P8110: Applied Regression II
Homework #8 [14 points]

NOTE: Use robust standard errors in GEE.

In a study of septic patients, each patient's temperature was measured at baseline, and 2, 4, and 8 hours after entry into study. Patients were randomly assigned to two treatment groups at baseline. Patients' APACHE scores were also measured. The data are saved in "HW8.csv". The columns of variables from left to right are:

ID	= patient ID
temp	= patient's temperature
treatment	= 1 - treatment B, 0 - treatment A
apache	= APACHE score at baseline
time	= 0, 2, 4, 8 hours after entry into study

1. Fit a GEE model with temperature as outcome and time, treatment, and their interactions as covariates. Write the mean response of the GEE model and treat time as a categorical variable. [2 points]

2. Try different working correlation structures (CS, AR(1), and UN) for the GEE model in (1). Which model yields the best QIC value? Show the SAS code and relevant SAS output. [2 points]

3. Use the model selected in (2) to test whether the trajectory of temperature over time is different between the two treatments. Write down the hypothesis, test statistic, p-value, and conclusion. [3 points]

4. Use the model selected in (2) to estimate the mean temperature change from baseline to two hours after entry into study for patients in treatment A group and those in treatment B group, respectively. [4 points]

5. Calculate the difference of the two estimates in (4). Denote the difference as DIFF. Which β coefficient does DIFF represent? Interpret this β coefficient. [3 points]