STAT 320: HW 4 Due: Monday 3/3/14 at 4:40pm

Instructions

- Bring a hard copy of your homework to class on the due date. Half credit for homework turned in after 4:40pm on the due date, no credit for homework turned in after the due date (because solutions will be posted).
- Also bring a hard copy of your R Script to class on the due date. The script should be self-contained, so someone else should be able to run it as is and get your results. The script should also be well-commented, so it is clear which code goes with which question.
- You may discuss these problems with each other verbally, but must write up the answers on your own, and may not share or show your answers to anyone else (this applies to code as well).
- Please be concise!

I've posted sample R code on subclassification with the Shadish data here. A template for estimating propensity scores, subclassification, and matching is available here. To access the new functions for our class, please rerun this line of code again:

```
source("http://stat.duke.edu/courses/Spring14/sta320.01/CausalInference.R")
```

Exercises

1. (10 points) Using the propensity scores you already estimated in Homework 3, use subclassification to balance covariates between the NJ and PA restaurants. Explain your process, report the breaks you decide on for your subclasses, show a plot of the propensity scores with these breaks, and show a love plot with the improvement in covariate balance.
2. (5 points) Using your subclasses from Question (1), estimate the effect that raising the minimum wage had on employment in the fast food industry. Give a point estimate, a confidence interval, and a p-value for whether it had any effect, and interpret these results in context.
3. (10 points) Using the Lalonde data from class, use matching to improve covariate balance. Include your thought process, how you ultimately decide to do the matching, and a love plot showing improvement in covariate balance.
4. (5 points) Using your matches from Question (3), estimate the causal effect that participating in the job training program has on wages. Give a point estimate, a confidence interval, and a p-value for whether it had any effect, and interpret these results in context.