Midterm EPI 853B

Name: _____

The exam is strictly individual. You can consult any materials you like but you cannot discuss your exam with anyone other than the instructor. You have 80 minutes to complete the exam.

For each question report in this document your results (in a clean and readable manner) and conclusions.

Provide a separate ASCII file with your code with appropriate comments indicating which question the code pertains to.

At the end of the exam e-mail me (gustavoc@msu.edu) both documents.

For all the questions of the exam you will use the Gout data set. A binary version of the data set is available at

https://github.com/gdlc/EPI853B/blob/master/gout.RData

Once you download this data, you can get into the R-environment using

```
load('~/GitHub/EPI853B/gout.RData')
```

Problem 1. Ordinary Least Squares Regression using lm

1.1 Using the Gout data set regress Systolic blood pressure (SBP) on sex, race and age, report your results (model R-sq, estimates, SE, p-values) and summarize your findings.

1.2 Report the estimated expected SBP for each of the rows of the table.

Predictors			Predictions
Age	Sex	Race	
50	M	W	
50	M	B	
50	F	W	
50	F	B	
65	M	W	
65	M	B	
65	F	W	
65	F	B	

2. Compute and report OLS estimates and SE for the regression of problem 1 using matrix operations.

Report your results here

3. Logistic regression of Gout (Yes/No) on Sex, Race and Serum Urate

3.1. Fit the model using glm(), report your results and summarize your findings

3.2. Fit the same regression via maximum likelihood using the optim() procedure. Reports the results obtained and comment on similarities/differences with those reported in 3.1

3.3. Did your ML procedure of 3.2 converged? How do you know that?

Converged? Yes/No

How do you know?

3.4. Estimate the SE of estimates of coefficients using 3000 Bootstrap samples. Report your results and compare them with those reported by glm (3.1).