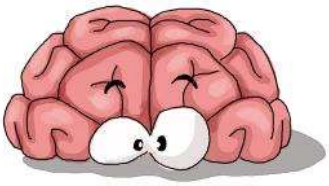
WST211
Practical 5



Date: 1 April 2016
Due: 11 April 2016

Instructions:

- **Answer all questions.**
- **Hand in a typed document with your answers which includes the following:**
- **Table of contents**
- **Answers**
- **SAS program**
- **SAS output**
- **Attach a copy of the SAS program in an appendix.**
- **Attach the relevant outputs of the SAS output.**
- **According to the question, make interpretations about the SAS output.**
- **Round the answers to 3 decimal places.**
- **Hand in a typed document with your answers and include the SAS programs.**

Questions

1. An office has 16 employees, ten men and thirteen women. The manager chooses ten at random to attend a short course on quality improvement. Use the RAND ('HYPER', N, R, n) function (see Help in SAS) and generate 100000 values for this experiment. Use this to determine empirical values for the following:

   (a) The probability that an equal number of men and women are selected?
   (b) The probability that more women than men are chosen?

2. Assume that the time (in hours) until failure of a transistor is a random variable X ~ EXP (120). Use the RANEXP function in SAS with a seed value of 35 to generate 50000 values from the EXP (120) distribution. Calculate empirical values for the following:

   (a) $P(X > 130)$
   (b) $P(90 \leq X < 170)$
   (c) $E(X)$
   (d) $Var(X)$

3. The hardness of a certain alloy (measured on the Rockwell scale) is a random variable. Assume that X ~ UNIF (60,90). Use the RANUNI function in SAS with a seed value of 54 to generate 50000 values from this distribution. Calculate empirical values for the following.

   (a) $P(65 < X < 80)$
   (b) $E(X)$
   (d) $Var(X)$

4. Write a SAS program, using the CDF and QUANTILE functions in SAS (see Help in SAS for syntax) to obtain the following results.

   (a) $X \sim N(0, 1)$, determine $p_{0.78.}$
   (b) $X \sim N(15,25)$, determine $p_{0.40.}$
   (c) $X \sim BIN(80, 0.7)$, determine $P(X \leq 50)$.
   (d) $X \sim N(25, 32)$, determine $P(20 < X < 28)$.
   (e) $Z \sim POI(32)$, determine $P(Z < 28)$.
   (f) Let $X \sim GAM(5, 3)$. Calculate

      (i) $P(4 < X < 20)$.
      (ii) $P(X > 15)$.
      (iii) c and d such that $P(X < c) = 0.05$ and $P(X > d) = 0.01$.