slides 4 and 5 are both problem slides but similar. Slides 6 and 7 are easy slide step examples that involve changing values.

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