

### Black Box Bonus (B3!)

If you are interested in 3 bonus points, first follow these steps:

- a) Our current data for the Black Box is as follows:

Input (I)	Output 1 (O1)	Output 2 (O2)	Output 3 (O3)
2	3	1	NO
1	2	0	NO
6	6	0	YES
3	2	0	NO
10	3	1	YES

- b) You will run an additional experiment by sending Ben one number to input into the Black Box (send an email to [kerrb@uw.edu](mailto:kerrb@uw.edu) with the subject “Black Box Experiment 1 [YOUR NAME]” and include the input in the message). Ben will send you the result.
- c) Based on **all** the data (both the table above and your experimental result), generate multiple working hypotheses (at least two) about how the Black Box is processing your input to generate outputs. Keep these hypotheses for your brief report (see below).
- d) Propose a critical test (integer to input) to *distinguish* your hypotheses. Keep this for your report.
- e) Run the critical test by sending Ben a number to input into the Black Box (send an email to [kerrb@uw.edu](mailto:kerrb@uw.edu) entitled “Black Box Experiment 2 [YOUR NAME]” and include the input in the message). Ben will send you the result.
- f) Think about all the results and reformulate your hypotheses if needed. Keep all this information for your report.
- g) If needed, you can run one last experiment by sending Ben a number to input into the Black Box (send an email to [kerrb@uw.edu](mailto:kerrb@uw.edu) entitled “Black Box Experiment 3 [YOUR NAME]” and include the input in the message). Ben will send you the result.

*The bonus points will be awarded based on a brief report that you turn in. This report should be no longer than 3 pages (less is fine) and should include:*

1. Your preliminary data (the results of the class data and your first experiment in Table form)
2. Your multiple hypotheses based on the preliminary data (label these H1, H2, H3...)
3. Your critical test (explain why this test is well-suited for distinguishing your hypotheses—a table giving expected outcomes under each hypothesis can be helpful here).
4. The results of your critical test and the implications for your hypotheses.
5. If you reformulated your hypotheses, include that information, your additional experiment, and its rationale.
6. A brief discussion of all the data and your current working model for the Black Box.
7. A brief (no more than 1 paragraph) discussion of whether you found the Black Box to be a helpful metaphor for how we approach and study systems scientifically (please include general comments, questions, or suggestions).

The Black Box Bonus Report will be due on Monday, Dec. 11 by 11:59pm. Please email this report to Ben at [kerrb@uw.edu](mailto:kerrb@uw.edu).