Black Duck example with both time variation & individual variation in weekly survival rates

1. Save the files (need the dbf and fpt to open in MARK; need the inp if want to see input)
2. Examine the input file & consider how data are entered and how much data are present
3. What would an encounter history look like if we put out newly radio-marked birds in week 7 who survived both week 7 & 8?
4. Why might it be useful to release new birds as the study goes along?
5. Open the file in MARK
6. Open the '.' model & examine the average weekly survival rate.
    a. Take the log-odds of that rate and compare it to the model's beta estimate
    b. What's the probability of surviving all 8 weeks? It's a derived parameter
    c. Take a look at the full output
7. Notice what happens if we run S(t) with a logit link vs a sine link – why and what to do?
8. Compare SE's for top model and S(t) model –
    a. which are bigger and why
    b. which model is more useful to a biologist and why
9. Could you come up with a different design matrix for the S(t) model that would yield the exact same estimates of weekly survival? Why might that be useful?
10. Open the 2nd-best model
    a. Consider the design matrix – note how we handle individual covariates differently than time-varying covariates that are the same value for all individuals for a given interval
    b. Consider the beta estimates – what do you see?
    c. Plot S_6 against *condix* and see if that matches what you saw with the beta estimates
    d. What value of *min<0* was used in the model when you made the plot?
    e. How much improvement in the -2logL was there when *Age* was added to the top model? What does this tell you about the importance of *Age*? Do the beta estimates support this? Why then is this model within 2 AICc units of the top model?
11. Retrieve the *S(min<0+Age*Weight)* model. Consider the functions available for manipulating the Design Matrix
    a. Open the help file, search for "design matrix", and click on "functions" in the help page
    b. There are quite a few so you can do some things with the data once it's in MARK
    c. What does the *Age* covariate do in this model?
    d. What does the interaction mean in this model?
    e. What would it mean if *Age* were a continuous covariate?
12. Look at the output for the top model
    a. What do the beta's tell us?
    b. What do the real parameters vs the covariate values tell us?
    c. What does the var-cov matrix look like for the beta estimates?
    d. Does this look like a great dataset for evaluating the temperature effect?
    e. What is the probability of surviving all 8 weeks?
13. Now that we have individual covariates in the model, what happens to our ability to model average the real parameters? How might we do it in a reasonable or useful way? Look at model averaged estimates.
14. What inferences can be drawn from this study?