**STAT 40001/MA 59800 Statistical Computing/ Computational Statistics Fall 2013**

**Test 1- Form 1**

**Name:**

**PUID:**

*This exam consists of 5 questions of worth 100 points. Please provide the R codes that have been used to perform the calculations and graphics along with the interpretation of the output. It is important that you distinguish between the R code and the description. You may use different fonts or different colors.*

**Q.N. 1)** **Short answer questions**

a) Create a vector named countby2 that is a sequence of 1 to 100 in steps of 2.

b) Provide R code to create the sequence 5, 10, 10, 15, 15, 15, 20, 20, 20, 20, 25, 25, 25, 25, 25.

c) Generate 100 random numbers from a normal distribution with mean 10 and standard deviation 5. Please print first 5 observations.

d) Generate 50 random numbers form a t- distribution with 18 degrees of freedoms. Please print first 5 observations.

e) The brightness dataset in the UsingR package contains the information about the brightness of stars in a sector of the sky. How many observations are included in the dataset? Please print first 5 observations.

**Q.N.2)** The chickwts data are collected from an experiment to compare the effectiveness of various feed supplements on the growth rate of chickens and are available in the base package.

a) How many variables are in the database?

b) Display the information by creating side-by-side boxplot by choosing an appropriate variable. Please make sure that you have appropriately labeled the axes and use suitable title of the boxplot.

**Q.N. 3)** Nine subjects were assigned to group A and nine subjects were assigned to group B. The two groups using different training methods to improve the subjects’ read speed. The results are as following:

A: 500 230 505 404 390 200 750 700 490

B: 355 388 445 469 560 502 515 430 480

Read the data above to the R system. Perform t-test and nonparametric test to compare the two groups A and B. Check if it is appropriate to use t-test. Compare the results of t-test and nonparametric test.

**Q.N. 4)** Grades of students taking a Statistics course and a Mathematics course simultaneously is given below

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Statistics Grades/Math Grades | A | B | C | Other |
| A | 25 | 6 | 17 | 13 |
| B | 17 | 16 | 15 | 6 |
| C | 18 | 4 | 18 | 10 |
| Other | 10 | 8 | 11 | 20 |

Are the grades in Statistics and Mathematics course dependent? Perform the chi-square test of independence.

**Q.N. 5)** An article entitled “Assessing claims made by a pizza chain” by Peter K. Dunn appeared in the Journal of Statistics Education, Volume 20, Number 1 (March 2012). The data provides the diameters of 250 pizzas, 125 each from two pizza chains (Domino’s or Eagle Boys) in Australia for a variety of crust types and toppings. The diameter of the pizzas is given in centimeters. Please visit

[http://www.amstat.org/publications/jse/jse\_data\_archive.htm](http://www.amstat.org/publications/jse/jse_data_archive.htm  and obtain pizzas.CSV)

[and obtain pizzas.CSV](http://www.amstat.org/publications/jse/jse_data_archive.htm  and obtain pizzas.CSV) data file. Please note that 192 and 193 observations are not included (for unknown reason as author cited.)

1. Test whether the Eagle Boys ThiNCrust pizzas are 12 inches (30.48cm) in diameter.
2. Are Eagle Boys Thin crust pizzas bigger than Domino’s ThiNCrispy crust pizzas?