The goal of this assignment is to use meta-analytical statistical techniques, both for their original use, and to assess the goodness of behavior detectors developed using multiple data points per student, for multiple students.

Problem 1.

In sheet "P1" of the assignment data, you will see summary statistics from a variety of studies, all of which attempt to answer the same question – "Does the SnorkelTutor improve student learning?". Give your best estimate of what the answer to this question is, across studies, including your numerical estimation of the confidence of this answer (e.g. a p-value). Show all work, and if you do this in a software package of some sort, indicate both the code or commands you used, and the results. You may solve this problem in any software package you wish, including statistical packages, Java software, Excel, and mathematics software.

Problem 2.

In sheet "P2" of the assignment data, you will see summary statistics from a variety of studies, all of which attempt to answer the same question – "Does more time spent using the YodelTutor improve student learning?". Give your best estimate of what the answer to this question is, across studies, including your numerical estimation of the confidence of this answer (e.g. a p-value). Show all work, and if you do this in a software package of some sort, indicate both the code or commands you used, and the results. You may solve this problem in any software package you wish, including statistical packages, Java software, Excel, and mathematics software.

Problem 3.

It has come to your attention that the authors of

Smurf, P., Smurfette, L., Smurf, B., Smurf, H. (2010) Does the SmurfingTutor improve learning? *Smurfology Review Letters B, 27* (2), 117-124.

excluded from analysis two studies that you believe should have been included, shown in sheet "P3". How does including these two studies change the results of that earlier paper?

Problem 4.

You have built a behavior detector that can identify whether a student was "Fnording" as they use the tutoring software. Is the A' value for this detector significantly better than chance? Show all work. Hint: See code at http://users.wpi.edu/~rsbaker/edmtools.html

BONUS: Any student who succeeds in producing fully correct answers on all four problems (according to Ryan's definition) gets the bonus.