BUS 735: Business Decision Making and Research
In-class Exercise: Logistic Regression

This exercise uses data on job satisfaction for 218 Arab and Jewish social services workers in Israel. Participants were asked background information (gender, age, marital status, education, experience, etc) and were given a set of questions to measure their overall satisfaction with their job, as well as their satisfaction specifically regarding their colleagues, supervisors, salary, and promotion. The goal of this assignment is to learn what factors lead employees to be more likely or less likely with their job.

The data can be downloaded and loaded into R with the following command:

```
load(url('http://murraylax.org/datasets/jobsat.RData'))
```

The variables in the data set that are used in this assignment include:

- `Satisfied`: a binary variable = 1 if person is overall satisfied with their job, 0 otherwise
- `Age`: age of the employee
- `Female`: binary variable = 1 if person is female, 0 otherwise
- `Jewish`: binary variable = 1 if person is Jewish, 0 otherwise
- `WorkLoad`: a numerical measure on a scale of 6-20 of the size of employees workload, where larger numbers indicate a larger workload
- `Married`: A binary variable = 1 if person is married, 0 otherwise (never-married, divorced, or widowed)
- `EduMasters`: A binary variable = 1 if person has a master degree, 0 otherwise
- `Tenure`: Number of years experience at current job

Run a logistic regression predicting job satisfaction using all of the above explanatory variables.

1. Fo which variables is there evidence that they influence whether or not a person is satisfied in their job? Conduct the appropriate hypothesis test for teach explanatory variable.

2. What is the marginal effect of age on the probability someone is satsified with their job?

3. Consider an employee who is male, 30 years old, has 2 years experience, is Jewish, married, and has a an undergraduate education, and has a workload measure equal to 12. What is the probability he will be unsatisfied with his job?

4. Consider an employee similar to the one part (c). What is the predicted impact that being married has on the probability he is satisfied with his job?

5. Consider an employee similar to the one part (c). What is the predicted impact that being male has on the probability he will be satisfied with his job?

6. Compute a 95% confidence interval for the marginal effect of tenure on the likelihood that someone is satisfied with their job. Use the standard errors as provided, and a value for z equal to 1.96 to compute confidence intervals.

7. Compute the confusion matrix and comment on the fit of the model.