

**Paper Code:** BCADSC 2.8

**Paper Title:** Numerical and Statistical Methods Lab

**Teaching Hours:** 3 Hrs / Week

**Marks:** Th-40+IA-10

**Credits:** 1

**NOTE:** Section A must be implemented using C Language and Section B using SPSS.

**Section A:**

1. Write a program to check whether the given matrix is singular or not.
2. Write a program to find roots of an equation  $f(x)=0$  using Bisection method.
3. Write a program to find roots of an equation  $f(x)=0$  using Regula-Falsi method.
4. Write a program to find roots of an equation  $f(x)=0$  using Newton-Raphson method.
5. Write a program to solve the system equation  $Ax=b$  using Gauss Elimination method.
6. Write a program to solve the system of equation  $Ax=b$  using Gauss Seidel method.

**Section B:**

1. Open a new data set in SPSS

- Create a nominal variable called `cat_dog` that has a width of 3 with 0 decimal places. The label should be "Do you like cats or dogs better?". The values should be 1 for cats and 2 for dogs (or vice versa). Do not worry about missing data codes.
- Create a scale variable called `neatness` that has a width of 8 with 3 decimal places. The label should be "Eric Cartman's Neatness Scale (higher = neater)". There will be no value labels.
- Enter data for the following cases
  - case 1 prefers cats and has a neatness of 4
  - case 2 prefers dogs and has a neatness of 3
  - case 3 prefers dogs and has a neatness of 7
  - case 4 prefers dogs and has a neatness of 2
  - case 5 prefers cats and has a neatness of 5
  - case 6 prefers cats and has a neatness of 1
  - case 7 prefers cats and has a neatness of 3
  - case 8 prefers dogs and has a neatness of 6
- Change the neatness of the second case from 3 to 6, like you would if you discovered a data entry error.

2. Create a data set in SPSS for the following data:

Group	Gender	Hw1	Hw2	Hw3
expt	Male	92	84	93
expt	Female	77	84	85
expt	Male	87	86	81
expt	Female	89	90	93
expt	Male	64	73	78
control	Female	81	84	93
control	Male	83	90	91
control	Female	84	88	86
control	Male	82	80	78
control	Female	96	91	88

- Using the Frequencies option, find the mean, median, mode, quartiles, 95th percentile, variance, standard deviation, minimum, and maximum of Hw1, Hw2, and Hw3.
- Using the Descriptives option, find the means and standard deviations of Hw1, Hw2, and Hw3.
- Using the Compare Means --Means procedure, find the means on Hw1, Hw2, and Hw3 for everyone, for the experimental group, for the control group, for men, for women, and for all combinations of gender and group.

3. A researcher has created a data table showing the anthropometrical measurements of tribal subjects under each of the four social categories, namely GM, OBC, SC and ST as shown in table.